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Editorial

The Cross-Cultural Approach to Medical Practice
by
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Elsewhere in this issue we publish two articles (based on papers presented at the Annual General Meeting of the Malaysian Medical Association earlier this year) which touch on the need for a cross cultural approach to medical practice in this country, Paul Chen dealing with the problem as it affects the Malay rural communities and Fred Dunn the Malaysian Chinese.

The Medical profession in this country, following on the traditions of practice laid down in the United Kingdom, has frowned upon registered medical practitioners having any form of professional contact or liaison with the non-registered. The practitioners of folk medicine are not under the same type of medical control and often do not hesitate to advertise themselves in the lay press. The general attitude of many of our qualified medical men towards these "quacks" is to completely ignore their existence or resort to attack by ridicule or exposure of their lack of scientific knowledge.

Nevertheless, there is a considerable body of followers of their own traditional medical practices among the ethnically heterogenic population of this country. This is not surprising. Persons born into a particular society are conditioned and moulded by the customs that comprise its cultural heritage which in turn determines the health patterns of that society and the health behaviour of the people. It must be realised that while relatively superficial aspects of culture may be chaged readily, others, especially the deep-rooted basic values of attitudes, habits and beliefs can only be changed more slowly and with difficulty.

It is known that in recent years there has been a shift in attitude in favour of modern scientific medicine but that is no indication that the older beliefs have been supplanted by the new. Surveys show that the people attending our hospitals and health clinics may simultaneously resort to self medication, consult a temple spirit medium, a 'sinseh' or 'bomoh' and wear charms and amulets to rid themselves of diseases, especially the chronic forms.

If we have failed to help the people in our midst to adequately improve the quality and standard of health the fault is largely ours. Applied social anthropologists have pointed out that if doctors wish to have full acceptance of modern medical science and enjoy its benefits to the maximum by people grown up in belief in folk medicine, then we must learn to think like the members of that community though not accepting the beliefs as scientifically valid. When the doctor does not recognise the beliefs and practices prevailing among the people he deals with and persists in seeing them as evidence of ignorance or superstition, he will fail to achieve satisfactory results. This is particularly evident in preventive medicine which prescribes a change in health habits. The health officer should base his recommendations only after having studied the interactions between modern medical science and traditional beliefs and practices. The acceptance or otherwise of new modes of behaviour is largely dependant on the way in which they fit into the modes of thought and action of the people concer ned.

The crowded medical undergraduate curriculum has little opportunity to include the study of traditional systems of medicine and the beliefs and practices of our heterogenous population. Our medical practitioners, however, would do well to combine their knowledge and technical skill with an understanding of the cultural beliefs that premeates and influences the behaviour of their patients in respect to illness, our health officer should certainly acquire during their training period some knowledge of the folk medicine of the people they wish to influence.

Socio-cultural foundations of Medical Practice in Rural Malay Communities

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Introduction

One of the chief impediments to the improvement of health in many developing countries is not so much the lack of technical knowledge as the inability to apply it on traditional cultures to produce the desired effect. This inability to apply technical knowledge is related to the fact that attempts to alter people's way of life, beliefs, and customary behaviour are never made in *vacuo,* but in competition with, and against the resistance of deep-rooted and time hallowed beliefs and practices. Too often our efforts to provide health care are not meaningful to individual members of traditional cultures. However much can be achieved if the health worker consciously and systematically sets out to study, understand and manage the interactions between modern science, and traditional and religious beliefs and practices, and builds his practice upon the firm foundations of socio-cultural rapport. The following paper outlines the socio-cultural foundations upon which medical practice in rural Malay communities may be based.

Malay culture

Present day Malay culture can be diagrammatically depicted as interactions between Islamic ideals, inherited traditional beliefs and modern scientific knowledge which form the three points, A, B, and C, of a hypothetical triangle (Mohd. Taib, 1972).

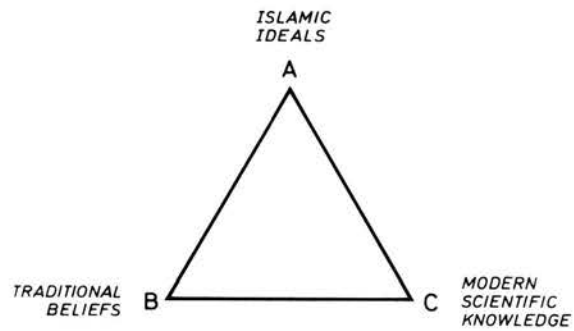

Figure 1. Graphic representation of present day Malay culture

Islamic ideals are the pre-eminent goals towards which members are supposed to strive. But in reality they have to take into account traditional beliefs as well as modern scientific knowledge. Conflicts between Islamic ideals and traditional beliefs (line AB) is a constant feature of Malay life. For example the exhortations in many *jampi* (incantations of the *bomoh*) refer to Hindu Gods (Winstedt, 1961). Such conflicts may be resolved by an injunction made in the name of Islam prohibiting the practice of a certain local custom; or certain reinterpretations are made so as to give "Islamic" meaning to a traditional practice; or the traditional practice may continue as an "informal" belief system fulfilling the day-to-day pragmatic needs side by side with the "formal" religion.

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*Paper read at the XIVth Annual General Meeting of the Malaysian Medical Association in April 1974.

An example of the interaction between traditional beliefs and modern scientific knowledge (line BC) is the competition between modern medical knowledge and traditional concepts of disease causation and practices. The problem is not medical in nature but socio-cultural. Can the practices of the two be married harmoniously within the basic principles of modern medical practice so that not only is the best choice offered to the people but it is also a culturally acceptable choice?

The interaction between Islamic ideals and westernization (line AC) is exemplified by the modern banking system which comes into conflict with the Islamic law on interests. Such a conflict can be resolved by an interpretation given as a *fatwa* (ruling) by a *mufti* (Islamic jurist). Family planning and organ transplants represent other areas of conflict. Let us then return to the first of our questions namely: Can traditional beliefs be merged with modern medical practices so that not only is the best choice offered to the people but it is also a culturally acceptable choice? As a prerequisite to a description of a practical approach towards the resolution of conflicts between traditional and modern medical practices, a brief description of examples of traditional beliefs and practices that influence health will be given below.

Interaction between traditional and modern medicine

I. Traditional concepts of disease causation

Traditional Malay medicine ascribes illnesses to three categories of causative factors: physical, supernatural, and predisposing causes (Fig. 2). Physical causes include certain foods (such as fish which is thought to cause ascariasis), "heat" and "cold", "wind" (thought to cause swellings), *kuman* (tiny parasites, bacteria and atoms) and physical trauma. Physical causes can arise directly, as when "cold" foods such as papaya is eaten, or they may arise from the workings of a supernatural agent as when a spirit makes an individual "cold".

Supernatural causes include the workings of a large variety of spirits, the use of witchcraft and the will of God. Predisposing causes include the loss of *semangat* (vital force or soul substance), and incorrect behaviour. It is believed that although healthy individuals can be afflicted by supernatural and physical causes, any individual with a predisposing condition is even more vulnerable (Chen, 1970).

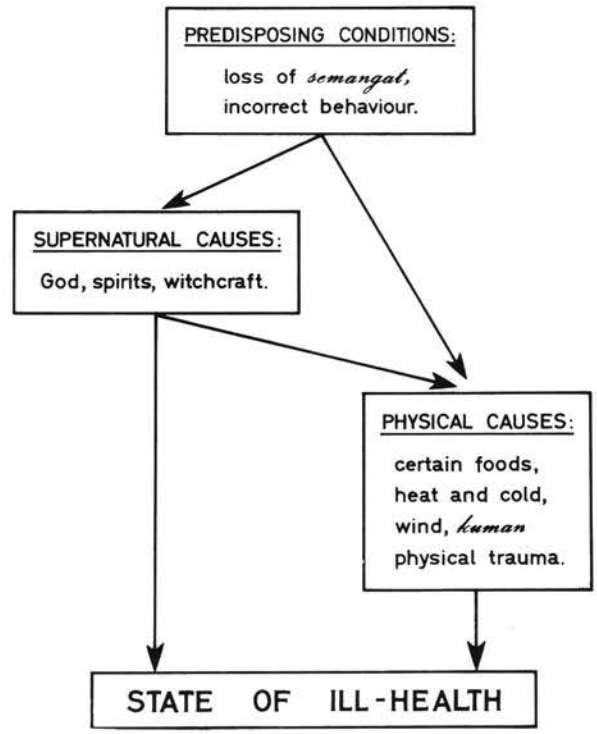

Figure 2. Traditional Malay concepts of disease causation

II. Traditional practices affecting health

Traditional practices affecting health usually represent attempts to prevent ill-health on the basis of the concepts of causation mentioned earlier. To prevent ill-health the rural Malay can attempt the following: firstly he can take action to avoid a predisposing condition such as a loss of *semangat*, and secondly, he can avoid contact with those objects that cause disease namely evil spirits, and physical agents such as foods that carry "wind". The following are a few examples of traditional practices in relation to health.

(a) Measures against predisposing conditions:

1. It is believed that the *semangat* leaves the body and wanders about during dreams. Thus, it is considered dangerous to rudely awaken an individual lest he wake up without his *semangat*.
2. The husband of a pregnant woman should not shoot a beast in the eye or the child will be born blind (Colson, 1969).
3. During child-birth, all doors, windows and cupboards must be left open, knots in the woman's clothes undone and her hair left to hang loosely and she must lie parallel to the nearest stream with her feet pointing downstream lest labour becomes obstructed.

(b) Measures against supernatural causes:

1. Various charms (Fig. 3) are worn during early childhood to protect the child against illnesses. These include the *tangkal sawan* (a talisman against convulsions which are usually ascribed to the *Hantu Sawan);* the *gelang bajang* (an amulet of black silk thread against the *Hantu Bajang);* and the *tangkal cacing* (a talisman against worms).
2. An infant may not be taken from the house if there are high winds or it threatens to rain, or the *Hantu Sagawang* who travels with the wind may descend and eat the child's liver (Colson, 1969).
3. A thorny bush placed under the raised floor of the house at the time of child-birth is used as a counter measure against the *Hantu Penanggalan,* a vampire spirit thought to be responsible for still-birth and post partum haemorrhage. It is believed that the spirit is deterred by the thorns for fear that her intestines might be caught in them.

Figure 3. A Malay child wearing a *tangkal sawan* (talisman against convulsions) and a *tangkal cacing* (talisman against worms) around his neck.

(c) Measures against physical causes:

1. After the child is born, the *bidan kampung* does not usually cut the umbilical cord until after the expulsion of the placenta. This delay has been shown (McLean, 1951) to add an appreciable amount of iron into the body of the child. The cord is knotted several times, rubbed with ash and then placed on a piece of tumeric "so that wind won't get in", and cut with a sharp sliver of bamboo *(sembilu).* Later the umbilical stump is dusted with a powder derived from pepper, tumeric and ginger "to ensure that wind won't get in". Undoubtedly the latter measures must contribute to an increased risk of *tetanus neonatorum.*
2. During the postnatal period it is belived that the mother's body is easily subject to "cold" and "wind", and thus various measures are taken to prevent this and to ensure that she remains "heated" (Chen, 1973). For example, she is usually required to externally heat her body by roasting herself over a bed of hot coals, *menyalai* and to heat her abdomen with a warm hearth stone wrapped in herbs, *bertungku.* As an added precaution, she is heavily dressed in warm clothes (Fig. 4).

Figure 4. A mother dressed in heavy clothing, woollen cardigan and socks, undergoing the customary "roasting" known as *menyalai* by lying on a temporary bed over a fire.

3. In addition to the foregoing, she receives from the *bidan kampung* on three days in the first week a form of massage the *urut-mengurut,* in which specially prepared "hot-medicines" are massaged into the skin to enhance circulation, restore muscle tone and keep the body "heated".

4. In addition to external heat, the mother also heats herself internally by drinking "hot medicines", such as that derived from "one hundred trees", either prepared by the *bidan kampung* or purchased from village shops.

5. During the postnatal period, the mother is enjoined to avoid all foods that are "cooling" and these include most fruits and vegetables. In addition she has to avoid foods that are *bisa-bisa* ("poisonous") such as prawns, cat-fish, cuttle fish, cockles, *belachan* (prawn paste) and certain varieties of fish, as well as foods that "carry wind" such as cassava, cassava tips, sweet potatoes, pumpkin, taro, maize and jackfruit. On the other hand "heating" foods such as pepper, chillies, smoked and salted fish, eggs and coffee are advocated. The end result is a diet consisting of rice, spices, salted fish and coffee. Such a restricted diet has been found to result in low serum levels for folic acid, carotene and iron (Wilson *et al.*, 1970).

III. An approach to the interaction

How then can the practices of traditional and modern medicine be married harmoniously within the basic principles of modern medical practice so that not only is the best choice offered to the people but it is also a culturally acceptable choice? As a first step, it is advocated (Williams and Jelliffe, 1972) that we should investigate as far as is possible relevant indigenous practices and then make an unprejudiced analysis of the effect of these practices on the physical and psychological health of the people. We can then divide the relevant practices into four categories and manage them accordingly.

(a) Beneficial: that is valuable to health in the local circumstances, such as the *urut-mengurut,* protecting an infant from chills, and delay in cutting the cord. Such measures should be actively encouraged.

(b) Harmless: that is with no obvious effect either way as far as health is concerned, such as most measures to avoid predisposing conditions and supernatural causes. Although such practices may be unaesthetic to the outsider, they are best left unaltered.

(c) Uncertain: that is, with possible beneficial and harmful effects at the same time, but which are difficult to classify such as the use of herbs, the *bertungku* practice and the indigestion of "hot medicines". These practices should be further studied but can be left unopposed in the meanwhile.

(d) Harmful: that is, with deleterious effects as far as health is concerned, and include the dietary restrictions mentioned in relation to the post-natal period, cutting the umbilical cord with a bamboo knife and dressing the umbilical stump with powder from the rhizome of tumeric and ginger. Such practices must obviously be slowly overcome by friendly persuasion in the form of personal or group health education and convincing demonstration.

In the above manner, not only will it be possible to help the people make choices that will be to their benefit, but it will also permit them to observe tradition and rituals (many of which are quite harmless but appear to us as irrational and unnecessary). Such traditional practices help the people identify with their community and are a cardinal factor in social stability.

It is also important to recognize the cultural absurdities in one's own culture and particularly to prevent their unwitting and harmful export in health education. Examples include the use of cow's milk in place of breast milk, expensive packaged and processed baby foods in place of home cooked semisolids for the young child, over-rigid attitudes towards toilet training and the clock-work regularity of infant feeding.

Interaction between Islam and modern medicine

Perhaps the most crucial area of interaction is exemplified by the apparent conflict between Islam and family planning. There are Islamic theologians who conclude that birth-control is *makruh* (frowned upon because of religious reasons), and they base their conclusions on the words of Syydina Abu Bakar, Umar and Ibn Massud (Syed Yusof, 1965). During the times of the Companions the act of preventing conception was called *al-azl* (coitus interruptus). It is recorded that when the Prophet was asked his opinion about this act, his reply was "It is best that you do not practice such acts. Every soul that God has seen fit to create even to the Day of Judgement must be born nevertheless".

As mentioned earlier, it is possible to resolve such a conflict between Islam and modern science by an interpretation given as a *fatwa.* A *fatwa* is based on the four *Shariah* evidences, namely the *Koran,* the

Sunnah (model conduct of the Prophet), *ijma* (consensus) and *quiyas* (analogical deduction). The following recent *fatwa* on family planning illustrate the value of working in conjunction with Islamic jurists in order to maximise the acceptability of choices we offer to the people.

(a) Haji Ali bin Mohamed Salleh, Chief *Kadhi,* Singapore April 1955:

"Steps to space a family because of maternal health reasons, are not in conflict with the teachings of Islam, whereas steps to sterilize mothers permanently are *haram* (forbidden). Abortion of a conception of four months or more is also *haram"* (Noh Abdullah, 1969).

(b) Haji Abdul Jalil bin Haji Hassan, Assistant *Mufti,* Johore November 1965:

"Prevention of pregnancy by the use of the pill and other measures, is permissible on condition that it does not result in permanent sterility. Sterilization using medicines or by other means is prohibited by Islam excepting where two doctors agree that the mother's life is in danger should she deliver again" (Noh Abdullah, 1969).

(c) Syed Yusof bin Ali Al-Zawawi, *Mufti,* Trengganu, January 1965:

"If prevention of conception is necessary for health reasons, whether of the wife, the husband, or the child-to-be there are absolutely no religious laws against it. Birth control practised for no health reasons or merely for the sake of preserving the beauty of the figure or as a means of escape from the responsibility of bringing up children is unanimously *haram.* Indeed birth control practised because of proverty and for no health reasons is not accepted by the laws of Islam".

"Sterilization without reasons sanctionable by religion, although done voluntarily is absolutely forbidden" (Syed Yusof, 1969).

A *fatwa* thus allows a precise interpretation of a practice that is ill-defined, stating clearly those conditions under which the practice is permissible, such as for reasons of personal health, and these conditions under which the practice is strictly forbidden, such as for reasons of beauty, economy and convenience. The doctor (for that matter any health worker) who operates within the context of a *fatwa* will obviously find minimal resistance. Where a *fatwa* does not exist, it will be necessary to seek such a ruling from the local *mufti.*

Summary

One of the chief impediments to the improvement of health is not so much the lack of technical knowledge as the inability to apply it on traditional cultures to produce the desired effect. Too often our efforts to provide health care are not meaningful to individual members of traditional cultures. However much can be achieved if the health worker builds his practice upon the foundations of socio-cultural rapport.

As a case in point, the socio-cultural foundations of medical practice in rural Malay communities is described. Present day Malay culture is depicted as interactions between Islamic ideals, inherited traditional beliefs and modern scientific knowledge. Practical methods of managing conflicts between modern medicine and traditional and Islamic beliefs and practices are suggested.

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Traditional beliefs and practices affecting medical care in Malaysian Chinese Communities

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Introduction

In this paper, focussed on medical care in the Chinese communities of Peninsular Malaysia, I offer a preliminary view of what is known of traditional Malaysian Chinese medical beliefs, practices, and personal health-related behaviour (Dunn, in press). I should also like to offer some thoughts on the implications of these facts for physicians and surgeons whose professional training and experience has been very largely within a medical tradition that we usually designate as scientific, modern, or Western, i.e. the system that I prefer to call cosmopolitan medicine.

Peninsular Malaysia is a land of considerable ecological and cultural diversity. In its ethnic heterogeneity, and in the history of immigration that has led to this modern diversity, there are many resemblances to the American experience and to modern American heterogeneity although, of course, ethnic composition is very different in the two nations. Malaysian ethnic diversity has led to some of the same problems, and challenges, that face the United States; and this applies with special force to the delivery of health care. Although there are obvious medical ecological differences between tropical Malaysia and the largely temperate United States, the distribution of diseases and disorders in Malaysia's population is coming to resemble that of America more closely every year, and the problems of health care delivery, especially to rural and to economically deprived segments of the populations, are broadly similar. Thus I have found that my work in Malaysia is in many ways relevant to American conditions as well, and vice versa.

An important element in assessing needs and priorities, and in providing cosmopolitan medical care, through both public and private channels, is a clear appreciation of the significance of what Dr. Paul Chen (1974) calls 'sociocultural factors' and I refer to as 'traditional beliefs and practices' in the titles of our papers for this issue of the Journal. Reflecting its ethnic diversity and immigration history Malaysia has acquired a wide range of traditional beliefs and approaches to medical care (traditional medical systems). But in this country, as in the United States and in most other countries, research on traditional medicine has thus far been very limited in scope. It is generally true, in my country as elsewhere, that medical students and young physicians complete their formal training with little awareness or understanding of the alternative modes of medical practice and the range of beliefs about health and disease that exist in their own communities. A consequence of this is that inevitable sociocultural barriers between physicians and patients often remain unrecognized as such, or if recognized remain impenetrable or insurmountable. These barriers can cripple effective delivery of medical care. A second consequence is that physicians and allied health workers in the cosmopolitan system, on the one hand, and practitioners of traditional medicine, on the other, have little common ground of understanding. This is almost a world-wide problem. On both sides there tend to be elements of suspicion and unnecessary competition, when there could be recognition that these forms of care are complementary rather than competitive; and that it is through cooperative action amongst all who are concerned with

medical care that the best progress can be made toward the enhancement of human health.

Personal Health Behaviour

Let us now consider some of the forms of traditional medicine and health behavour that are prominent in Malaysian Chinese communities today. I shall begin with what can best be classified as forms of personal health behaviour – and each of these I shall mention only briefly. Each item of behaviour is in one sense an 'indicator' in that the extent of its practice reflects adherance to tradition and perpetuation of a Chinese cultural heritage within the broader frame of Malaysian national cultural identity.

An obvious example of what I am talking about is T'ai Chi Chuan, those calisthenics that are perhaps the most conspicuous expression of one's personal commitment as a Chinese to health maintenance through preventive behaviour. Although these exercises are often associated with 'self-defense' it is only the advanced student, in command of all the classic movements, who can make full use of the art for such purposes. For most people the basic movements simply provide good exercise with emphasis on relaxation and control, in the interest of continued good health. T'ai Chi is widely practiced in Malaysia, and devotion to the art is growing. A school recently established in Kuala Lumpur, for example, now has some 300 students of all ages and both sexes. Instruction in Chinese medicine is considered a normal part of the training to become a T'ai Chi instructor, and many instructors are said to be skilled in the treatment of sprains and strains. One of the most famous instructors in Kuala Lumpur is also locally renowned as a bonesetter. It is indeed difficult to draw a line between T'ai Chi Chuan and preventive (or even curative) medicine.

Cuisine is another important and obvious expression of the preventive element in Chinese philosophy for the balanced and considerate use of foods is seen as essential to maintenance of good health. The arts of cooking and dining are intimately tied to concepts of biological and social health; and personal food behaviour is subject to important modifications – still widely recognized among Malaysian Chinese – at certain points in the life cycle. In traditional Chinese medical practice too, the practitioner gives his patient's food habits special attention, and often recommends temporary or permanent modifications in diet. Without doubt many Malaysian Chinese see food behaviour and health as closely linked: this attitude is manifest in ideas about 'balance' in cuisine; in concepts of 'hot' or 'heating' versus 'cold' or 'cooling' foods; in wide recognition of the need to observe certain food taboos during confinement; and in the general use of medicinal teas and herbal remedies that border on being 'foods.'

A book could be written solely on the subject of Malaysian Chinese medicinal teas. In old Kuala Lumpur, for example in the vicinity of Petaling Street, one can find more than 20 medicinal tea stalls, patronized with regularity by the residents of the neighbourhood and by visitors to the evening street markets of the area. The stalls are located in traditional street-side spots, and ownership is usually handed on from parent to child. At one such stall four varieties of tea are dispensed: sugarcane and lallang root extract as a 'cooling' tonic; chrysanthemum tea, also 'cooling;' wong loh khat, a popular dark and bitter tea taken as a preventive tonic; and Korean ginseng flower tea, used especially for sore throat. Hundreds of passersby purchase these and similar teas every day, not only at this site but in many such localities up and down the length of Peninsular Malaysia. The popularity of these teas – together with many other kinds of self-medication, especially in the form of ointments and tonics – is still another measure of personal adherance to Chinese medical tradition.

Confinement behaviour in the Chinese communities also illustrates the continuity of traditional belief and practice in Malaysia. Food taboos, seclusion practices, and post-confinement ritual are interwoven with ideas about protection of the mother, the infant, and the household from misfortune, and especially from disease. Many of the customs may indeed be protective, e.g. against such hazards as staphylococcal infection of the newborn and maternal mastitis. According to my informants, traditional confinement practices continue to be widely observed in Malaysia and are unlikely to fade away. The guardians of these traditions are the mothers and grandmothers; their daughters, however non-traditional their views, will generally accede to their elders' wishes at the time of confinement, and so the traditions are maintained. Delivery itself is generally accomplished in a hospital or maternity home, even in the most traditional Chinese families in rural areas or new villages. Thus delivery and confinement practices constitute a blend of modernity and tradition, a good example of the interface between cosmopolitan and traditional medicine where cooperation and understanding are truly essential.

Another major category of personal health behaviour is that relating to the use of charms and talismans, and to consultation with fortune tellers or spirit mediums. This is the only part of Malaysian and Singaporean Chinese medical behaviour that has received much scholarly attention in years past. It is impossible to measure the importance of such beliefs and practices either in terms of physical or psychosocial health, but it is clear nonetheless that many people believe in and resort to these practices at times of stress in their lives. In a broad view of

health and medical care in Malaysia we must, I think, accept the notion that even the temple spirit medium plays an important role (for certain people), and that on occasion the sidewalk fortune teller may, in fact, assume a psychiatric role as dispassionate listener and advisor. Again I must note that in all societies, in all parts of the world – and in all Malaysian ethnic communities – there are counterparts to these Chinese practices, beliefs, and health-supporting personnel.

Traditional Medical Practice

Let us now give some attention to Chinese medicine itself, to a strong tradition in Malaysia that continues to grow stronger each year. Many Malaysians, Chinese and others, support and patronize Chinese medical practitioners, at least for selected medical complaints. In the Peninsula today it is estimated that there are about 1,000 practitioners of Chinese medicine. Of these about 500 are members of Chinese medical practitioners associations who received formal training in Institutes. Most of the rest entered practice on their own, often after completing apprenticeships. Only a few continue in practice of those who came to Malaya before the second world war, after completing their training in China. Most with Institute training have attended courses in Kuala Lumpur, Penang, Ipoh, or Singapore. Since its opening in 1955 the Chinese Medical Training Institute in Kuala Lumpur has graduated about 200 practitioners, and a new class of some 50 students (selected from about 80 applicants) began coursework in January of this year. (It is estimated that there are about 130 students in Malaysia's three Institutes at this time.) The Institute course in Kuala Lumpur extends over a four year period, with three terms per year. Instruction is carried on in the evening since most students have to support themselves in jobs during the day. Instruction stresses Chinese medical theory, diagnosis, and herbal, acupuncture and moxibustion therapy. Instruction is also provided in Western medical theory and therapeutic principles; and diseases are considered from both the traditional Chinese and Western perspectives. Thus the graduates have the potential training for some forms of cooperative work with cosmopolitan-trained physicians. At the end of each year the Kuala Lumpur students take a series of examinations, and upon graduation they receive certificates that are recognized by the various Malaysian associations of Chinese medical practitioners although not by the Government.

Patterns of practice are varied. Many practitioners work in association with medical halls (herbal medicine shops); others maintain Western-style offices, in group or solo practice. Still others support themselves in non-medical fields and practice part-time as volunteers, e.g. at the Free Clinic associated with the training Institute in Kuala Lumpur. Several, again in Kuala Lumpur, practice as employees of the Tung Shin Hospital. Typically the practitioner associated with a medical hall holds office hours thoughout the day when the shop is open. He provides herbal and other prescriptions which the patient can fill immediately in the shop, and he may employ acupuncture-moxibustion. He may also assist the patient by advising on diet and exercise, and by provision of informal psychological support. Often he will recommend that a patient see a physician or go to a government hospital. Most Chinese traditional practitioners with whom I have talked in Kuala Lumpur are agreed that about 20 to 25% of their patients are non-Chinese. This is also the approximate percentage of non-Chinese customers reported by some of the proprietors of herbal medicine shops in the city. It has been difficult to collect data on the medical halls; a comprehensive survey is clearly needed. Certainly they can be found in every Malaysian town and in great numbers in the cities. According to best estimates there may be 200 such shops in Kuala Lumpur alone, and more than 1,000 in Peninsular Malaysia. The traditional shop carries a formidable inventory of crude herbs and other preparations. An inventory in medical halls in Singapore once recorded 456 drugs – 415 of plant origin, 29 from animal sources, and 12 minerals (Hooper, 1929). Many shops today carry similar arrays of drugs, supplemented by scores of patent medicines.

To sum up this brief description: I am convinced of the continuing strength of Malaysian Chinese traditional medicine and am impressed as well by the persistence of many traditional forms of personal health behaviour. The strength of Chinese medicine, as such, is attested to by the vigour of the medical practitioners' associations and training institutes, and by the abundance and heavy patronage of the herbal medicine shops.

Implications

Let us now consider some implications of these observations for cosmopolitan or Western medicine in Malaysia. The first point to stress is, of course, that in Malaysian society it is the health care consumer who makes the choice of kind of medical care, and his (or her) choice depends upon his perception of a health problem. (What kind of problem is it, and how severe as measured by anxiety, by pain, by disability, by inability to go to work?) His choice also depends upon his view of the options for appropriate medical care. The most important point to emphasize in discussing the Malaysian Chinese is just this: that the perceived range of options for care appears to be very broad. Thus, depending upon the

health problem, the "patient" may resort to self-medication, perhaps by visiting a tea stall; may visit a private physician; may consult with a temple spirit medium; may attend the nearest government hospital or clinic; may consult a practitioner of Chinese medicine – a sinseh – at a medical hall; and so forth.

Among my informants, however, there is substantial agreement that there has been a shift in attitude in favour of cosmopolitan medicine in the Chinese community since about 1950. Prior to that time it is said that many Malaysian Chinese turned to cosmopolitan medicine – and especially to hospitalization – only as a last resort. In recent years more and more people seem to have reversed their choice, especially for acute physical diseases and disorders. Thus today it appears that cosmopolitan, Western-trained physicians see much of the infectious disease and the other acute and severe complaints of Malaysian Chinese. However the stubborn problems of old age, the chronic disorders such as arthritis, the incurable diseases in general continue to receive the supportive care of Chinese practitioners in many instances.

This brings me to a series of questions for future research in Malaysia. These questions apply to all Malaysians. What are the actual and perceived spectra of options for medical care in each of Malaysia's health sectors? What therapeutic alternatives do people actually consider when confronted with threats to health of various kinds? What actions do they finally take, and in what sequence if several types of practitioners, and physicians, are consulted? Little information is available on the behaviour of Malaysia's health care "consumers," and much is needed. Also demanding of research are several questions about practitioners of traditional medicine and their behaviour. Who enters such practice, and how, and with what motives and values? What kinds of relationships exist between practitioners of different traditions and schools, as well as with the physicians of cosmopolitan medicine? How do these relationships, or their absence, influence patient access to care? To generalize these questions: how does the traditional practitioner fit within the broader system of Malaysian national health and medical care?

It does seem obvious to me that traditional medicine – Chinese, Malay, Ayurvedic, and other – is not likely to disappear or sharply diminish in strength in this country in the decades ahead. What does the future hold then? Will some form of blending or merging of some of Malaysia's diverse forms of medical care emerge? Will traditional practitioners come to be seen as allied ("paramedical") health workers within the broader national programme of health care? In my view these are essential research topics for the future as a part of the development of Malaysian research in comparative medical systems and community health.

In conclusion two points deserve to be stressed: first that we, as physicians, ought to keep in mind that our medical school-ingrained definitions of medicine may be very different from – and perhaps narrower than – the definitions of medicine in the minds of our patients; and second, following from this, that we need to increase our awareness of the breadth of options for medical care that exist in people's minds. Among these options cosmopolitan (Western) care may be only one, and one to be called upon for relief of only a limited range of disorders and diseases.

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Mosquito-borne Haemorrhagic fever

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MOSQUITO–BORNE HAEMORRHAGIC FEVER

A study of 45 positive cases seen in the Paediatric Wards General Hospital, Kuala Lumpur. (May – September, 1973).

Introduction

This was the second epidemic of Haemorrhagic Fever observed in Malaysia. The first epidemic comprising of 61 cases occurred in Peninsular Malaysia in 1962. In that epidemic there were 14 isolates and they were identified as Dengue Type 11 (Rudnick etal – 1965). Since then only a few sporadic and isolated cases have been observed till May 1973. As the physicians were aware of this disease at the beginning of the second epidemic, the disease was identified fairly rapidly in its early stage.

Aetiology

Virus isolation

In the present study viruses were isolated from the acute phase sera of 4 patients. The method used for the isolation of virus is by innoculation of acute serum into the brains of suckling mice. Two of these isolates have been identified as being Dengue Type III virus.

In addition to the 4 cases where virus isolation had been successful 35 other cases showed significant rises in group B arbovirus antibody titre by the haemagglutination – inhibition test. The method used for the detection of antibody rise in the second specimen of serum when compared to the acute phase (first) serum is according to the method of Clarke and Casals (1958). In 3 of the remaining cases it was necessary to make a presumptive diagnosis based on the significantly high levels of antibody in one specimen of serum. In all these 3 cases antibody titres to group B arbovirus of 1/1280 or greater were demonstrated. These titres were well above those studied in a group of normal children in Kuala Lumpur. Based on this study it was felt, with some justification, that these 3 cases should be included. In the remaining 3 other cases only 1 specimen of serum from each were available as they died early. 2 of these cases had low antibody titres to group B arboviruses atitre of 1/640 was demonstrated. On strong clinical grounds, however, it was felt that diagnosis of haemorrhagic fever should be made, although its aetiology could not be established with certainty, and that these 3 cases should also be included. Acute phase serum specimens should be taken within the first three days of disease in order to isolate virus and to demonstrate a rise in antibody titres when compared to a later specimen. However, many patients were not admitted into hospital until after the 3rd day of disease or were discharged after successful management but did not return for the

collection of a 2nd specimen, hence no second specimens were obtained.

As the majority of these cases had originated from Jinjang village which is located on the fringe but within the boundary of Kuala Lumpur district, a mosquito survey was carried out. Larvae survey was carried out and it revealed an *Aedes* index of 71.9%. This is considered high but adult surveys did not reveal a very high abundance of *Aedes aegypti* or *Aedes albopictus*. Subsequent investigations carried out, strongly indicate that this was as an *Aedes aegypti* transmitted dengue infection.

Selection of cases

This is an analysis of 45 cases of Haemorrhagic Fever admitted to the childrens' ward, General Hospital Kuala Lumpur from May – September, 1973. Out of these 45 cases were confirmed as positive cases, 3 by direct isolation; 1 by direct isolation and serology and 41 by Haemogglutination inhibition studies. Only children below the age of 8 years are admitted to the Paediateric Wards in this hospital. (During this period a total 131 children were admitted to wards as suspected cases and blood sent for virological studies). There were 6 deaths among these cases.

Racial distribution

Chinese 42, INdians 3, Malay Nil.

Area

The majority of the Chinese children came from the crowded suburb of Jinjang.

Jinjang 25, Ulu Selangor 6, Kuala Lumpur 8, Suburbs 11, Kajang 2, and Sabak Bernam 1.

Sex distribution

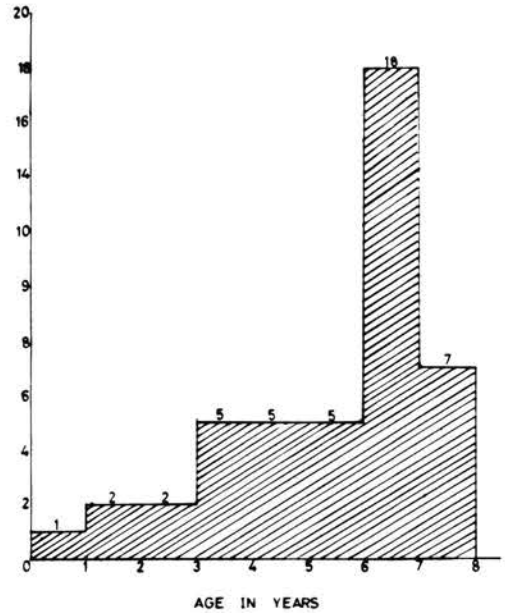
Male 19, Female 26.

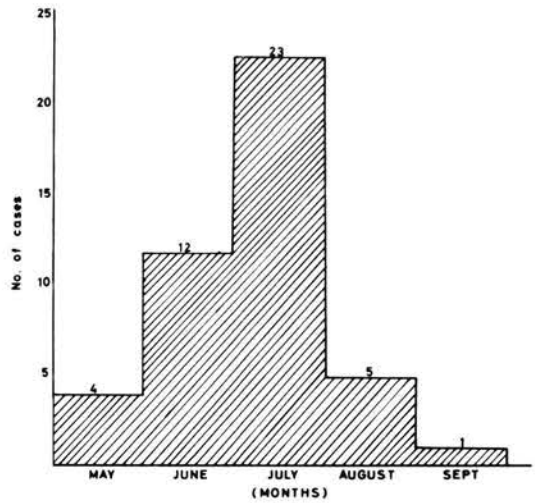
The majority of the children i.e. 18 cases were between 6 and 7 years of age. There was only one case below the age of one year.

The maximum number of cases i.e. 23 occured in the month of July.

Grade of disease according to severity. (based on classification used in the Bangkok Paediatric Dept: Ramathibodi Hospital).

AGE DISTRIBUTION





DISTRIBUTION OF CASES IN VARIOUS MONTHS

Table 1

Grade 1	Fever and mild symptoms but no frank bleeding.	5
Grade 11	Significant bleeding from any site but no shock; including flushing of patients extremities or of the whole body.	29
Grade 111	Shock or impending shock as shown by narrow pulse pressure of 20 mm.Hg. or less, hypotension with BP systolic 80 mm. Hg. or unobtainable BP.	11

Table 2

Clinical features	45 cases	
	%	No.
Fever	100	45
Bleeding tendency	66	30
Skin rashes	60	27
Hepatomegaly Grade I Grade II Grade III	55	25 1 15 9
Vomiting	49	22
Injected throat	49	22
Abdominal pain	47	21
Lethargy	35	16

Table 3

Clinical features	45 cases	
	%	No.
Cough	33	15
Restlessness	27	12
Shock	25	11
Lymphadenopathy	22	10
Neck stiffness	11	6
Muscular pain	9	4
Convulsions (Death)	6	3 2
Facial palsy	2	1
Distended bladder	2	1
Pleural effusion	2	1

Tables 2 and 3 show the clinical features in order of frequency.

Fever was the commonest feature seen and occurred in all cases. In 11 cases the fever lasted for 5-6 days. In 9 cases the fever lasted for 4-5 days and in 6 cases for more than 9 days. The majority had a low grade fever of about 100 – 101°F. Only 3 cases showed a temperature of above 102°F. Eleven cases developed shock, and these had the worst prognosis. All the 6 deaths were among cases who went into shock. Convulsions in 3 cases, 2 of whom died. Pleural effusion was seen in 1 case. This child showed remarkable improvement after pleural tapping was done.

Table 4

Total No. of cases	% 66	Cases 30
Epistaxis	27	12
Maelena	24	11
Haematemesis	18	8
Gum bleeding	29	13
Hess Test positive (Grade III)	49	22 2 out of 11 cases.

BLEEDING TENDENCIES

Table 4 shows the type of bleeding tendencies seen in the 45 cases. 22 cases showed a positive Hess Test. However only 2 out of 11 cases in Grade III showed a positive Hess Test. This shows that in the presence of shock, this is not a reliable sign.

Table 5

Total No. of cases	% 60	Cases 27
1. Flush Generalised Extremities	8.9	4 2 2
2. Erythema (maculopapular) Generalised Extremities Face and trunk	18	8 4 1 3
3. Petechae	35	16
4. Ecchymoses	6	3

SKIN LESIONS

Table 5 shows the different skin lesions. The flush seen was a diffuse violacious flush, and at time a diffuse morbile form rash. In a few cases there was an extensive maculopapular rash similar to that seen in measles.

LABORATORY RESULT:

	Grade 1		
	% No. out of 5 cases	% No. out of 29 cases	% No. out of 11 cases
50,000	1	6	6
50,000 - 1000,000	2	16	3
100,000 - 2000,000	2	5	1

Total white cell and differential count

PROGRESS OF THE DISEASE:-

45 Patients:- Stage I - 5
Stage II - 29
Stage III - 11
MORTALITY - 6 cases (all in Grade III)
Mortality cases: P.M. in 3 cases

Name of Patients	Duration of illness.	Duration of stay in Hospital
1. Tan Pah Hong	4 days	21 hours
2. Yap Yoke Ying	4 days	14 hours
3. Pang Saw Mooi	9 days	2 days
4. Soon Wan Hua	5 days	13 hours
5. Wong Soon Woi	7 days	10 hours
6. Yap Foo Keong	4 days	½ hour

PLATELET COUNT – 42 done

	Grade I 5 cases	Grade II 29 cases	Grade III 11 cases
Serum albumin		3.2 gms	3.55 gms
Total protein		5.4 gms	5.6 gms
SGOT	76 units	105 units	311 units
SGPT	23 units	57 units	212 units

CORRELATION OF LIVER FUNCTION TESTS TO SEVERITY OF DISEASE

This table shows the lowest values obtained for Serum albumen and Total Protein, and the highest values obtained for Serum transaminase studies.

CORRELATION OF LIVER FUNCTION TESTS TO SEVERITY OF DISEASE

Laboratory investigations

These have been tabulated in tables 8, 9, 10, & 11.

The majority of the patients had a total white count which was within the normal range for Malaysians and Indonesians (5,000 – 13,000/cumm). One child showed on peripheral smear, irregularly contracted and fragmented cells, (anisopoikilocytosis). This with the presence of low platelet count of below 17,000/cumm and the clinical features of persistent fresh bleeding from various sites, made us suspect Disseminated Intravascular Coagulation Defect, and I.V. Heparin was given to this child. The platelet count was found to be the most useful investigation. From table 9, it can be seen that only 1 out of 11 cases belonging to grade III and in shock, had a normal platelet count of 100,000 – 200,000 whereas 6 cases out of 11 in Grade III had a very low platelet count of below 50,000/cumm. In slide 10, we observed that the cases showing evidence of hepato-cellular damage had a bad prognosis.

We did not find the estimation of serum amylase to be a very useful index in the few cases that were investigated.

Management of Patients in the Ward

When a patient of suspected Haemorrhagic Fever was admitted into the ward, the patient was first graded according to the severity of the disease.

Urgent investigations like TWDC, B.T.C.T. Platelet count were done. Blood for FBP and for viral studies were collected on admission in as many cases as possible.

1. Grade I, B.P. recorded every two hours to detect shock.

If platelet count was very low, (i.e. below 50,000/cumm.) we considered it as a sign of impending shock, and then the patient was given plasma at 30ml/kgm. The I.V. drip was maintained for about 24 hours using 1/5 D/S at slow rate.

2. Grade II & III. I.V. drip was started as soon as the patient was admitted. 1/5 D/S was used to start the drip. Fresh blood was only given in a few cases where the Hb was low.

3. *I.V. Heparin* given to one patient.

This child came in with large ecchymotic patches mainly on the abdomen and back, and was in coma III on admission. Meningococcal septicaemia was done. Blood started oozing from the lumbar puncture sites.

Later DIVC was suspected due to the following reasons.

1. Bleeding continiously from LP site.
2. Big ecchymotic patches all over the body.

A few of them later ulcerated.

3. Fresh bleeding from the mouth and nostrils.
4. Platelets count 17,000/cumm.
5. Prothrombin index below 70%.
6. Irregularlycontracted and fragmented red cells. Presence of amisopoikilocytosis.

I.V. Heparin was given as a desperate measure at the rate of 100 units/kgn/4 hourly. The patient made a remarkable recovery, I.V. drip was stopped when the platelet count came up to 31,000/cumm. Later a blood transfusion was given as Hb was low.

5. *Pleural tapping.*

Done on one patient in Grade III.

This child came in coma III and had several episodes of convulsions. Evidence of massive pleural effusion both clinically and radiologically.

Results (R) side 200cc) straw coloured fluid
(L) side 180cc)

Fluid – Protein 4 gm%

This child also made a remarkable recovery.

Table 7

Normal	5,000 - 10,000	-	20 cases
	10,000	-	11 cases
	5,000	-	14 cases
Lymphocytosis	40%	-	33 cases
Polymorphonuclear leukocytosis	60%	-	12 cases
Atypical Mononuclear cells		-	18 cases
1 case where heparin given		-	17,000 - low platelets; irregularly contracted cell and fragmented cells.

Mortality

One child Pang Saw Mooi was admitted on the 7th day of illness with a mild upper respiratory tract infection; on the 9th day in the afternoon, coughed up about 5 ml of fresh blood; about half an hour later she suddenly went into irreversible shock and died. Hence we found that shock could develop late in the disease.

Post mortem was done in 3 cases.

Naked eye appearance

Significant findings

Lungs 2 cases had massive pleural effusion

Stomach Evidence of bleeding in Stomach in all 3 cases

Large intestine

1 case haemorrhage from caecum to rectum.

Liver all enlarged.

Brain 1 case petechial haemorrhages on the surface of the brain

Section No evidence of internal bleeding.

Histological picture was nonspecific suggestive of virus infection with evidence of internal bleeding in the lungs, spleen and kidney, which could be brought about by haemorrhagic fever.

Conclusion

The clinical features, diagnosis, management, and treatment of 45 positive cases are discussed. The majority of the cases were between the ages of 6 & 7 years. This age distribution was similar to that in the epidemics which occured in Penang in 1962, Thailand in 1961 and 1969, and in Singapore in 1965. In the Singapore epidemic in 1961 young adults were mainly affected. In the clinical features, fever was present in all the cases, but was of a low grade type. Bleeding tendency was seen in 30 cases a positive Hess test was elicited in 22 cases. However we found that this was not a reliable sign in the presence of shock, as it was elicited only in 2 cases belonging to Grade III. Skin rashes (27) hepatomegaley (25) abdominal pain (21) were other common features. Shock was found in 11 cases, and its presence had a very bad prognostic sign. Convulsion occurred in 3 cases, 2 of whom died. Massive pleural effusion was seen in one case. Isolated facial palsy was an unusual finding in one case.

In the laboratory data we found the platelet count a very useful index in grading the severity and management of the cases. A low platelet count at the onset was taken as a danger signal and a level of below 60,000/cumm was an indication for plasma infusion. In the management of these cases, we found that plasma infusion was better than whole blood in combating shock. The use of I.V. Heparin in one case where disseminated intravascular coagulation defect was suspected resulted in a remarkable alteration of the bleeding tendency. It is recommended that this feature should be looked for in the very ill cases. Pleural tapping is recommended if there is evidence of massive effusion and respiratory distress.

COMPRATIVE STUDY OF CLINICAL FEATURES OF CASES SEEN IN PENANG, SINGAPORE, THAILAND & KUALA LUMPUR

Clinical features	Singapore 1961	Thailand 1961 & 1969	Penang 1962	Singapore 1965	Kuala Lumpur 1973
Onset	Abrupt	Abrupt	Abrupt	Abrupt	Abrupt
Fever	100%	100%	100%	100%	100%
Nausea and Vomiting	60%	70%	83%	48%	49%
Abdminal Pain	Rare	25%	39%	26%	47%
Respiratory Symptoms	?	40%	7%		33%
Hepatomegally	Nil	45%	63.4%	63%	55%
Petechiae	49%	Most cases	41%	39%	33%
Splenomegally	39%	Nil	Nil	26%	Nil
Circulatory Fairlure	Absent	Present	Present	Present	Present
Thrombocyto-paenia	usual	usual	usual	usual	usual
Leucopania	usual	uncommon	uncommon	-	usual
+ ve Hess tess	usual	usual	common	-	common
Mortality	Nil	1961 1969 2% Nil	12%	30%	1%
Age Distribution	Young adult	children	children	children	children

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Survey of Influenza Hi antibodies in Peninsula Malaysian sera collected before and after the Hongkong 'Flu epidemic in 1968

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INTRODUCTION

In July, 1968, an epidemic of Hongkong 'flu occurred throughout Peninsular or West Malaysia. Because of inadequate returns of epidemiological date from the respective medical departments in the various states, the epidemiological picture of the outbreak was incomplete and the final reports, unreliable. The extent of involvement and severity of the outbreak, therefore, were not assessed to any degree of accuracy.

The object of this survey is primarily to determine the actual involvement of the population in the Hongkong 'flu and to recapitulate, immunologically, the prevalence of the various A, A2 and B influenza virus strains in the country before the Hongkong/68 outbreak.

MATERIALS AND METHODS

Human sera

A total of 725 sera from normal persons of different age group were examined. Of these, 375 were collected in 1961-67 (pre-Hongkong 'flu outbreak) and 350, in 1969 (post-Hongkong 'flu outbreak). These sera were left-overs from routine Kahn testing and serological surveys carried out for leptospirosis and poliomyelitis, and were obtained from persons all over Peninsular Malaysia. They were stored at -20^0 C until required.

All sera were inactivated at 56^{0}C for 30 minute prior to treatment with Receptor Destroying Enzyme (RDE) to remove non-specific inhibitors. The method adopted was that recommended by the WHO International Influenza Center for the Americas.

Viral antigens

Antigens were prepared from strains obtained from the WHO.
They Are:

1. A/Swine/1976/31 (Hsw1N1)
2. A/PR/8/34(HON1)
3. A/FM/1/47(H1N1)
4. A/Singapore/157(H2N2)
5. A/Taiwan/1/64(H2N2)
6. A/Hongkong/1/68(H3N2)
7. A/England/878/69(H3N2)
8. B/Massachusetts/3/66

The A/Eng/69 (H3N2) strains was reported by Dr.H.G. Pereira of the WHO World Influenza Centre as representing a "drift" from the prototype Hongkong strain in its antigenic characteristics (personal communication).

Each of these strains was tested by the cross haemagglutination-inhibition (HI) test with specific antisera (Table 1). Some amount of cross-reaction was obseved between A/TW/64(H2N2) antigen and

TABLE 1
RESULTS OF CROSS HAEMAGGLUTINATION INHIBITION TESTS

Antiserum	Antigen							
	A/HK/68 (H3N2)	A/Eng/69 (H3N2)	A/TW/64 (H2N2)	A/Sing/57 (H2N2)	A/FM/47 (H1N1)	A/PR/34 (H0N1)	A/SW/B1 (HSw1N1)	B/Mass/66
A/KH/68(H3N2)	320	160	160	40	10	10	·10	10
A/Eng/69(H3N2)	320	160	40	20	10	10	10	10
A/TW/64(H2N2)	10	10	160	40	10	10	10	10
A/Jap/57(H2N2)	40	10	40	160	10	10	10	10
A/FM/47(H1N1)	10	10	10	10	160	10	10	10
A/PR/34(H0N1)	10	10	10	10	10	80	10	10
A/Swine/31 (HSw1N1) 10	10	10	10	10	10	10	160	10
B/Mass/66	10	10	10	10	10	10	10	160

A/KH/68(H3N2), although there was no similar cross-reaction between the Hongkong antigen and the Taiwan antibody. The cross-reactions between the A/HK(H3N2) antigen and A/Eng(H3N2) antibody and vice versa are consistent with the close relationship between the 2 strains. A/Sing (H2N2) did not cross to any great extent with A/HK strain and appeared to behave differently from A/TW(H2N2) virus. There were no corss-reactions among the subtypes HO, H1, H2/H3 and type B viruses.

Haemagglutination-inhibition test (Microtiter system)

The technique employed was that recommended by WHO and taught to participants of the Symposium on Joint Activities of WHO Virus Reference Centres and National Virus Laboratories held in Tokyo in 1970. Serial two-fold dilutions of each serum from 1:1280 were tested against 16HA units of the viral antigens. 0.025 ml. of virus was added to 0.025 ml. of serum and to this was added 0.05 ml. of 0.5% suspension of fowl erythrocytes. The titre was expressed as the reciprocal of the highest dilution giving complete inhibition of haemagglutination. HI titres of 1:10 and above are regarded as positive. The usual controls and a back titration of the virus antigens were set up with each batch of sera tested.

RESULTS AND DISCUSSION

The donors of the 725 sera collected before and after the Hongkong 'flu outbreak in 1968 were divided into 5 age groups according to their year of birth:

Age group	Year of birth
A (Pre-outbreak)	1957-67
(Post-outbreak)	1957-68
B	1940-56
C	1918-39
D	1900-17
E	1889-99

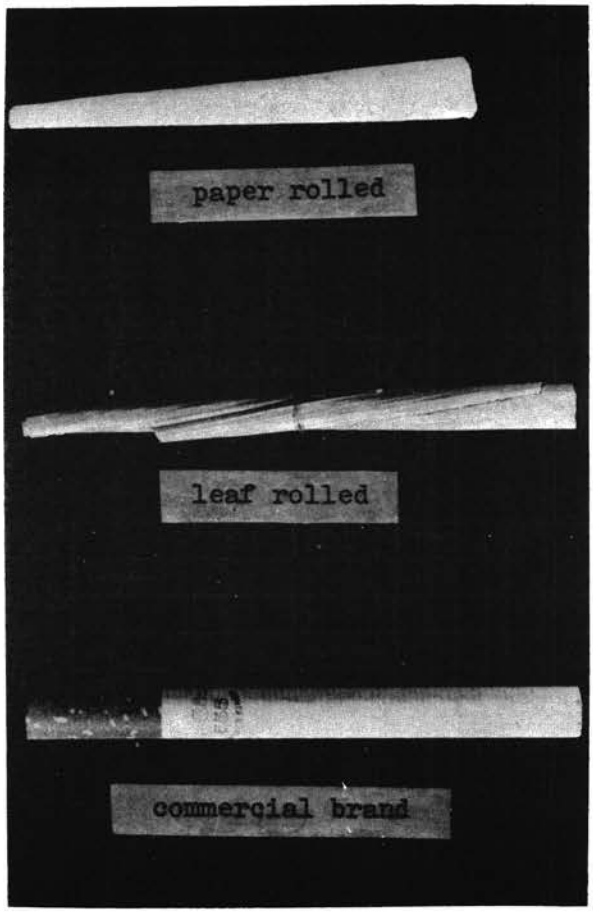
This form of age-grouping is based on the time of occurrence of important events in the history of influenza epidemic and investigations and was employed for the sake of more meaningful interpretation of results. Pandemics presumably due to Asian (H2) prototype and swine influenza viruses occurred in 1899-90 and 1918-19, respectively. These periods were termed by some workers as the "ancient A2 influenza era". From immunological recapitulation (Davenport et al., 1969: Masurel, 1969: and Fukumi, 1969) it was presumed that an "ancient Hongkong influenza era" existed in or about 1900. In 1940, the type B virus (Lee strain) was firts recovered and recognised to be distinctly seperable from type A strain antigenically (Francis, 1940). In 1957, another Asian (H2 pandemic occurred.

The pre-outbreak sera of age group A was collected in 1967 and of age group B to E, in 1961. The post-outbreak sera of all age groups were collected in 1969. The group A sera collected before the outbreak belonged to children born in

1957-67 but those collected after the outbreak were of children born in 1957-68.

Conversion rates after the Hongkong 'fle epidemic

The conversion rate of the antibodies against the Hongkong virus in Peninsular Malaysian sera after the Hongkong 'fle outbreak in 1968 was from 8% to 81% (10-fold). About 29% of the population appeared to have been spared of the infection. The mean geometric antibody titre(GMT) rose from 6 to 21 representing an almost 4-fold increase (Fig. 1).



A similar conversion was observed with the closely related A/England/69 antibody where there was a 13-fold increase in incidence and a 2-fold increase in GMT.

The incidence of A/Taiwan and A/Singapore antibodies rose between 1½ - to 2-fold after the outbreak. However, the GMT of the A/Taiwan antibodies increased by 5-fold and that of the A/Singapore antibodies increased by 3-fold. It is possible that the rise in incidence and titre of the A/Taiwan antibodies indicated an anamnaestic response to the A/Hongkong virus rather than a simultaneous infection with these 2 strains.

No significant conversion was noted with A/PR/8, A/FM/1 and A/Swine antibodies. A 2-fold increase in incidence and average mean titre was, however, noted with B/Mass antibodies.

Moderate rates of antibodies versus Hongkong virus were detected in children less than 10 years of age (groupA) even before the 1968 outbreak (Fig 2 and Table 2a). It is possible, however, that the HI test was detecting neuraminidase (N2) antibodies to the Hongkong virus, which is closely related to the N2 antigens of the Taiwan and Singapore strains.

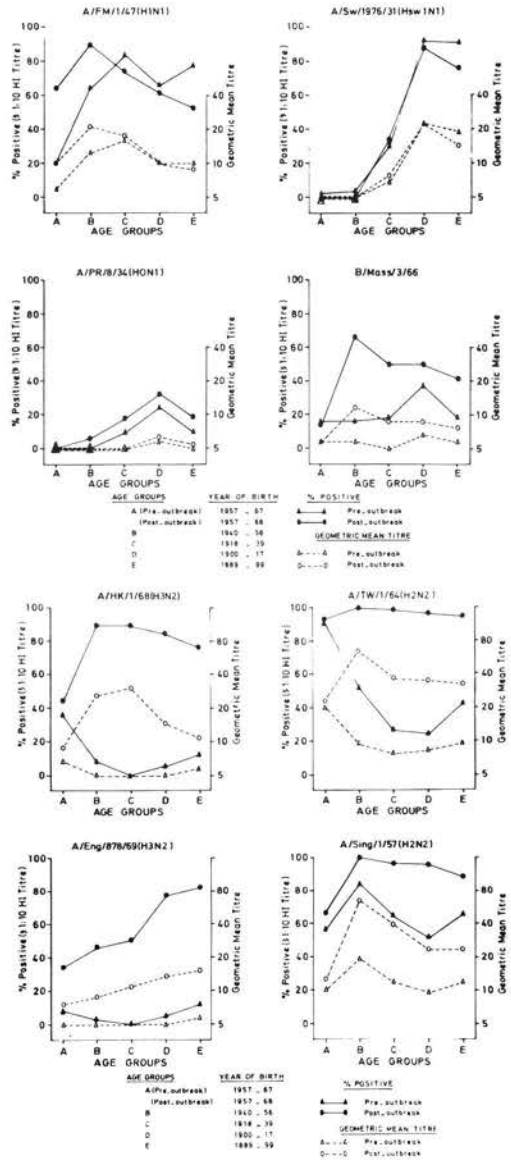


Fig. 2 FREQUENCY DISTRIBUTION AND GEOMETRIC MEAN TITRE OF HI ANTIBODIES TO 8 INFLUENZA VIRUS STRAINS IN W. MALAYSIAN SERA OF 5 AGE GROUPS COLLECTED BEFORE AND AFTER THE HONGKING 'FLU OUTBREAK IN 1968.

TABLE 2

DISTRIBUTION AND GEOMETRIC MEAN TITRE (GMT)* OF HI ANTIBODIES IN SERA OF FIVE AGE GROUPS TESTED AGAINST 8 INFLUENZA STRAINS

(a) Pre-1968 epidemic sera

Group	Year of Birth	Age (years)	Date of collection	No. Exam.	A/HK/68 (H2N2)		A/Eng/69 (H3N2)		A/Tw/64 (H2N2)		A/Sing/57 (H2N2)		A/FM/47 (H1Na)		A/PR/34 (H0N1)		A/SW/31 (Hsw1N1)		B/Mass/66	
					%	GMT	%	GMT	%	GMT	%	GMT	%	GMT	%	GMT	%	GMT	%	GMT
A	1957 –67	0 –10	1967	45	36	7	9	5	91	20	56	10	20	6	0	5	2	5	15	6
B	1940 –56	5–21	1961	80	8	5	3	5	51	9	84	19	64	13	0	5	3	5	16	6
C	1918 –39	22–43	1961	115	0	5	0	5	26	6	64	12	83	17	9	5	30	7	18	5
D	1900 –17	44–61	1961	92	5	5	5	5	24	7	51	9	65	10	24	6	92	23	37	7
E	1889–99	62–72	1961	43	12	6	12	6	42	9	65	12	77	10	9	5	91	19	18	6
			GROSS	375	10	6	4	5	41	8	64	12	66	12	10	5	43	10	22	7

(b) POST – 1968 epidemic Sera

A	1957 – 68	1 –12	1969	50	44	9	34	8	92	24	66	13	46	10	0	5	0	5	14	6
B	1940 – 56	13 – 29	1969	100	89	27	46	9	99	67	99	66	89	21	5	5	0	5	66	12
C	1918 – 39	30 – 51	1969	104	89	32	50	11	98	37	96	39	74	18	17	5	33	8	49	9
D	1900 – 17	52 – 69	1969	79	84	15	77	14	96	36	95	24	61	10	32	7	87	23	49	9
E	1889 – 99	70 – 80	1969	17	76	11	82	16	94	34	88	24	53	8	18	6	76	15	41	8
				350	81	21	54	11	97	43	92	34	70	15	15	6	33	8	48	10

* Titres expressed as reciprocals

Titres less than 1:10 arbitrarily assigned a value of 1:5 or log 10=o.7 in the calculation of G.M.T.

The sera of these children were sent to the WHO International Influenza Center for the Americas, Atlanta, U.S.A., to be tested for specific H3 antibodies. They were put up against the wild type A/HK/8/68(H3N2) and the recombinant A/HK/8/68 (H3)-equine/Praque/1/56(Neql) in the HI test (see Table 3). With one exception all of the Hi titres to A/HK antigen dropped out when the sera were tested against the recombinat strain containing only the H3 haemagglutinin. This suggests that the pre-1968 HK titres were apparently due to N2 and and not to H3 antibodies. The possibility that the HK virus could have been circulating among the younger age group prior to 1968 was therefore ruled out.

TABLE 3

HI TEST OF PRE-HK INFLUENZA OUTBREAK CHILDREN'S SERA TO DETECT H3 ANTIBODIES

Sera Code No.	ANTIGEN		
	A/HK/8/68	A/HK/8/68 (H3) - eq/Pr/56 (Neq 1)	Serum Control
VR 23076	80	0	10
22875	10	0	0
22851	160	80	0
23321	160	0	0
23419	20	0	0
23610	0	0	40
23476	40	0	0
23631	10	0	0
23641	10	0	0
23405	40	0	0
22834	0	0	>40
CONTROLS:			
A/HK/8/68	320	160	
A/HK/8/68-eq/Pr/56	320	160	

Why the N2 antibodies inhibited H3N2 virus to this degree is not clear. It could be due to the presence of low level (undetectable) nonspecific inhibitors which will greatly enhance the reaction. Frequently, this is the result of incomplete distruction of nonspecific inhibitors by RDE. In any event, this is a real phenomenon.

The actual epidemic in 1968, appeared to have involved more the adult groups than children aged 1 to 2 years. The individual post-epidemic titres of the older groups ranged from 1:10 to 1:640 whereas those of age froup A ranged from 1:10 to 1:80. In subsequent minor and localised outbreaks caused by the Hongkong variant which occurred in Malaysia in 1970 (Tan etal., 1971) and 1971 (unpublished) the children were again spared of the infection. The reasons for this are not clear.

The pattern for A/Singapore antibodies in the pre-outbreak sera differed considerably from those of A/Taiwan and A/Hongkong antibodies. All age groups possessed A/Singapore antibodies with the peak incidence in group B, born in 1940-56, who comprised children and young adults. A post-epidemic booster effect is evident in all age groups.

In the case of A/Taiwan antibodies, their relative high prevalence in children (group A) compared with the older age groups may be attributed to the fact that groups B to E were sampled in 1961 i.e. before they experienced the A/TW/64 virus and group A was sampled in 1967 after the emergence of the 1964 virus. Not much significance can therefore be attached to the difference in antibody prevalence between group A and the others. The post-outbreak sera showed greater than 90% prevalence rates for all age groups, presumably due to anamnestic response.

The oldest age group, E, born in 1889-90, showed residual antibodies versus A/Taiwan and A/Singapore viruses which were generally higher in prevalence and titre than those of antibodies in persons born between 1900 to 1939 (aged 22 to 61 years). This was also evident with antibodies versus A/Hongkong and A/England strains although in these cases the titres were much the same among the various age groups (Table 2a).

It has been presumed, as mentioned in the foregoing, that the pendemic of 1889-90 was due to Asian (H2) prototype and that the Hongkong type virus apperared in man about 1900. Marine and Workman (1969) had even suggested that the 1889-90 pandemic was in fact more closely related to the Hongkong variant than to other known strains.

Based on the hypothesis of Davenport et al. (1953) and the antibody patterns of the elderly persons of Malaysia born in 1889-90, it may be deduced that this section of the population did

encounter the Asian (H2) prototype virus and the Hongkong variant in their younger days.

The pandemic of 1918-19 was presumed to be caused by strain related to swine influenza virus. This is most clearly evident in the extremely marked incidence of antibody against A/Swine strain in those born between 1889 to 1917 compared with the incidence in the younger age groups.

There were no significant differences between the pre-and-post epidemic prevalence and titres of antibodies against A/FM/1/47, A/PR/8/34 and A/Swine/1976/31 viruses ($P \geqslant 0.01$) as there were in antibodies versus all the H2 strains. It appears therefore that infection with the Hongkong virus caused anamnestic rises in antibodies to H2 antigens but not to H1 or HO. This suggests that reinforcement of antibodies with each succeeding epidemic (Davenport, 1953) may be limited to certain antigenic "families" of type A viruses.

The peak incidence of antibodies against A/PR/8 was in group D (born in 1900-17). However, the GMT in all the age groups were low (less than 1:10) as were the prevalence ratios.

Antibodies versus A/FM/1/47 were highest in prevalence and titre in the adults and middle-aged born between 1918 to 1956, They were minimal in children and declined with age.

Since this laboratory was set up in 1953, it has not detected, to any great extent, influenza outbreaks due to the type B variant in Peninsular Malaysia. A localised outbreak of type B influenza was reported by Smith and Thomson (1956) to have occurred in 1955 in a residential boys' school, the Malay college in Kuala Kangsar (166 miles north of Kuala Lumpur). This was the first time type B influenza virus had been isolated in Malaysia ("Malaya" at that time). In May, 1955, a further outbreak of type B influenza, confirmed by serology alone, occurred in a Malay Regiment Depot at Port Dickson (56 miles south of Kuala Lumpur). However, on both occasions, the infection did not assume epidemic proportions.

The pre-Hongkong 'flu epidemic pattern of the B/Mass antibodies (Fig. 2) shows a peak in incidence (37%) in those born in 1900-17, but the GMT was less than 1:10 as in the other age groups.

After the Hongkong 'flu outbreak, however, the mean titres of B/Mass antibodies increased in all the age-groups except the youngest (Table 2). The highest increase was in age group B, born in 1940-56, in which the GMT rose from 6 to 12. As no HI cross reactions were detected between the type B and A2/HK variants (Table 1) nor are such reactions to be expected, the only possible conclusion is that type B virus had been active, in mild way, during during the A2/HK epidemic itself. This activity had reinforced the low and sparsely-distributed type B antibodies acquired during the mild and localised outbreak in or about 1955. Here again, the youngest age-group appeared to have been spared of the infection.

SUMMARY

Of 725 Peninsular Malaysian sera tested for influenza HI antibodies 372 were collected before the Hongkong 'flu outbreak in 1968 and 350, after the epidemic. Five age froups ranging from those born in 1889 to those born in 1968 were tested with 8 influenza type strains; A/Swine/1976/31(HSw1N1), A/PR/8/34 (HON1), A/FM/1/47(H1N1), A/Singagapore/1/57 (H2N2), A/Taiwan/1/64(H2N2), A/Hongkong/1/68 (H3N2), A/England/878/69 (H3N2) and B/Massachusetts/s/66.

The A/Hongkong antibodies increased in prevalence by 10-fold and in GMT, by 4-fold after the epidemic and about 80% of the population were involved. Children aged 1 to 12 were comparatively spared of the infection which appeared to have attacked mainly the young adult groups. The reasons for this are not clear.

A similar conversion was observed with the the closely related A/Eng/69 antibodies.

Moderate rates of antobodies versus Hongkong virus were detected in children less than 10 years old even before the 1968 outbreak. However, further examination of these sera by the WHO International Influenza Center for the Americas, USA., suggests that these titres were due to N2 and not to H3 antibodies, thus ruling out the possibility that the HK virus was circulating among the younger age group prior to 1968.

Antibodies versus A/Taiwan and A/Singapore viruses were increased by 1½ to 2-fold in an

anamnestic response to A/Hongkong virus. No significant conversion was noted with antibodies versus A/Swine, A/PR/8 and A/FM/1 strains after the epidemic.

An increase in incidence (> 2-fold) and GMT (1½-fold) was noted with B/Mass antibodies.

The antibody patterns in the elderly population of Malaysia indicated that the country had been affected by the ancient Asian (H2)pandemic of 1889-90, the 1918-19 pandemic caused by the swine virus and possibly also by the ancient Hongkong 'flu strain presumed to have circulated around 1900 or even prior to that.

Antibodies against A/PR/8 and A/FM/1 viruses were most prominant in the adult and middle-aged groups.

Evidence of mild type B activity during the A/Hongkong epidemic itself was detected in the boosting of type B antibodies, especially in the age group born during the recorded localised outbreak in 1955.

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Ethnic differences in Physiological responses to maximal effort in Malaysian Adolescents

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ABSTRACT

A sample of twenty-six boys of different ethnic origins taken from one selected urban school in Kuala Lumpur were exercised to exhaustion to measure their aerobic capacities. 9 Malay, 9 Indian and 8 Chinese boys aged between 12 – 18 years, all living under similar environmental and ecological conditions performed from submaximal to maximal work loads on a step-ergometer of two risers, each 0.4m high. Statistical treatment of the data did not show any significant differences between all the parameters measured. The Malay boys had a maximum aerobic power of 49.5 ± 10.6; the Indian boys, 47.2 ± 5.1; and the Chinese boys, 43.6 ± 4.6 ml/min/kg respectively. The maximum heart rates recorded during the last 10 seconds of maximal exercise also showed no significant differences being, 193 ± 10; 198 ± 5 and 196 ± 8 beats/min respectively. The blood lactate and pH levels were inconclusive and range from 78 ± 30 and 7.24 for Malays; 69 ± 24 and pH 7.27 for Indinas; and 85 ± 30 and pH 7.23 for Chinese. Thus, ethnic differences in adaptation to maximal effort could not be demonstrated. Differences in adaptability such as have been reported could have been due to differences in habitual activity, as has been indicated here, and that the factors which determine aerobic power are postulated to be natural selection operating under contrasting environments and modified by genetic endowment. Races do not diverge in adaptive capabilities without selective external pressures.

INTRODUCTION

Racial differences in physical working capacity have not been demonstrated as yet, although many studies have been done. The work on primitive societies also do not show the expected adaptation to outdoor life. The Arctic Indians (Andersen *et al*, 1960), the nomadic Lapps (Andersen *et al*, 1961), the Eskimoes (Andersen and Hart, 1963); the Pascuan women of Easter Island (Andersen, 1967); the Eskimo hunters of Greenland (Lammert, 1972) and the Malaysian Temiars (Chan *et al*, 1974) have shown insignificant differences in maximal aerobic power. The studies of aerobic power of selected populations has been reviewed by Andersen (1966).

Ethnic differences have also not been shown in

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working capacity in studies where different ethnic groups work under similar ecological and environmental conditions. Adaptation between negro and white share-croppers (Robinson *et al*, 1941); between African bushmen and whites in Africa (Wyndham *et al*, 1963), between Czechoslavakian physicians and Vietnamese (Skrang and Havel, 1964), and between European caucasians, Nigerian natives of Yaruba and Kurdish and Yemenite Jews (Davies *et al*, 1972) have also not revealed significant differences in aerobic power.

The present study was undertaken on Malaysian schoolboys sampled from the same school in Petaling Jaya randomly, to study any differences in their physiological and metabolic reactions to graded exercise that might result from ethnic differences.

MATERIALS AND METHODS

SUBJECTS

A random sample of 26 schoolboys aged between 12 to 18 years were selected from the same school in Petaling Jaya, comprising 9 of Malay origin, 9 of Indian origin and 8 of Chinese origin. As far as possible, they were living under identical ecological and environmental conditions, and indulged in the same types of activity in and out of school. A physical medical examination and electrocardiogram was carried out in each case to exclude those unfit for exercise.

EXPERIMENTAL PROCEDURE

All the tests were carried out on a step-ergometer of two risers, each 0.4 m high, in the school gynamsium where the ambient temperature was about 26°C throughout the year. Electrocardiographic electrodes were placed at positions V_1, V_4 and V_5 and records were read from a portable Cardiostat T (Siemens) electrocardiogram. The subjects were made to perform work loads in identical fashion, with three work loads of 18, 23 and 28 cycles per minute on the single step. Subsequently, two work loads, at 22 and 26 cycles per minute were performed on the double step. Each workload was performed for 5 min with an interval of 10 min rest in between, except the last when the duration depended upon the work tolerance of the individual. Heart rate was monitored throughout the test, especially the last 10 sec before the end of each test. Expired air was collected through a one-way value into a Douglas Bag during the last minute of each exercise period. The volume of expired air was measured by a calibrated gasometer and the expired air was analysed by a Haldane Gas Analyser in duplicate.

Blood from a finger prick was sucked up a capillary tube immeidately on cessation of exercise for later measurement of pH using an Estrup machine. 0.1 ml of blood taken 4 min after exercise was measured for blood lactate using the standard Sigma Kit for lactic dehydrogenase.

RESULTS

PHYSICAL CHARACTERISTICS

The physical characteristics of the subjects are given in Table 1, where it can be seen that the average somatotype is not significantly different. However, on closer examination, there seems to be some variability within the groups of different racial origins.

TABLE 1: PHYSICAL CHARACTERISTICS OF THE DIFFERENT ETHNIC GROUPS

ETHNIC GROUPS	AGE (yrs)	WEIGHT (kg)	HEIGHT (cm)
MALAY	14.0 ± 2	43.6 ± 12.8	155 ± 12.7
INDIAN	15.0 ± 1.8	43.4 ± 9.8	161 ± 13.3
CHINESE	15.0 ± 2.2	48.0 ± 10.5	163 ± 10.2

MAXIMUM AEROBIC POWER

The physiological and metabolic responses of the three ethnic groups are given in Table 2, where it can be seen that there were no significantly different values for maximal aerobic power maximum heart rate and blood pH and lactate values amongst the three ethnic groups studied.

The mean values of maximal oxygen consumption (Fig. 1.) blood pH and blood lactate (Fig. 2) demonstrate clearly the insignificant differences found. It was also shown that blood pH levels tended to fall whilst blood lactate values rise in accordance with the proportionate amount of oxygen consumed at their maximal levels (Fig. 3).

TABLE II: PHYSIOLOGICAL AND METABOLIC RESPONSES TO MAXIMAL EFFORT

SUBJECT	WORK OUTPUT	AEROBIC WORK		ANAEROBIC WORK	
	Kg-m/min	V_{02} max (ml/min/kg)	Hf (beats/min)	PH	La(mg %)
MALAYS					
1	1178	53.6	194	7.21	104
2	905	57.4	194	7.25	96
3	528	44.4	176	7.24	42
4	538	62.66	198	7.20	73.6
5	533	55.6	191	7.26	46
6	1155	50.5	212	7.23	98
7	661	55.2	188	7.21	72
8	855	34.6	180	7.28	72
9	630	31.3	199	7.33	62
	708.4 ± 282.6	49.5 ± 10.6	192.9 ± 9.9	7.24 ± 0.04	78.2 ± 29.6
INDIANS					
1	796	56.6	203	7.3	66
2	915	42.3	198	7.18	94
3	598	46.8	198	7.25	40.8
4	501	48.5	200	7.32	444
5	780	44.8	188	7.22	68
6	683	49.2	198	7.30	50
7	841	48.0	199	7.33	64
8	564	38.4	196	7.26	86.8
9	1093	49.8	196	7.31	74
	727.4 ± 181.2	47.2 ± 5.1	198.1 ± 4.8	7.27 ± 0.05	68.6 ± 29.6
CHINESE					
1	850	47.2	191	7.13	126
2	1054	45.3	202	7.24	94
3	982	47.9	207	7.18	96
4	341	36.6	189	7.29	49
5	610	36.6	191	7.29	36
6	848	46.6	194	7.24	78.4
7	1007	46.1	194	7.29	106
8	994	42.6	188	7.19	96
	747 ± 222	43.6 ± 4.6	196.3 ± 2.9	7.23 ± 0.06	85 ± 29.7

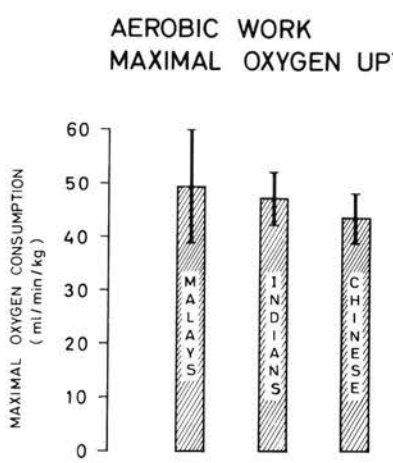

FIG. 1. DIAGRAM OF AEROBIC WORK OF THREE ETHNIC GROUPS

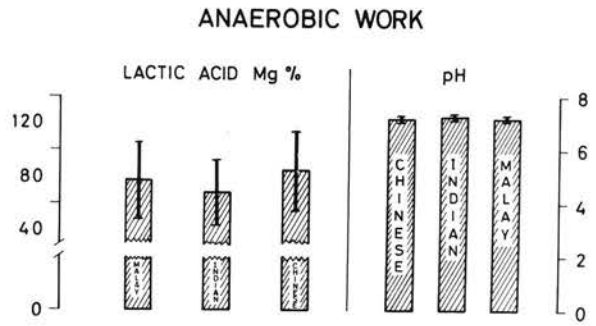

FIG. 2: DIAGRAM OF ANAEROBIC WORK

COMPARISON OF LACTIC ACID LEVELS REACHED AND pH OF BLOOD IN THE THREE ETHNIC GROUPS

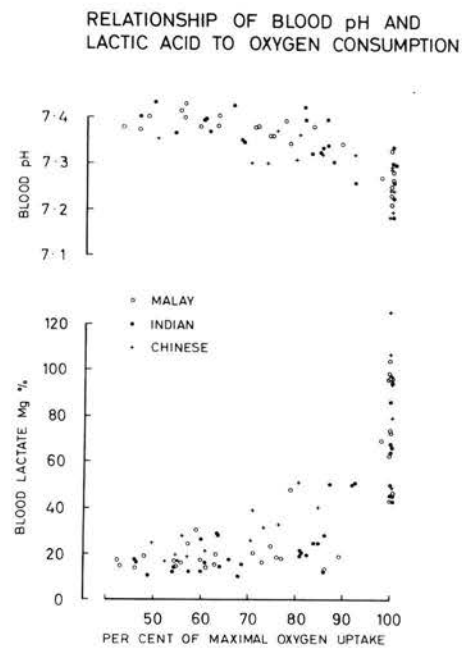

FIG. 3: RELATIONSHIP OF BLOOD pH AND LACTATE TO MAXIMAL OXYGEN CONSUMPTION.

DISCUSSION

Studies that attempt to correlate racially or ethnically inherited characteristics that predetermine maximum aerobic power require large population samples to be meaningful. However in a multitude of studies, several criteria have been laid down so that results obtained from one study can be validly compared with those obtained in other studies (Shephard *et al,* 1968; Andersen *et al,* 1971) whether the step ergometer, the bicycle ergometer or the treadmill is used.

The above criteria have been religiously followed, in that the subjects were tested in identical fashion, and were living under very similar conditions, environmentally, socio-economically and indulged in the same type of physical training exercises. That there has been no significant differences shown in both physiological and metabolic parameters observed in this study does not make it more or less valid. Similar studies between ethnically different groups also show no significant differences in work capacity (Wyndham et al, 1963; Skrang and Havel, 1964; Davies *et* al, 1972).

However, some differences in physical adaptability have been demonstrated within the same sample of a homogenous population, e.g., differences in work capacity due to sex and age (Astrand, 1960) or due to age alone (Rodahl and Issekutz Jr, 1962). It is also well known that well-trained endurance athletes have much higher aerobic capacities than do untrained persons or even groups of people employed in different occupations such as the bus conductor having a higher aerobic capacity than his bus driver (Astrand and Rodahl, 1970). In a similar fashion, examination of the whole sample of schoolboys revealed that according to the amount of physical activity undertaken, as adjudged by a history of the level of sports they play (Fig. 4) (e.g. whether representing school or combined school or house), it was found that there was a correlation between physical activity and high aerobic power. It can therefore be argued that whatever differences of aerobic power that can be demonstrated, would be derived from the daily physical routine of that particular group of people, without regard to ethnic heredity, and that these groups of people habitually tax their oxygen transport system whether because of work or by design such as athletes.

In conclusion, variability from the above statement of the correlation between high-activity life and high aerobic power can sometimes be found, and this has been explained by the limits to which a person is genetically endowed with his capacity to consume oxygen (Klissouras, 1971).

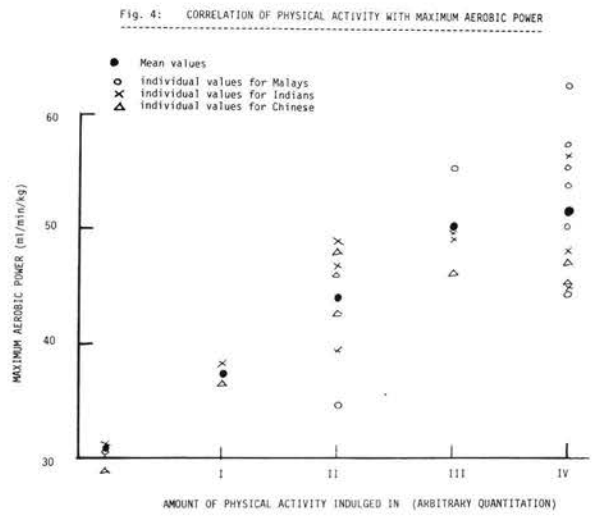

FIG. 4: CORRELATION OF PHYSICAL ACTIVITY WITH MAXIMUM AEROBIC POWDER

AC KNOWL EDGM ENTS

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Cot deaths in Malaysia

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COT DEATHS IN MALAYSIA

Cot Deaths, Crib Deaths or Sudden Infant Death Syndrome is a term which refers to the death of any infant or young child, which is unexpected by the history and in which a thorough post mortem examination fails to demonstrate an adequate cause of death. (Bergman et al 1970). In the majority of cases, the infants are found dead by their parents in cots, beds, or cribs, after having been placed there the night before. Because of the dramatic suddeness, these deaths remained until recently, within the province of forensic medicine. It was also believed that these infants had died of suffocation because of autopsy findings, suggestive of asphyxia in some cases. Even as far back as 1947, Werne and Garrow were not prepared to accept, so facile an explanation. Therehas since been a tendency, for a more critical approach, as to the cause of these deaths, the aetiology and/or mechanism of whichsis still not fully understood. The problem has assumed considerable importance especially in the Western hemisphere. In recent years cot deaths have been reported from many parts of the world, and they can be expected to assume greater prominence in those countries with a decreasing incidence of infectious diseases and nutritional disorders.

CASE REPORTS

The first case is LJH, a 2 month old, male infant of mixed Asian origin. He is reported to have been well earlier on the day of his death. Having received his last bottle feed of milk early in the afternoon, he was put to sleep in a cot. He was found dead at about 5.00 pm. According to the parents the position he was found in, did not suggest the possibility of suffocation.

LJH was an adopted child of middle-class parents, who had two other children of their own, a girl aged 2 years and a boy aged 7 months. He was seen by a general practitioner at the age of 6 weeks for a routine check up, and found to be well. He had not as yet been started on routine immunization. There was no history of any recent illness in the family. However questioning the father revealed that the maidservant, but not the infant, had been having snuffles. Information about the birth history and the early life of the infant was not available but the parents claim that he had been perfectly well since adoption at the age of 1 month.

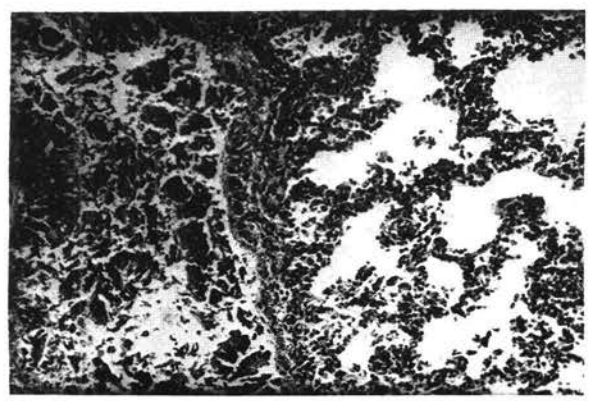

Fig. 1. Show large collections of bronchial epithelial cells in bronchus and normal aerated lung tissue.

At autopsy, the body was that of a well nourished infant with post mortem lividity over the trunk and thighs. The trachea and bronchi contained a small quantity of clear fluid but there was no aspirated material. Both lungs were expanded with a uniform pinkish appearance of the pleura on which a few petechiae were seen. The cut surfaces showed congestion. The heart was normal. The stomach was filled with a curdled mass of milk. The other abdominal viscera and brain were unremarkable. Histology revealed focal haemorrhages in the thymus. Most sections of the lungs showed aerated lung tissue with congestion, oedema, and subpleural haemorrhages. In areas groups of alveoli contained macrophages. Some of the lung sections showed that bronchi were devoid of epithelium but explosive epithelial desquamation was not seen. The other organs showed no significant histological abnormality though a detailed study of the parathyroids and cardiac conducting system was omitted.

The second case is CKF, a 2 months old male Chinese infant, who is said to have been well and cheerful on the morning of the day of his death. After being given his mid-day bottle feed on milk the mother put him to sleep, in a hammock, with a spring suspension. About 2 hours later she heard him cry and when she went to look at him he was seen closing his eyes; and looking at him again half an hour later, he was noticed to be pale and listless. He was rushed to hospital where on arrival the doctor pronounced him dead. The past history, is that a week earlier he had been having a bad cough which a private practitioner diagnosed and treated as bronchitis. However about 3 to 4 days before his death he was relatively free of cough and his bronchitis had apparently cleared up.

CKF was the only son of a self-employed tradesman in the lower income group, and the mother, a housewife. He was born in a hospital at term. The delivery was normal and his birth weight was 5 lbs. 10 ozs. He was bottle fed from the beginning. He became slightly jaundiced on the fifth day but this soon cleared up.

The autopsy findings were that of a well nourished Chinese infant which showed peripheral cyanosis and lividity of the posterior chest and abdomen. The trachea and bronchi contained scanty clear fluid but no aspirated material. The pleural surfaces of both lungs were to some extent mottled pink and purple and showed a few petechial haemorrhages. The tracheo-bronchial nodes were slightly enlarged. The heart was normal except for petechiae over its mid posterior aspect on the atrioventricular groove. The stomach contained milk curds.

The liver, biliary tree, other abdominal viscera and the brain were unremarkable. Histology of the tracheo-bronchial nodes showed reactive lymphadenitis. Histology of the lungs showed oedema, congestion, sub-pleural haemorrhages and in some of the sections there were collections of macrophages within the sub-pleural alveoli. There was no evidence of a pneumonitis. Explosive desquamation of the bronchial epithelium was seen in an occasional bronchus (Fig. 1) but most of the bronchi had a normal epithelial lining. Other organs showed no significant histological abnormality. As in the previous case detailed study of the cardiac conduction system and parathyroids was omitted.

DISCUSSION

The purpose of this paper is to review briefly the current facts and theories pertaining to cot deaths and present two cot death cases which hitherto as far as we are aware have not been reported from this part of the world. We have no doubt that these deaths are far more numerous than suspected and it is hoped this paper will stimulate greater awareness. It is therefore salutary to follow this up by establishing the incidence of cot deaths here. It must be emphasized that in all suspected cases of sudden unexpected infant death, the scene, usually the home should be visited by at team of medical and social workers. The enigma of a healthy infant dying in this way must be explained to the bereaved parents amongst whom considerably recrimination and despair are the usual sequalae. The 'clearing of the air' by the team will go a long way to dispel grief and misgiving on the part of the parents. The investigation should include an interview of the family to ascertain the prior health of the dead infant, and to what extent trauma and infectious diseases in the family or in the neighbourhood may have been a contributory cause. At the onset of such an investigation it is pertinent to entertain thes question of child cruelty (battered baby syndrome) and therefore a radiographic skeletal survey followed by an autopsy should be an essential routine whenever possible. The reasons for an obligatory autopsy in cot death cases cannot be overstressed and this is discussed by Raven (1973) and others. Not only is it important to determine the exact cause of death but rule out deaths due to accident, negligence or even infanticide.

It is probable that cot deaths are less common here than in temporate countries as has been suggested by a recent study in Isreal, (Winter and Bloch 1973). In round figures the incidence in Great Britain is approximately 1,100 deaths per year and in the U.S.A. 10,000 deaths per year (Valdes-Dapena, 1963). In countries with a temperate climate there is an excess of cases in winter (Carpenter and Shaddick, 1965) and even a clustering of cases on a single day was reported in a Canadian study. In Brisbane, Australia which has sub-tropical climate, cases showed no seasonal incidence but with a tendency to occur in groups (O'Reilly and Whiley, 1967).

Most workers agree that cot deaths occur in the first six months of life, though a few occur before three weeks or after six months. There is a relative peak incidence between the ages of two and four months with a male preponderance, which varies from 53 – 62%. It will be noted that both our cases were aged about two months and were boys. Perhaps the most striking feature of this syndrome is the time of the day when the deaths occur, that is, during sleep and early in the morning. As will be seen in our cases, both had died in their sleep but in the afternoon. Some variation from the generally recognised features of the syndrome may be attributed to a tropical climate, pertinent features of which are, negligible seasonal variation and the equal duration of the day and night throughout the year.

Valdes-Dapena (1963) notes that, on autopsy with subsequent appropriate laboratory investigations, a cause of death is found in 16 percent of cot death cases. In 5 percent of the cases the basic lesion is demonstrable on gross examination. Some of these have been reported as congenital heart disease, neonatal myocarditis, endocardial fibroelastosis, bilateral purulent otitis media and pneumonia. We have on our records an infant aged ones week, apparently well, who died suddenly and unexpectedly in the post-natal ward of this hospital. Autopsy revealed a gross cardiac abnormality (cor bi-atrium triloculare). In view of its age and the severity of the cardiac lesion we considered it was not appropriate to be labelled as a cot death.

Bowden in Australia had published a list of conditions from which babies had died suddenly, including congestial heart disease and pneumonia, stating that cot death cases were all dying of natural diseases which had failed to be recognised. Camps (1972) commenting on this thinks that Bowden may have introduced a false idea, that is, to assume that *a* cause of death is necessarily *the* cause of death.

The most common naked eye findings at autopsy are petechial haemorrhages, seen in a variable proportion of cases on the lungs, heart and thymus. It was this that led to the hypothesis of suffocation as a cause of cot deaths though it cannot be denied that this may account for a negligible number. The age incidence, with a relative peak in the third to fourth month and the preponderance of cases being over six weeks of age argues against suffocation (Judge 1953). Woolley (1945) demonstrated that infants will respond to an experimentally contrived smothering by rolling over and continuing to breath well. The presence of intrathoracic petechiae does not itself lend support to suffocation as an important mechanism. Polson (1973) has discussed the significance of petechial haemorrhages. Gordon et al (1953) say that Liman's views "receive substantial support at present as pathologists have repeatedly described petechial haemorrhages in the serous membranes in may forms of deaths". More recently Guntheroth et al (1973) have repeated Handiforth's (1959) experiments in rats to determine the factors responsible for the appearance of petechiae and to establish the specifity of those lesions for laryngeal obstruction and concluded that unremitting airway obstruction is unlikely as a cause of cot deaths.

Nasopharyngeal obstruction coupled with obligatory mouth breathing (Shaw 1970) has also been claimed as a cause of death in these cases. In such a position wherein it cannot breathe through its mouth the infant would suffocate. There has been no uniform corroboration of this. Acute epiglottitis is now a well recognised paediatric entity but it has not been documented as a cause of cot deaths and likewise there is no morphologic basis for any presumptive or definitive diagnosis such as bronchiolitis, laryngospasm, laryngitis (Huntington and Jarzyn 1962).

A variety of histological findings have been reported in cot deaths. Some of these include upper respiratory tract inflammation (Valdes-Dapena 1963), intraalveolar large mono-nuclear cells with an explosive desquamation of bronchial epithelial cells (Bodian and Heslop 1956) seen in one of our cases. This however may be an artefact and has been seen in a number of non-cot deaths. Stowens (1966) has described mild diffuse alveolar over-distention and pulmonary oedema. Stowens (1966) also described a decrease in the number of eosinophils in the thymus,

a retention of its infantile and a diffuse swelling of arterioles in many organs, findings which have been uncorroborated.

In the heart, myocardial cell lesion has not been demonstrated. James (1968) described resorptive changes in the left bundle of His and the left margin of the atrioventricular nodesbut these changes were also seen in some of the controls. As current hypothesistends toward the concept of an instantaneous interruption of some basic physiologic function such as the control of cardiac action or respiratory function it would be tempting to attribute death to a transient but fatal cardiac arrhythmia based on his observations. However re-examination of the histological characteristics of the atrio-ventricular node and the bundle in infants who had died suddenly and unexpectedly and in age matched controls by Valdes-Dapena et al (1973) questions the validity of malfunction of this or any other anatomic system to features of its normal developmental histology. Cardiac electrolyte imbalances have been described and refuted in cot deaths. (Fraggot Lynas and Marshall, 1968).

Geertinger (1968) advanced the hypotheses that congenital incomplete development of the parathyroids is the underlying basis for such vulnerability to sudden death but other studies havesnot supported this finding. The demonstration of the fusion of parathyroids to the thymus in cot deaths has also been noted in otherwise explained infant deaths. It is apparently a structural variant and presumably of no significance. Cervical spinal epidural haemorrhage have been reported in cot death cases. These haemorrhages have also been found in controlled studies and they have been presumed to be a secondary or agonal. No underlying spinal cord pathology or changes in the cervical vertebrae have been found in such cases.

Werne and Garrow (1947), based on a study of 167 consecutive cases of infants allegedly suffocating, in the final paragraph of their paper stressed the importance of efforts to prevent the sudden death of infants by diminishing exposure to known sources of infection. Nevertheless, in general, most studies of cot deaths have not recovered a virus. Johnstone and Lowy (1966) were unable to culture a virus in 47 cases. Negative results were obtained by Parish et al (1964), who cultured fresh autopsy material in 8 cot death cases and this offsets the criticism of the deleterious effect of freezing known to kill the respiratory syncytial virus of epidemic infantile bronchilitis and possibly other viruses. Valdes-Dapena (1963) states that bacteriological studies are essentially negative and the presence of post mortem bacterial growth characterised by the absence of an inflammatory reaction has to borne in mind when a presumed pathogen is isolated from post mortem tissue. Johnstone and Lowy (1966) on the otherhand found a bacterial pathogen in 37 out of 56 cases, the offender being usually a Pneumococcus, Klebsiella pneumonia or Staph pyogenes in 37 out of 56 cases. These were pure or predominant cultures. It is not known to what extent post mortem overgrowth following terminal or agonal tracheal aspiration of gastric contents may be a factor especially as these infants are usually dead for some hours before they are found.

In 1954 Spain stated that the serum gammaglobulines in three cot deaths were lower than in two control cases. This was apparently an exceedingly attractive piece of data as it denoted an unusually low gammaglobulin for cot deaths in the period of known physiological hypogammaglobulinaemia. Recent studies have demonstrated an elevation of IgG and IgM in 15% of cot death cases (Balduzzi et al 1968). A more recent study of the cord blood from 15 out of 23 cot death cases (Clausen et al 1973) indicates that immunological mechanisms may not be of primary significance.

Hypersensitivity to cow's milk in particular became an important consideration in the aetiology and/or mechanism of cot deaths. Barret (1954) had consistently suggested the possibility of some association between these deaths and cow's milk. As a result, an immunoserological study was commenced by Parish and Coombs in 1960. They succeeded in producing a somewhat similar clinical and histological picture in milk sensitized guinea pigs by intratracheal injection of small quantities of milk under conditions simulating sleep (barbiturate sedation). The cow's milk hypersensitivity proposal is based on the contention that cot death infants are invariably bottle fed, there is a higher level of serum antibodies to milk protein, cow's ilk can be demonstrated in the lungs of cot death cases and the mechanisms of death is sudden, therefore suggestive of anaphylaxis. There is an animal model which supports the proposed aetiology and mechanism of death. The hypothesis of hypersensitivity to cow's milk though attractive has been the subject of a much critical contention and the issue remains unsettled.

SUMMARY AND CONCLUSIONS

1. The literature on Cot Deaths or the Sudden Infant Death Syndrome is reviewed with a report of the first two cot death cases from this region. A proceedure for the investigation of sudden infant deaths by a medico-social team has been recommended.

2. The main characteristics of Cot Deaths such as the peak age incidence male preponderance, clustering of deaths during the colder months in temperate countries, deaths early in the morning during sleep, all of which present a uniformly striking picture are outlined.

3. The cause and/or mechanism of Cot Deaths remains obscure for more than two decades and innumerable theories have been put forward, some of the plausible ones have been discussed briefly. At the moment the theories have not stood the test of time but it appears, either allergy to cow's milk proteins or an acute viral infection may have the greatest chance of eventually being proved correct.

4. Besides the United States and Great Britain Cot Deaths have been reported from many parts of the world, and these include Canada, Czecko-slovakia, Ireland, Sweden, Israel and Australia. With improvements in the proceedure of death certification here, these deaths can be expected to be more precisely delineated as an entity, and statistics on Cot Deaths for international Comparison and research compiled.

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Tobacco smoking patterns in a rural community in Negri Sembilan

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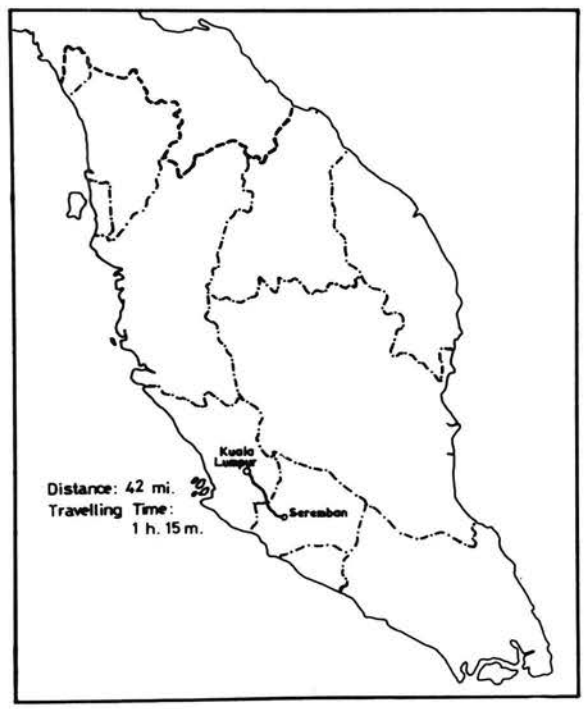
The morbidity and mortality associated with cigarette smoking is causing increasing concern in the medical world. However economic interests in many countries including Malaysia foster the production and sale of tobacco and cigarettes and there is little epidemiological information on the smoking habits in the country.

During March 1973 a survey was conducted in a small rural community in Negri Sembilan. This community was selected for no better reason than that the author was supervising a student i teaching assignment in the area at that time.



THE SURVEY AREA

The 4 villages (Kampongs) selected were linear settlements along the north-south trunk road in the district of Rembau in Negri Sembilan. One of the villages was ten (10) miles south of the capital city of Seremban while the others were twenty (20) miles south. All the villages had populations of less than 1,000 each and had neither piped water supply nor electricity. However they were easily accessible from the main trunk road and adjacent townships had provision shops and coffee shops where cigarettes and tobacco were readily available. Giant cigarette advertisement billboards line the trunk road beside the villages. The main occupations in all the villages were rubber tapping and rice farming.

Method

After an initial introduction to the householders by a community leader living in the village, every dwelling unit was identified, numerically tagged and the entire resident population aged 15 years and above were identified as eligible respondents.

These respondents were interviewed in their homes by the author or her assistant, a public healht nurse (W.L.H.) using a standard series of questions. Infrormation regarding smoking habits was readily volunteered and samples of cigarettes and tobacco were produced whenever requested.

Respondents who admitted to currently smoking cigarettes were classified as smokers and information was obtained on the amount they smoked. The main types of cigarettes smoked were commercial brands and self-produced paper-rolled cigarettes.

THE STUDY POPULATION

389 adults were included in the study population.

The demographic pattern of the community Was rather unusual. The largest village (Gaing Pedas) had an adult population of 179 composed of 55.6% Malays and 46.3% Chinese. The other three (3) villages were predominantly Malay (90.5% – 100%). Females (61 4%) outnumbered males in the sudy population. The age distribution was very atypical - there being a remarkable scarcity of adults (only four (4) in the 15 - 24 age group. This demographic pattern was also noted by Swift in other matrilocal residnece rule communities in Negri Sembilan, and was attributed by him to the matrilineal tracing of descent and inheritance patterns peculiar to these communities, and to developing wage-earning opportunities outside the community. It is difficult to assess what effect this socio cultural background had on the cigarette smoking patterns in the community.

SMOKING HABITS

133 (34 2%) of the adult population in the study community were current cigarette smokers. The smoking habit was significantly more prevalent amongst males Malays and in the older age groups (Tables I (a), I (b) and I (c)).

TABLE I (a) SMOKING AND SEX

	CURENTLY SMOKING		NOT SMOKING		TOTAL	
	No.	%	No.	%	No.	%
Males	84	56 0	66	44.0	150	100
Females	49	20.5	190	79.5	239	100
	$X^2 = 53.49$		$P \ll 0.001$			

TABLE I (b) SMOKING HABIT ETHNIC GROUP

	CURRENTLY SMOKING		NOT SMOKING		TOTAL	
	No.	%	No.	%	No.	%
Malays	110	37 2	185	62.7	295	100
Chinese	'23	24.5	71	75.5	94	100
	$X^2 = 8.49$		$0.05>p>0.02$			

TABLE I (c) SMOKING HABIT AND AGE GROUP

AGE	SMOKING HABIT					
	CURRENTLY SMOKING		NOT SMOKING		TOTAL	
	No	%	No.	%	No.	%
25 44	15	9.9	137	90.1	152	100
45 yeats & above	118	49.8	119	50.2	237	100
TOTAL	133		256		389	
	$X^2 = 65.59$		$p<0.001$			

Each of the villages (Kampongs) varied in its ethnic and age sex compositions and the smoking rates by ethnicity, age and sex are shown in Table II. However the numbers involved are too small to commnet on the significance of the variatoni in smoking rates in the diffrent villages

TABLE II CIGARETTE SMOKING RATES IN EACH KAMPONG

by Ethnicity Sex and AGe Group

	GAINS PEDAS	TANAH DATAR	CHENONG KEDAI	CHENONG ULU
TOTAL ADULT Population	179	88	80	42
SMOKING RATES				
MALAYS	32 9% (32)	39.7% (35)	45.9% (34)	23.6% (9)
Chinese	22 9% (19)	Nil (Nil)	42.8% (3)	25.0% (1)
MALES	49.3% (34)	22.7% (20)	63.6% (21)	47.3% (9)
FEMELES	15 5% (17)	17.0% (15)	40.0% (16)	4.5% (1)
25 - 44 yrs	12.0% (12)	15.0% (6)	32.3% (10)	12.5% (2)
45 years and above	35 0% (35)	54.1% (26)	46.1% (24)	26.9% (7)

FOOTNOTE: The figures in brackets refer to actual numbers.

Amount of cigarettes smoked

Chinese in the study community smoked more "heavily" (i e 20 or more cigarettes per day) than did the Malayas

TABLE III AMOUNT SMOKED BY ETHNICITY

	No. of cigarettes smoked per day							
	10		10 - 19		20 & above		Total	
	No.	%	No.	%	No.	%	No.	%
MALAYS	44	40.4	44	40.4	21	19.2	109	100
CHINESE	3	12 5	10	41.7	11	45.8	24	100
TOTAL	47		54		32		133	
	X^2 = 10 17				p< 0.01			

Type of tobacco used

Current smokers in the villages (Kampongs) used commercially available cigarettes cigars, or cheroots or self-produced cigarettes made up by rolling loose tobacco in either dried nipah (Nipah fruticans) leaf or cigarette paper. The loose tobacco as well as the cigarette paper and dried nipah leaf could to obtained in the provision shops in the neighbouring towships.

TABLE IV TYPE OF TABACCO USED BY CURRENT SMOKERS

TYPE OF TOBACCO USED	CURRENT SMOKERS	
	Age<45 years	Age 54+ years
Commercial brands of cigarettes	14	77 (62.6%)
Paper rolled cigarettes	–	31 (25.2%)
Leaf rolled cigarettes	–	7 (5.6%)
Other forms of tobacco	1@	5 (4.1%)
Cigarettes and other tobacco	–	3 (2.4%)
	15	123 (99.9%)

@ Respondents smoking other forms of tobacco i.e. pipe cherrot etc. have not been included as 'smokers' in the rest of this peper.

Younger smokers (below age 45 yerars) smoked commercial brands of cigarettes while amongst older smokers 62 6% used commercially available varieties and 25.2% rolled their own cigarettes using cigatette paper such self produced cigarettes being cheaper than the commercial brands.

DISCUSSION

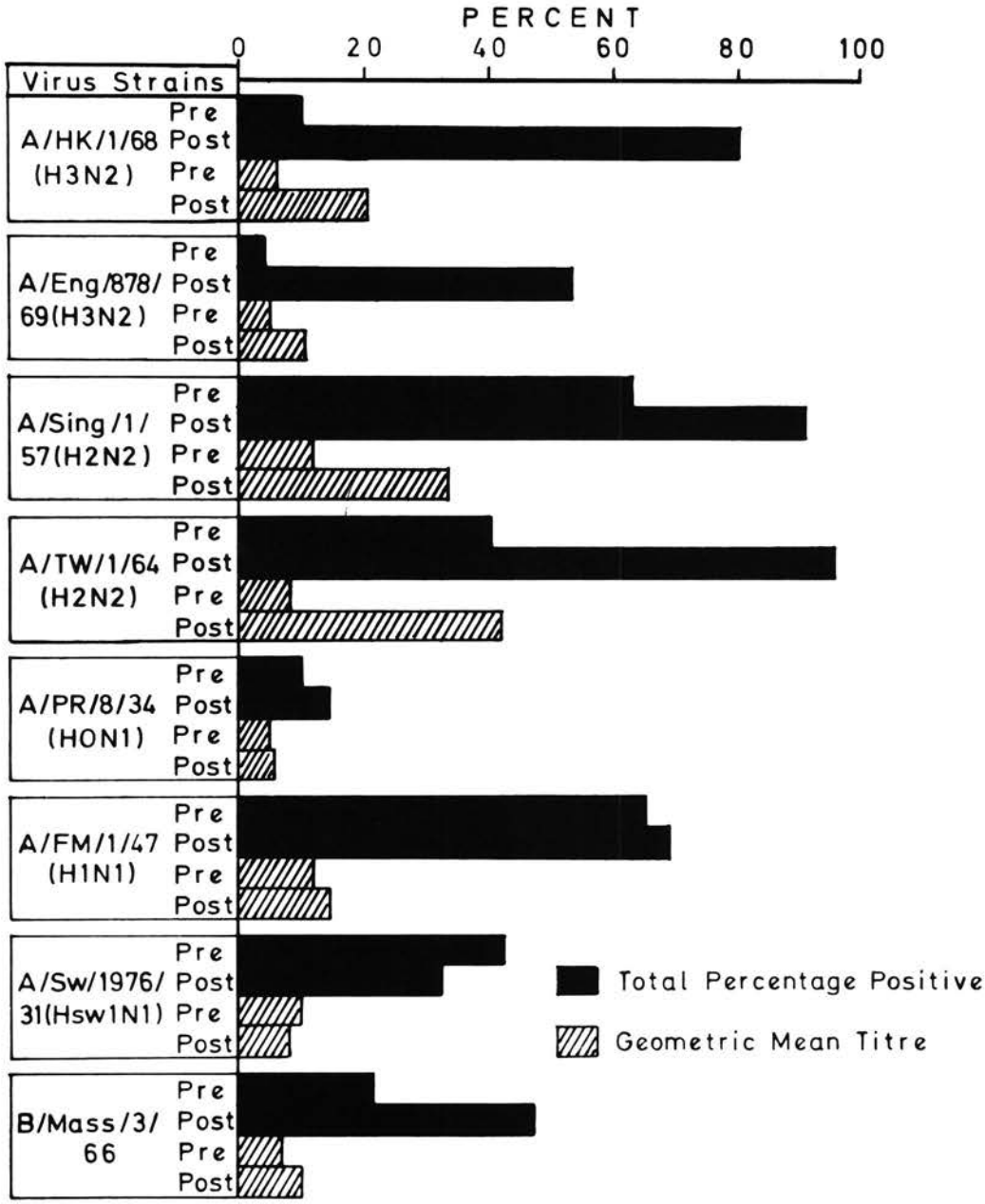
The small and rather select rural community studied showed an interesting epidemiological pattern of cigarette smoking with an overall smoking rate of 34 2%. In other communities where much larger and more significant studies have been carried out for example in the United States (1966) self respondents aged 25 years and above[2] had 25.2% current cigarette smokers; and in 1969 in an urban population sample aged 15 years and above in Kandy, Ceylon[3] a current smokers. rate of 25.2% was demonstrated. It would certainly be interseting to study the epidemiological pattern of cigarette smoking in a larger Malaysian population sample including urban and rural residents.

The ethnic sex and age variations in smoking patterns shown in these Rembau villages (Kampongs) may be a function of the particular community studied but the possibility that these characteristics have a great influence on cigarette smoking patterns in the larger Malaysian community as well is worth further investigation. It would also be interesting to know whether the particular way of life in these villages (Kampongs) did not encourage the smoking habit earlier in life or whether the younger emigrants from the villages (Kampongs) had a dsiproportionately high percentage of current and potential smokers compared to those of their age group who remained behind. Certainly it is clear that smoking is very much a part of the way of life of the older rural residents in these Rembau villages (Kampongs). How much is it also a way of life among other Malaysians?

SUMMARY

A house to house interview of 389 Malay and Chinese adults living in four rural villages (Kampngs) in the district of Rembau, Negri Sembilan showed that 34 2% of them were currently cigarette smokers- the large majority of them smoking commercially available brands of cigarettes. In the community studied, Malays, males and the older age group (45 yrs and above) had higher smoking rates although the Chinese who smoked were heavier smokers.

This epidemiological study in a very select rural Malaysian community suggests that the study of epidemiological patterns of cigarette smoking in larger Malaysian communities including urban and rural samples might reveal interesting and useful knowledge of ethnic age and sex variations in smoking habits in Malaysia This informations would be of great importance in assessing mortality and morbiduty associated with cigarette smoking in the country and could provide useful guidelines for future action aimed at reducing this mortality and morbidity



THE TOTAL PERCENTAGE POSITIVE AND GEOMETRIC MEAN TITRE OF HI ANTIBODIES AGAINST 8 INFLUENZA VIRUS STRAINS IN MALAYSIAN SERA COLLECTED BEFORE AND AFTER THE HONGKONG 'FLU OUTBREAK IN 1968

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Certain aspects of ovarian cancer

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INTRODUCTION

The two outstanding recent advances in Obstetrical and Gynaecological cancers have been in the field of carcinoma of cervix and chorioepithelioma. With mass cytological screening of all females at risk, backed up by a competent Gynaecological & Pathological service, cervical cancer is now a preventable disease (Stallworthy 1972). To a lesser extent, the combined approach of liberal prophylactic hysterectomy and methotrexate therapy, has very significantly reduced the incidence of chorioepithelioma and its aftermath. As these two success stories are extensively documented and well known it is proposed to mention them merely by way of introduction. For the purpose of this afternoon's discussion let us examine some of the problem areas in connection with Ovarian Cancer.

Ovarian Cancer:

Even as we reach the mid-Seventies, the outlook for patients who develop carcinoma of the ovary is almost as bleak as it has been ten years ago. Ovarian cancer continues to be a devastating disease. It looms as the killer of more adult women than any other form of female genital cancer. Despite improved operative techniques, irradiation methods with sophisticated high energy machines, and new chemotherapeutic agents, the overall poor prognosis remains. One typical series (Artner & Beck 1970) reports a 50% 5-year survival for stages IA & IB and 27.3% for Stage II. For Stages III & IV it is well below 20%.

The main reasons for such a gloomy picture for ovarian cancer are as follows:—

(1) delayed diagnosis
(2) a primary inherent tendency for ovarian cancer cells to exfoliate, and
(3) inadequate response to surgery (often incomplete because of delayed diagnosis), radiotherapy, and more recently, chemotherapy.

I propose to consider these and related issues in some detail but before that it is pertinent to point out that there is great complexity in ovarian cancer. Any evaluation would of necessity take into account clinical staging on the one hand and histological typing and grading on the other. Unfortunately, there is no clear cut correlation between the clinical course of the disease and the two groups of multiple variables.

Delayed Diagnosis:

Carcinoma of the ovary has been named the

greatest masquerader in Gynaecology, and delay in its diagnosis has been repeatedly emphasized. From the standpoint of initial symptoms and indeed ultimate prognosis, two gross types of ovarian cancer can be recognised, namely, encysted and non-encysted variety. In patients with encysted ovarian cancer, initial symptoms are usually primarily pelvic in nature and consist of pain and pressure from rapid distension and tension of the cyst wall. These symptoms occur relatively earlier, but even then they are sometimes mistaken for pelvic endometriosis, pelvic inflammatory disease, benigh ovarian cyst or laterally displaced pedunculated fibromyoma.

On the other hand, in the non-encysted or solid variety, pain from capsule tension is minimal and relevant symptoms would not occur until the intra abdominal absorbing membranes i.e. peritoneum or omentum, become involved with metastases. The initial symptoms are usually gastrointestinal in nature – abdominal distension, cramps, bloated sensation, nausea, constipation – symptoms frequently attributed to "indigestion" and very often treated with self-medication. Regretably, in carcinoma of the ovary, these symptoms too frequently herald the beginning of Stage III disease.

From these observations it is quite obvious that no significant advance in the management of ovarian cancer is feasible until newer and accurate methods for early diagnosis are available. Meanwhile, a high index of suspicion as exemplified by these two rules of thumb is the only way to improve salvage rate.

(i) a constant awareness of the possibility of ovarian cancer in female patients who present with vague symptoms of a gastrointestinal nature. This particularly applies to general practitioners and physicians who are usually the first to be consulted.

(ii) it cannot be too strongly emphasized that an adequate and competent pelvic examination should be part of the medical work-up of every adult woman. This aspect is singularly relevant as more and more women are now coming forward for a 'Pap' smear. Every woman who has an ovarian enlargement, certainly if it feels hard, should have a laparotomy or laparoscopy if available. Ovarian cancer is notoriously difficult to recognise early and by laporatomy or laparoscopy, not only may the tumour be visualised, but also a biopsy may be performed, if this is considered necessary.

What of the future? What are the approaches being currently pursued? Will there be a breakthrough for early diagnosis of ovarian cancer soon? Let us do a little crystal-ball gazing:

Tendency to Exfoliate:

Noting the tendency for ovarian cancer to exfoliate, one logical answer would be to look for cancer cells at the earliest possible moment. Periodic culdocentesis may be performed but its value is doubtful. It is unlikely for asymptomatic women to agree to such a procedure at a routine examination. Besides the volume of fluid so obtained would be small so that the percentage of false negatives would be too high to be useful. On the other hand at laparotomy, to take samples of ascitic fluid or to take peritoneal washings on all adnexal tumours for cytological studies is simple enough. To-date, experience at Johns Hopkins have shown that even in those apparently encapsulated tumours, free-floating intra-peritoneal cancer cells have been found thereby indicating possible microscopic peritoneal implants.

This is of extreme importance because it gives clinicians a tool in addition to clinical findings to determine the true extent of disease and institute adjuvant radio or chemotherapy or both, accordingly. Creasman and Rutledge (1971) further demonstrated that this simple procedure has prognostic value. His patients were divided into three groups:–

Group A: 98 patients with ovarian cancer had surgery as their primary treatment and of these 60% had Class IV and V cytology. The patients with normal cytology results have a much better survival rate than those with abnormal findings at one, two, three and four years.

Group B: 93 patients, previously treated, but having recurrent or persistent gross tumour, surprisingly had a lower percentage (48) of abnormal cytology.

Group C: 71 patients who had been treated with chemotherapy for various length of time were submitted to a "second-look" exploratory laparotomy. Twenty had no gross evidence of disease and of these 18 had normal cytology. The two who had abnormal cytology developed recurrence. Of the 51 who had disease either in the pelvis or abdomen only 53% had abnormal cytology and their prognosis was

worse than the patients with normal cytology specimen.

Why gross tumour sheds malignant cells in one patient and not in another patient is unknown. Still on the note of cytology. In this instance it concerns the peritoneal fluid cellular composition. McGowan and Davis (1970, 1972) observed that the female mouse is the laboratory model most comparable to women in this connection. They claim to be able to detect development of primary ovarian neoplasms by a significant change in the differential cellular patterns of peritoneal fluids. These observations occur months before morphological cellular changes appear in the peritoneal fluid. If similar correlation can be diagnostic aid for primary ovarian cancer in women.

Immunodiagnosis:

Tumourigenesis begins when one single cell, transforms itself through genetic alteration, gives rise a multiplicity of similarly altered cells. Such genetic change would induce the synthesis of a new protein, which in turn would be expected to provoke an immune response from the host. Proliferation of the malignancy would indicate failure of such immune response.

It should therefore be possible in theory at least, to diagnose ovarian or any cancer by identifying the specific antigen and/or antibody.

Levi (1971) using advanced ovarian lesions, and therefore with plentiful supply of altered protein, produced results to suggest the existence of a "specific" tumour antigen in papillary serous cystadenocarcinoma of the ovary. He went on to forecast that with refined radioimmuno-assay methods, it should be feasible to reveal nanogram amounts of antigen and thereby diagnosing ovarian cancer at its earliest stage.

If Levi's work is confirmed and can be applied clinically, it represents one of the few silver linings of the dark ovarian sky!

Clinical Staging:

Over the years many forms of staging have been used and none was free from deficiency. In the mid Sixties the International Federation of Gynaecology & Obstetrics (FIGO) adopted a method of clinical Staging (appendix I) and is universally accepted. However, even this does not take into account the significant prognostic difference between intact, completely encysted ovarian cancer; the surface exfoliating variety; and the cancer which has become exfoliating because the capsule has been ruptured or penetrated.

The "Second-look" operation:

In the first edition of Jeffcoate's Textbook of Gynaecology he cited an experience during his younger days when first appointed Consultant. There was a woman of 55 who presented for paracentesis every 3 months for 10 years after laparotomy had revealed an inoperable cancer of the ovary. He concluded that a 10 years history was incompatible with the diagnosis and recommended a second operation. This not only confirmed the diagnosis but also speeded the patient's demise.

Opinions have changed since then. Although radiation and chemotherapy are seldom curative, occasionally the clinical response may be sufficiently striking, – prolonged evidence of clinical remission, no abdominal masses no ascites and a freely mobile solitary tumour that was previously fixed – to warrant a repeat laparotomy. In addition, the "second-look" operation, in conjunction with peritoneal cytology, can be used to gain assurance of the disappearance of all tumour before stopping chemotherapy.

Chemotherapy:

As many ovarian cancers are not resectable or are incompletely resected at laparotomy, and adequate radiation rarely possible as disease has spread beyond the pelvis, it was inevitable that chemotherapy has been increasingly tried. In the nineteen fifties, less than 10% of ovarian cancers received this form of treatment. The figure increased to 30% in the sixties whereas to-day almost all receive some form of chemotherapy.

Chemotherapeutic agents act by having selective toxicity on the biochemistry of cancer cells, with different drugs acting on different phase of the cell cycle e.g. during DNA synthesis or during mitosis and so on. Unfortunately this toxicity also applies to vulnerable normal tissues thus accounting for the classical side effects. The major toxic effect which limits the use of chemotherapy is bone marrow suppression, and some of the advances to combat this include – transfussion of platelets or leucocytes prophylactic antibiotics, and reverse isolation. In reverse isolation the patient is protected from infection by a controlled flow of recirculating filtered air. The contaminated air brought

in by vistors is blown into filters and rendered bacteria-free before it is recirculated to her.

Many cytotoxic drugs have been and are still being assessed as to their efficacy. They may be used singly, like Endoxan, or Chlorambucil, both alkylating agents. Alternatively and increasingly more often recently, they are used in combination, involving in addition to an alkylating agent, an antimetabolite such as methotrexate or 5-fluouracil; an antibiotic like Actinomycin-D, plus an alkaloid like Vinblastine. Nitrogen mustard is usually reserved for effusions that fail to regress after systemic chemotherapy.

Although the presently available bewildering maze of data makes objective evaluation very difficult, there is general agreement that chemotherapy has a place in the management of ovarian cancer. The drugs definitely produce clinical improvement in many instances although they have yet to demonstrate significant effect on 5-year survival rates.

One typical report insa series of 130 patients gave this summary:— (Hreschyshyn 1966)

1. 17% show good response, i.e. 50% decrease in tumour size by palpation for 3 months.
2. 21% had "some" response.
3. in patients with ascites and/or pleural effusion, 26% had complete suppression of fluid and 38% partial suppression.
4. Patients with good response survive three times as long as those with no or poor response.
5. chemotherapy was the contributor to the death of 11 patients.

The last point raises many ethical problems of human experimentation in cancer therapy, as we are giving potentially lethal drugs. Voluntary consent is important and there should be a hospital committee to review study protocol. The overriding consideration is that the expected benefits should outweigh the estimated risks. This unfortunately is easier said than done.

Summary:

In summary this brief review attempts to highlight some of the current thinking and problems in ovarian cancer. Many investigations are continuing, and some with startling findings e.g.

1. It is now possible to culture various kinds of fresh ovarian cancer from human beings. (Rogers 1971).
2. A critical metabolic pathway is known for some tumours such as malignant papilloma of the rabbit, (Diddle 1971).

However, these and many others arebut small fragments of the big jig-saw puzzle the total picture of which is yet to emerge. An exciting field awaits the scientists and clinicians alike.

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Appendix I.

FIGO Staging of Carcinoma of the Ovary:

Stage	I	Tumor limited to one or both ovaries
	Ia	Tumor limited to one ovary
	Ib	Tumor in both ovaries
	Ic	Tumor in one or both ovaries, but with ascites in which tumor cells can be seen on cytologic investigation
Stage	II	Tumor in one or both ovaries with extension within the bony pelvis
	IIa	Extension and/or metastases to uterus and/or tubes
	IIb	Extension to other organs or tissue in the bony pelvis
Stage	III	Tumor in one or both ovaries with widespread intraperitoneal metastases involving the upper half of the abdominal cavity (including retroperitoneal glands and liver)
Stage	IV	Tumor in one or both ovaries with distant metastases outside the peritoneal cavity
Special category		Tumors that are thought to be cancer of the ovary, but in which surgical exploration has not been done so that certain classification is impossible.

Onset of Labour:

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Introduction

The onset of labour is a fascinating but complex subject and up till today, mechanisms involved in the spontaneous onset of labour are little understood. Control of uterine contractility in pregnancy and control of parturition itself has been the subject of a great deal of study and an even greater amount of speculation has arisen in recent years.

Bengtsson (1965) commented that all important mechanisms controlling the maintenance and termination of pregnancy are influenced and safe-guarded by a number of different factors, some, improving or activating and others, depressing uterine activity. Based on this concept, he suggested in equation form that:

$$\text{Uterine activity} \propto \frac{\text{oestrogen} + \text{oxytocin} + \text{volume} + \text{neural factors}}{\text{progesterone} + \text{oxytocinase} + \text{other neural factors}}$$

Factors like oestrogen and oxytocin, he refers to as "activating" factors, and progesterone and oxytocinase, as "depressing" factors.

In recent years, the possible role of prostaglandins has been brought into the picture (Karim, 1971).

Labour may therefore start, by either an increase in one or several of the activating factors, or by a decrease in one or several of the depressing factors. There is no doubt that multiple factors involving placenta, fetus and mother are responsible for the onset of labour in the human. (Gillard, 1973).

PART I: ROLE OF HORMONES

I. Hormonal Factors in the onset of labour

Endocrine mechanisms involved in the onset of labour are also essential for parturition as well as for lactogenesis and normal expression of maternal behaviour and nursing impulses (Catala and Deis, 1973).

Various hormones have been implicated in the onset of labour and these include:

i) Progesterone
ii) Oestrogen
iii) Oxytocin
iv) Oxytocinase
v) Human placental lactogen (HPL)
vi) Cortisol, and the role of the fetal adrenal gland

i) Progesterone

The role of progesterone is still very much debated. As early as 1949, Reynolds has shown in rabbits, that progesterone withdrawal leads to termination of pregnancy and progesterone replacement therapy maintained it.

Csapo (1960) proposed that progesterone is the key hormone in the "defence mechanism" of human gestation and in 1961, he showed that it was possible to terminate pregnancy by withdrawal of progesterone. Using cases for termination of pregnancy, he showed that, following intraamniotic infusion of hypertonic saline there was a gradual but statistically significant progesterone withdrawal (Csapo, 1969 a). The fall in plasma progesterone was marked ten hours after saline infusion and during clinical abortion, a final withdrawal of 55.0% was measured. He also showed that a highly significant correlation between decreasing progesterone levels and increasing intrauterine pressure exists, indicating a causal relationship between these two factors.

There is also reliable evidence to show that labour is more readily induced in patients with low progesterone levels than in those with high levels.

The weakening of this defence mechanism at term has therefore been postulated by Csapo to be the main factor in initiation of labour. This fall in progesterone level prior to the onset of labour has also been the experience of other authors (Wiest, 1970; Pepe, 1972).

Based on this concept of progesterone withdrawal, Bengtsson (1965) used intra-myometrial injections of *Provera* (6 – alpha-methyl-17 alphaaceto-Progesterone) in different types of abortion in which effective uterine activity had started, and found that uterine activity could be completely extinguished.

Csapo believes that progesterone exerts a 'block' on uterine activity depressing the conductivity of the myometrial fibres and in this way, allows the continuance of pregnancy. Progesterone has no effects on the contractile elements of the myometrium (Turnbull and Anderson, 1971), but appears to influence the membrane potential of the myometrial fibres. The "progesterone block" is a result of direct spread of progesterone from the placenta into the muscle. There is an obvious local deposition in the myometrium adjacent to the placenta, but the rich blood supply to uterus would ensure that the progesterone content in the myometrial fibres would be evenly distributed (Theobald, 1968).

Possibly, declining plasma progesterone levels as term approaches, reflect diminishing biosynthesis of progesterone by the placenta (Wiest, 1970), related to the degenerative or ageing changes in the placenta near term when the uterus stops growing and disturbances of uterine circulation ensues (Greenhill, 1960) Then, according to Csapo's theory, the inhibitory effect on the myometrium is withdrawn and labour starts when the ratio between uterine volume and placental progesterone increases beyond a critical value.

ii) Oestrogen

The role of oestrogen probably rests on its regulatory effect on uterine function counteracting the influence of progesterone, by promoting the excitability and conduction of co-ordinated uterine contractions (Csapo, 1969 a). Oestrogen has been shown to increase the conductivity between muscle bundles in the myometrium (Csapo, 1960).

Bengtsson (1965) has shown that oestradiol therapy results in an increase in spontaneous uterine activity, as well as an increase in oxytocin sensitivity of the myometrium.

Masson and Klopper (1972) noted a tendency for unconjugated plasma oestriols to increase as labour approaches, reaching maximum values 2 to 4 days prior to the onset of labour.

Catala and Deis (1973), and Csapo (1969) observed that oestrogen was essential near term for normal parturition in experiments on rats. Yoshinaga (1969) described a rapid increase in oestrogen concentration in ovarian venous plexuses near term, the highest value being obtained on the day of parturition, falling to non-detectable levels on the day following delivery.

It is possible that critical steroid changes which brings on labour lies not in absolute changes in oestriol levels, but rather in the shift from a progesterone-dominated myometrium to an oestrogen-dominated myometrium. This is as reflected in the progesterone-oestriol ratios (Masson and Klopper, 1972).

The physiological effect therefore of a rise of oestrogens at the end of pregnancy could be related to an increase in sensitivity of the uterus to oxytocic substance (e.g. oxytocin, prostaglandins), and an increase in spontaneous uterine activity. The phenomenon is one of "oestrogen priming" of the uterus prior to the onset of labour.

iii) Oxytocin

The role of oxytocin in the onset of labour has been the subject of much controversy. Caldeyro-Barcia (1961) advanced the view that an increase in secretions of the neurohypophysis is one of the important factors causing the intensity and frequency of the uterine contractions during pre-labour. He also noted that a marked increase in the myometrial sensitivity to oxytocin is a pre-requisite for the onset of labour (Caldeyro-Barcia and Theobald, 1968).

Therefore, one would expect to find a rise in blood oxytocin levels prior to and during labour. Few studies, however, have been attempted in human pregnancy because of technical difficulties (Turnbull and Anderson, 1971). Chard, Boyd and Hudson (1970) found no circulating endogeneous oxytocin in human plasma during any stage of labour. Fitzpatirck (1966) and Chard et al (1970) failed to find any release of oxytocin during parturition in other species. Coch (1965) found "low oxytocin activity" in plasma during the first stage of labour, which increased markedly in the second stage. This has been the experience of Csapo (1960), Csapo and Ogata (1969), and Porter and Schofield (1966).

There is therefore no conclusive information on blood oxytocin levels in pregnancy prior to the onset of labour (Turnbull and Anderson, 1971). In the human, oxytocin is implicated only in the promotion of delivery already in progress. However this late involvement of oxytocin in human parturition does not minimise its therapeutic value.

Oxytocin promotes uterine activity by lowering the threshold, exerting its action on the cell membrane itself, bringing the membrane potential into the range most suitable for activity. Its action is instantaneous, promotes activity at all myometrial cell lengths and is rapidly reversible (Csapo, 1969 a).

Hence, despite its great therapeutic value there is no conclusive evidence for the essential involvement of oxytocin in the regulation of normal human uterine function and the initiation of labour.

iv) Oxytocinase

Oxytocinase, an enzyme capable of inactivating oxytocin was found to be present in high levels in plasma and placenta of women during pregnancy (Mathur and Walker 1968).

Increased oxytocinase activity has been reported in prolonged labours (Babuna and Yenen, 1966; Lambrinopoulus, 1964; Mathur and Walker, 1968). The maximum myometrial sensitivity to oxytocin occurs when the amount of oxytocinase in the blood is at its highest (Theobald, 1971).

The role of oxytocinase in the onset of labour is difficult to envisage. However, it might be logical to expect a fall in oxytocinase activity prior to the onset of labour but this has not been substantiated either in humans or in animal experiments.

v) Human Placental Lactogen (HPL)

The function of HPL in labour is unknown. Gillard (1973) showed that there was no change in the circulating HPL levels in the 14 days prior to onset of labour. Falls in HPL levels during labour are not great and not significant and are probably attributed to utero-placental ischemia associated with uterine contractions. There is no relationship between HPL levels and time of onset of labour.

vi) Corticosteroids and the Fetal Role

The role of cortisol in the initiation of parturition has been shown experimentally by Nathanielsz and Abel (1973). They found that cortisol administered into the rabbit on day 21 of pregnancy will initiate parturition. Shorter induction times were noted when cortisol was injected into the fetal sacs; this suggested that cortisol was more effective when administered into the fetus. However, while showing that adrenal steroids play a role in the onset of labour in rabbits there is no indication whether the steroids are secreted by the maternal or fetal adrenal.

It also appears that cortisol is unable to produce delivery in less than 60 to 70 hours over a wide range of infusion rates. This suggests that cortisol probably acts through a further step/steps which are indispensable for onset of labour, e.g.,

i) there is evidence that cortisol, in higher species, initiates certain metabolic reactions which produce hormonal changes necessary for parturition,

ii) in the sheep, one major secondary effect of cortisol infusion, is the production of prostaglandins (Liggins and Grieves, 1971),

iii) progesterone, in the rabbit, can inhibit cortisol induced parturition and this suggests that cortisol may also be exerting its effect by removing the 'progesterone block'.

The Fetal Role

Changes in function of the fetal adrenal cortex have been implicated in the initiation of labour in the sheep (Liggins et al, 1972), in the goat (Thorburn et al, 1972), and in the cow (Comline et al, 1973).

Josimovich (1969) reported that adrenalectomy in the fetal rat resulted in prolonged gestation. Liggins (1969) noted similar results with fetal hypophysectomy and bilateral adrenelectomy in the ewe. Conversely, ACTH administration, stimulating the fetal adrenals, provokes premature labour. This strongly suggests that the fetal adrenal may have something to do with the onset of labour (Theobald, 1971).

It has been shown that anencephalic fetuses, with adrenal hypoplasia secondary to pituitary deficiency, are often associated with prolonged gestation (Theobald, 1971; Turnbull and Anderson, 1971). Prolonged gestation has also been reported in women carrying a fetus affected by congenital adrenal hypoplasia, (O'Donohoe and Holland, 1968).

The fetal control of timing of its delivery is a highly advantageous biological adaptation (Nathanielsz, 1973). Preliminary evidence suggests that an increased concentration of cortisol in the fetal circulation causes a fall in progesterone production (Liggins, 1969), and onset of labour may be the result of withdrawal of the progesterone block in this way.

The control of the fetal adrenal is likely to reside in the hypothalamus. Inconclusive evidence suggests that the fetal hypothalamus may be responsive to stimuli well before term, thus allowing the possibility that increasing hypothalamic activity is the result of an increasing input of physiological stimuli as term approaches, rather than the result of maturation of the hypothalamic centres.

The timing of the onset of labour therefore appears to be an autonomous function of the fetus. It is the subject of continuing study in human pregnancy and in other species.

Conclusion

There is therefore a complex background of hormonal conditions determining the onset of labour. Groundwork for the preparation of labour seems to be accomplished by:

i) a fall in progesterone action and withdrawal of the "progesterone block",

ii) oestrogen "priming",

iii) changes in oxytocin concentration and myometrial sensitivity and probably oxytocinase activity,

and iv) changes in the function of the fetal adrenal gland with critical cortisol levels.

PART II: ROLE OF MECHANICAL AND NEURAL FACTORS

Both mechanical and neural factors no doubt influence myometrial function in their own ways, and are probably of importance in the onset of labour. Hippocrates in 460 B.C. commented that "when the child is grown big, he incontinently passes out into the outside world, free from any bonds". This was probably the earliest reference to a mechanical influence on the onset of labour. Theobald, discussing the nervous control of uterine activity, commented on a lighter strain that "the cow's uterus is said to contract when she casts eyes on the bull that is to cover her".

II.A. Role of Mechanical Factors

Research on the role of uterine volume shows it probably affects contractile function independently at multiple points through:

i) myometrial hypertrophy (Reynolds, 1949; Csapo, 1965).

ii) length-tension relationship (Csapo, 1955; Schofield and Wood, 1964).

iii) increase in pacemaker activity (Kuriyama, 1961, Csapo et al, 1963a, 1963b).

and iv) increase in conduction velocity (Csapo et al, 1963a, 1963b).

Clinical Examples

It has been long thought that the duration of pregnancy may be limited by the amount of stretch the uterine muscle can undergo. The frequent occurrence of premature labour when the uterus is over-distended and overstretched by hydramnios or multiple pregnancy lends support to this belief (Turnbull and Anderson, 1971; Greenhill, 1960; Csapo, 1969a).

The increase in uterine volume outstrips the myometrial progesterone concentrations and in addition enhances uterine activity. Onset of labour is imminent when the myometrial fibres are close to their optimal lengths for contraction.

Volume effects are further exemplified by the fact that post-menopausal women are capable of entering a process, hardly distinguishable from normal labour when delivering a submucous myoma by a futile effort (Kloosterman, 1960).

In intra-uterine death, there is a reduction of uterine volume which is considered by Csapo to be a significant factor in the continuance of missed abortions. Spontaneous evacuation occurs subsequently probably as a result of decreasing progesterone levels resulting in withdrawal of the "progesterone block". This is the likely mechanism for premature onset of labour in certain cases of toxaemia of pregnancy, placental infarction and abruptio placentae where there is placental insufficiency.

Experimental work

Volume effects have been shown experimentally by various authors.

Csapo (1969b) showed that ovariectomised rats first deliver from the uterine horn of greater volume. Volume a-symmetry between the uterine horns was also found by Csapo and Csapo (1969) to be a determining factor.

Csapo and Sauvage (1968) indicated that increasing stretch of the myometrium effectively promotes the "evolution" of uterine activity.

Certainly by late pregnancy, the myometrium is at its optimal length for contraction (Wood, 1964). Mosler (1967) has shown that the spontaneous onset of labour occurs only when the volume of the uterus has reached a critical point for maximal effective work and when wall tension is at its optimum.

Mechanism of Action

An increase of uterine volume in normal term pregnancies by intra-amniotic saline has been shown experimentally to increase uterine activity and may lead to labour (Csapo, 1963 c). Turnbull and Anderson (1968) has also shown that an artificial increase in the uterine volume at 18 weeks' gestation produces increased frequency of low intensity contractions.

Csapo (1961) postulated that another possible mechanism was that increasing uterine volume in pregnancy diminishes the "progesterone block" on the myometrium by increasing the non-placental uterine area. Spontaneous onset of labour occurs when the withdrawal of the "progesterone block" is adequate. Csapo formulated that the maintenance or termination of pregnancy is determined by the ratio $\frac{V}{PM}$, where V = uterine volume and PM = myometrial progesterone content.

There is therefore evidence supporting the theory that increasing distension of the uterus might initiate labour.

A counter argument against this theory lies in the fact that decreasing uterine volume following amniotomy might initiate labour. The mechanism here is however not related to volume loss which is shown by the lack of correlation between the volume of amniotic fluid removed at trans-abdominal amniocentesis and the onset of labour (Csapo et al). Amniotomy therefore increases uterine activity by a mechanism other than reduction of uterine volume: this is related to the Ferguson's reflex which will be commented on later.

Fundal Dominance

Before labour, the lower uterine segment is close to its optimal length for isometric contraction. During labour, this segment becomes over-stretched and the strength of contraction is reduced to between 10 – 35% of the maximum. This overstretch provides a natural mechanism for increasing the dominance of the upper segment over the lower uterine segment (Wood, 1964).

Role of Amniotic Fluid

The amniotic fluid may influence the onset of labour by means of active substances contained in the fluid, its ionic composition and its contribution to the uterine volume. The presence of oxytocics in human amniotic fluid has been demonstrated in vitro. However more recent work indicate that these oxytocic effects are largely due to ionic differences between the amniotic fluid and the perfusion medium. The importance of amniotic fluid oxytocics in the initiation of labour is doubtful, though the mechanical value of the bag of waters as a cervical dilator is considerable (Fuchs and Wagner, 1963).

II.B. Role of Neural Factors

It is established that all uterine activity is spontaneous and is but modified by hormones, nervous activity and impulses, electrolyte concentrations and membrane permeability (Theobald, 1968). This is exemplified by the fact that paraplegic women usually have normal labours and piglings and puppies

have been born normally after most of the maternal spinal cord has been cut (Csapo, 1960).

Establishment of Pathways

Unit activity in the hypothalamus and other diencephalic regions have been recorded, with a spontaneous firing rate varying from 0.1 sec. to more than 50 per second (Baraclough and Cross 1963). Probing of the cervix resulted in an acceleration of this firing rate, while progesterone administration resulted in selective depression of lateral hypothalamic neurones to cervical probing.

A neural connection therefore exists between the uterus and hypothalamus which is further evidenced by the precipitation of ovulation in the rabbit following coitus, an effect which could be mimicked by electrical or mechanical stimulation of the cervix and abolished by hypophysectomy (Csapo, 1960). Other similar confirmatory evidences include those of Theobald (1966), Theobald (1968), Cibils and Hendricks (1964) and Abrahams et al (1964). Abrahams commented that the specificity of the pathways from uterus to hypothalamus is however, open to doubt.

There is no doubt that pathways exist between the hypothalamus and pituitary gland, possibly commencing the efferent pathway. Fitzpatrick and Walmsley (1965) found that stimulation of certain nuclei and nervous pathways associated anatomically with the posterior pituitary gland could initiate labour or abortion.

Little work has been done on the regulatory effect of the autonomic nervous system of myometrial activity. Present knowledge is incomplete and confusing but there is no doubt that both parasympathetic and sympathetic elements exist. In the non-pregnant uterus there is a preponderance of noradrenetgic nerve fibres. As pregnancy progresses, this preponderance diminishes and a noticeable increase of adrenergic influences exists; this increase being about four fold. It is known that adrenaline has a depressive effect while nor-adrenaline has a stimulatory effect on the pregnant uterus. Wood (1969) therefore believes that the autonomic nerve influence on the human uterus changes in pregnancy to favour its maintenance. This is because during pregnancy, increasing levels of circulating adrenaline and a relative decrease in nor-adrenergic fibres supplying the uterus would both act to depress uterine activity.

It is therefore unlikely that the efferent autonomic pathway to the uterus plays any positive role in the onset of labour.

Contributions by Haterius and Ferguson (1938) and Ferguson (1941) showed that electrical stimulation of the neuro-hypophysis in rabbits resulted in increased uterine activity apparently due to some humoral agent. Stretching of the cervix evokes strong uterine contractions similar to those produced by oxytocin injections. These responses are abolished by mid-thoracic spinal or by destruction of the pituitary stalk.

The evidences suggest therefore that upon mechanical or electrical stimulation of the cervix, uterine activity is dependent on neurogenic impulses travelling along the afferent pathway from uterus to hypothalamus and higher centres and an efferent pathway to uterus via hormonal influences from the neurohypophysis rather than via autonomic efferents. This reflex forms the basis of "Ferguson's reflex", which probably explains the mechanism of induction of labour following amniotomy. The trigger for the reflex is related partly to the stretching of the cervix at amniotomy and partly to the direct mechanical stimulation by the fetal head on the pressure receptors in the cervix. Abrahams (1964) demonstrated that the relay between the uterus and hypothalamus is not only concerned with oxytocin release but also with effecting increased myometrial sensitivity to oxytocin.

Csapo (1960) commented that the myometrial (smooth muscle) cell contraction resembles rather than contrasts with that in striated muscle. Wansbrough et al (1967) demonstrated in addition the presence of alpha- and βeta-receptors in the human uterus. Continuance of pregnancy is associated with diminished conduction between muscle bundles, thereby reducing contractile activity. Progesterone reduces conduction velocity while oestrogen increases it. Excitation can also be related to alpha-receptor stimulation, a feature of oestrogen, while inhibition of uterine activity is related to βera-receptor stimulation, a feature of progesterone.

Therefore though all uterine activity is spontaneous, it is nevertheless modified to a great extent by hormonal influences, nervous activity and impulses, and even by volume effects.

CONCLUSION

Pregnancy therefore persists because of a fine

balance in "opposing" forces, those "holding" and those trying to expel the pregnancy. It seems that the effect of mechanical and neural factors in regulating myometrial function is super-imposed on a complex background of hormonal conditions – probably no single factor determines the onset of labour in human pregnancy.

PART III: ROLE OF POSTAGELANDINS

The name "prostaglandins" was given by von Euler in 1935 to a substance found in human seminal fluid. This substance stimulated smooth muscle and lowered blood pressure. It is now known that prostaglandins is not a single substance but a group of chemically related long-chain hydroxyfatty acids. They are not confined to the seminal fluid but are ubiquitous in mammalian tissues. In recent years, the role of prostaglandins in relation to parturition has been the subject of much research.

Karim (1971) suggested that prostaglandins may play a physiological role in the onset of labour. His arguments were based mainly on the following observations:–

i) the demonstration of a causal relationship between the level of prostaglandins in amniotic fluid and labour. Prostaglandins $F_{1\alpha}$ and $F_{2\alpha}$ were found to be present in amniotic fluid only during labour (Karim and Delvin, 1967). Prostaglandins E_2 was also found to be significantly higher in the amniotic fluid of patients in labour compared to patients at term but not in labour (Karim, 1971b). Prostaglandins E_1, though present, was not significantly higher in patients in labour.

ii) Prostaglandins $F_{2\alpha}$ was present in the maternal circulation only during labour (Karim, 1968), the highest concentration found at the peak of uterine contraction, with the second highest level just preceeding uterine contraction. Prostaglandins E_2 has recently also been identified in the maternal circulation during labour (Karim, 1971b).

iii) All four prostaglandins found in amniotic fluid during labour stimulated the pregnant myometrium is vivo. Prostaglandins E_2 and $F_{2\alpha}$ had been used successfully to induce labour at term (Karim et al, 1969; Embrey, 1969; Karim et al, 1970; Beazley et al, 1970).

iv) The pattern of uterine activity induced by prostaglandins E_2 and $F_{2\alpha}$ infusion was similar to that of normal labour.

Karim (1968) believes that prostaglandins is not released as a result of uterine contractions, but rather probably an increase in prostaglandins effects uterine contractions resulting in the onset of labour.

Liggins and Grieves (1971), experimenting on pregnant ewes suggested a causal relationship between prostaglandins $F_{2\alpha}$ and labour. In sheep, labour is controlled by secretion of cortico-steroids from foetal adrenals. In these experiments, dexamethasone was infused into three groups of sheep. In the first group where dexamethasone was infused for 24 hours but labour did not start, prostaglandins $F_{2\alpha}$ was noticed to be increased in the maternal cotyledons but not in the myometrium. In the second group, in which labour was initiated with 48 hours infusion of dexamethasone, a further increase in prostaglandins $F_{2\alpha}$ in both the maternal cotyledons and the myometrium was noticed. In the third group where dexamethasone was infused for 48 hours but labour was suppressed by progesterone injection, the level of prostaglandins $F_{2\alpha}$ was however, found to be the same as in the second group. It was concluded that prostaglandin $F_{2\alpha}$ precedes the onset of induced premature labour, indicating that it is probably not a consequence of labour. It was also postulated that the role of steroids in initiation of labour involves the release of prostaglandins.

Gillespie, Brummer and Chard (1972), have postulated that a release of prostaglandins from the decidua, heralding the onset of labour, causes release of oxytocin from the maternal neurohypophysis, the effect of which is enhanced in the myometrium by the local action of the decidual prostaglandins. A similar mechanism might act via the foetal pituitary. This involvement of the neurohypophysis may explain why spontaneous and prostaglandins induced contractions are inhibited by alcohol. Exogeneous pitocin induced labour is not inhibited by it.

Speroff (1973) has suggested that cortisol activation of placental enzymes is followed by oestrogen and prostaglandin production, both processes occurring within the same cell, possessing some sort of feedback effect upon each other.

Csapo (1973) has proposed that the myometrial

content of prostaglandins is stretch dependent. Therefore increasing uterine volume maintains a stimulation of uterine prostaglandins synthesis and release, but its oxytocic effects are suppressed by progesterone. As progesterone production diminsihes, the progesterone block is withdrawn and the increasing prostaglandins syr·' is resulting from uterine stretch predominates, thereby initiating labour.

Some authors however feel that the prostaglandins increase during labour may be a result rather than a cause of labour. Hibbard (1972) using serial sampling techniques found that peak prostaglandins release followed rather than preceded the peaks of contractions, a finding contrary to that of Karim (1968).

Brummer (1972) found that prostaglandins $F_{2\alpha}$ was higher in the maternal serum of women in labour than those at term but not in labour. The level of prostaglandins $F_{2\alpha}$ was not significantly different in women in spontaneous labour, labour induced by amniotomy and pitocin drip, and labour hastened by pitocin drip. Prostaglandins $F_{2\alpha}$ was also found to increase with cervical dilatation. He concluded that though prostaglandins was associated with labour, it was not the cause but rather a result of labour. He postulated that pressure, stretching and manipulation of the cervix caused the release of prostaglandins during labour. Poyser et al (1971) has noticed that distension of the guinea pig uterus in vitro will release prostaglandins $F_{2\alpha}$. Kierse and Turnbull (1973) measuring prostaglandins E_2 in amniotic fluid in women in spontaneous labour and oxytocin-induced labour produced a similar pattern of results. Their conclusion was almost identical.

CONCLUSION

This review of the literature shows that prostaglandins is in some way associated with labour. It is probable that prostaglandins is important in the complex chain of events that goes to initiate labour. Considering its success in the induction of labour, it is difficulty to believe that prostaglandins release is only the result of uterine contractions and in no way goes to initiate labour.

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Amniotic fluid creatinine as Index of foetal weight

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In assessing foetal maturity during pregnancy, a precise knowledge of gestational age and foetal weight is essential but often unavailable. A poor menstrual history, for instance, interferes with accurate calculation of gestational age. Similarly, palpating the gravid uterus to determine the weight of the foetus is often unreliable particularly in the presence of hydramnios or obesity. It is not surprising, therefore that the gravest consequence of timely. termination of pregnancy through mistaken foetal maturity is delivery of a premature baby that may not survive extrauterine life.

Pitkin et al[6], however, have found that the concentration of amniotic fluid creatinine increases with the duration of pregnancy, and that at 37 or more weeks' gestation the liquor creatinine level exceeds 2 mgm/100ml. Since then, the value of monitoring gestational age by liquor creatinine determination has been confirmed by several workers[1,3,4,8,9]. Much less, however, is known about the reliability of liquor creatinine as an index of foetal weight. The present study therefore attempts to determine whether a correlation between liquor creatinine concentration and foetal weight exists in normal pregnancy, and if so, whether it is influenced by abnormal pregnancy states.

METHODS AND MATERIAL

Five to ten ml. samples of amniotic fluid were obtained from 268 pregnant women admitted to the Obstetric Unit of the University Hospital, Kuala Lumpur 1972. Amongst these were 195 patients with normal pregnancy, 63 with preeclamptic toxaemia (blood pressure of 140/90 mmHg or more with oedema or proteinuria or both, after the 24th week gestation), 5 with diabetes mellitus and 5 with twin pregnancy.

A total of 273 amniotic fluid specimens were collected either at elective caesarean section or at the time of induction of labour or soon after the onset of spontaneous labour via a Drew-Symthe Catheter. A few specimens were obtained by transabdominal amniocentesis within 3 days of delivery. Liquor creatinine was measured by an Autoanalyser system using a modified Jaffe picric acid method. Known standards were run with each batch of estimations.

RESULTS

Normal pregnancy

Figure I shows a scattergram of liquor creatinine levels plotted against birth weights of 195 infants whose mothers had uncomplicated pregnancies. It is observed that the creatinine concentration tends to rise with increasing foetal weights. The correlation is statistically significant $p < 0.005$. White[8] and Wyatt[9] have claimed that a creatinine level of 1.5 mgm/100ml reliably reflects foetal weights of 2.5 kg or more. Applying this criterion we found that the maturity by weight (i.e. 2.5 kg or more) of 163 of

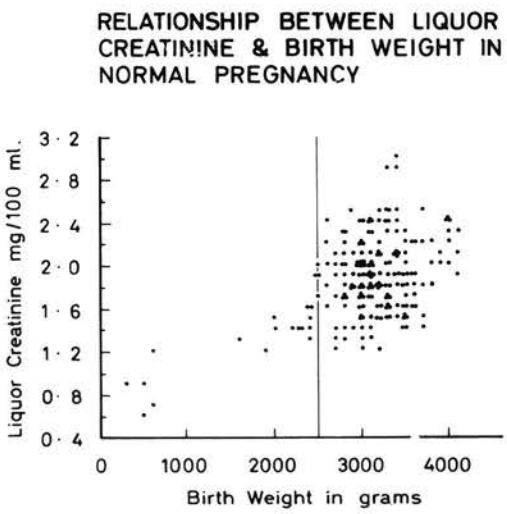


Figure 1

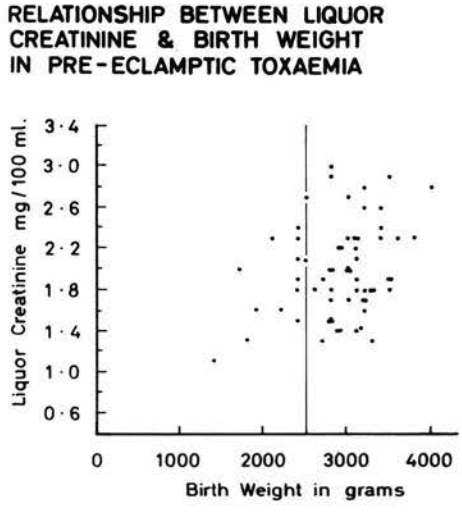


Figure 2

182 babies (89.6%) was indicated correctly and the maturity of 19 babies (10.4%) was indicated wrongly. Of these 19 infants, 4 (weighing 2000-2400gm) had creatinine levels of 1.5mgm/100ml or above. Fifteen infants (weighing 2700-3700 gm) had creatinine concentration less than 1.5mgm/100ml.

Pre-eclampsia

Figure 2 is a scattergram comparing the individual creatinine values with the birth weights of 63 infants whose mothers had pre eclampsia during pregnancy. No statistical significant correlation between foetal weight and liquor creatinine concentration in pre-eclampsia can be discerned. However, the mean concentration of liquor creatinine for corresponding foetal weights is found to be generally higher in pre-eclampsia than in normal pregnancy, Table I. Roopnarinesingh[7] et al have also noted that the levels of liquor creatinine in pre-eclampsia are significantly higher than normal values at corresponding periods of gestation. They suggest that the increase in liquor creatinine concentration in pre-eclampsia is related to a diminution in the rate of transfer of creatinine across the placenta to the mother. Furthermore they cite that in pre-eclamptic toxaemia the clearance of paraaminohippurate from amniotic fluid is reduced (Edelberg)[5] and that the transmission of sodium and amino-acids is also diminished (Cox)[2].

TABLE 1

Birth Weight (gram)	Amniotic Flud Creatinine mg/ 100ml.			
	Normal Pregnancy		Pre-eclampsia	
	Mean	I.S.D.	Mean	I.S.D.
1500	1.35	0.13	1.50	0.12
2000	1.45	0.11	1.79	0.32
2500	1.85	0.32	1.94	0.26
3000	1.93	0.36	2.04	0.40
3500	1.90	0.30	2.39	0.61
4000-5000	2.22	0.19	2.80	

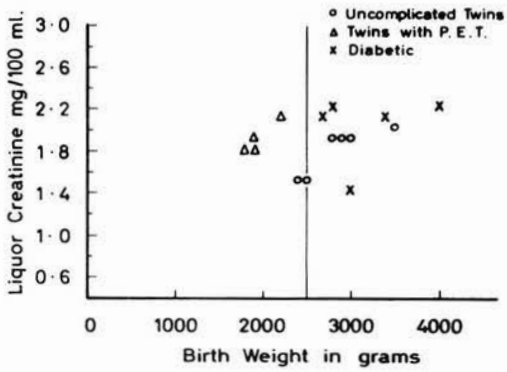
Diabetic pregnancy

5 patients had diabetes mellitus, Figure 3. The predicted maturity by weight (i.e. 2½ kg or more) from liquor creatinine determination was correct for 4 of the patients. The number was too small for statistical evaluation.

Twin pregnancy

Of the 5 patients with twin pregnancy, 2 developed pre-eclamptic toxaemia, Figure 3. In these 2 cases all 4 babies (weighing 1800 to 2250 gm) had creatinine levels of 1.5mgm/100ml or above: i.e. their maturity was indicated wrongly. On the contrary, the maturity by weight of all 6 babies from the 3 normal twin pregnancies was correctly predicted.

RELATIONSHIP BETWEEN LIQUOR CREATININE & BIRTH WEIGHT IN ABNORMAL PREGNANCY



DISCUSSION

It is widely accepted that the concentration of liquor creatinine increases with gestational age. At 37 or more weeks' gestation the liquor creatinine level has been found to be 2mgm/100ml or more. With this yardstick, Pitkin and Zwirek[6] have correctly predicted foetal maturity in 94% of their cases. Not surprisingly then, we also have observed the level of liquor creatinine to rise with the foetal weight. However, our range of normal creatinine values is too broad to be of use for precise antenatal prediction of foetal weight. Even so, a liquor creatinine level of 1.5 mgm/100ml has been found to be a reliable guide for foetal weights of 2.5kg or more in our series. In other words, a liquor creatinine reading of 1.5 mgm/100ml may be regarded as a fair indication that the foetus has reached a stage of gestation compatible with early maturity.

In pre eclamptic toxaemia our results have failed to show any correlation between creatinine levels and foetal weights. Quite possibly in our study, the inclusion of patients with varying severity of toxaemia as well as patients on thiazide therapy could have influenced such as outcome. At the present time we feel that liquor creatinine estimation for predicting individual foetal weight during pregnancy is of limited value especially when toxaemia has supervened.

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The place of Laparoscopic tubal sterilisation in Malaysia

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INTRODUCTION

For any surgical methods of tubal sterilisation to be widely accepted in a developing country it must not only be safe, simple and effective but preferably it should also have features which would appeal to most women. Of foremost importance are such factors as brief hospitalisation, cosmetically pleasing scars, smooth convalescence and normal resumption of physical activity after operation. Laparoscopic sterilisation, in our view, comes nearest to satisfying these requirements. Other less obvious advantages include:—

a) good visualisation of pelvic organs and
b) easier restoration of tubal patency by tubal reconstruction.

Presented here is a review of our experience with our first 142 such operations, performed at the University Hospital, Kuala Lumpur from October 1972 to May 1973.

INSTRUMENTS & TECHNIQUES

Basically the instruments consist of 1) a Verres needle for introducing carbon dioxide into the peritoneal cavity, 2) a Wolf laparoscope for visualisation of the pelvic organs and 3) a Palmer forceps for coagulation and resection of the tubes. Illumination is very efficiently provided for by a high intensity fibreoptic light system.

Steptoe's technique has been used on all 142 patients. Under general anaesthesia, the patient is placed in the supine position with the legs supported at an angle of 45°. The bladder is emptied with a catheter and a tubal insufflation cannula inserted into the uterine cavity to help in manoeuvring the tubes into the field of vision of the laparoscope.

Carbon dioxide is introduced into the peritoneal cavity at a rate of 1 litre/minute via the Verres needle inserted through a small incision at the inferior border of the umbilicus. No more than 3 litres of carbon dioxide are needed. The carbon dioxide pressure should not exceed 20 mmHg. After the Verres needle is withdrawn, the laparoscope is inserted through a trocar over the same incision. The Palmer forceps is then inserted through a separate incision in the right iliac fossa. Under direct vision, each tube is identified, grasped with the Palmer forceps at about 1 cm. from the cornu, coagulated and resected. Before withdrawing the Palmer forceps, it is important to ascertain that there is no bleeding near the cut ends of the tube. The abdomen is deflated and the incisions are closed either with skin clips or subcuticular sutures.

RESULTS

Ethnic Groups

Almost all 142 women were from the neigh-

bouring rubber and palm oil estates. 69% were Indians, 23.3% Chinese and 6.3% Malays. The ethnic bias towards the Indians probably only reflects the ethnic pattern of the estates' labour force.

Ethnic Groups

	Number	Percentage
Indians	98	69
Chinese	33	23.3
Malays	9	6.3
Others	2	1.4

Age Distribution

Quite obviously the demand for sterilisation is greatest in our patients between the age of 25 and 34 years. Even so, a significant percentage (13.4) of relatively young women (20 to 24 years) were also sterilised. No one under the age of 20 years, however, was recorded in this study.

Age Distribution

Age	Percentage
Less than 20 years	0
20 – 24	13.4
25 – 29	37.6
30 – 34	29.6
35 – 39	16.9
40 years and over	2.5

Age of Marriage

Except for 6 women, all were married by 25 years of age. 60% were married between the age of 15 and 20 years, while 15.4% even did so below the age of 15 years. Early marriage probably has contributed to the high parity pattern amongst these women.

Age of Marriage

Age	Percentage
Less than 15 years	15.4
15 – 20	60.0
21 – 25	20.4
26 years and over	4.2

Parity Distribution

84.1% had 4 more children (maximum 11), 13.4% had 3 and only 2.5% had 2 children. The parity distribution in these women might well reflect the parity trend of most of the estate workers in West Malaysia.

Parity Distribution

Parity	Number	Percentage
2	4	2.5
3	19	13.4
4	119	84.1

Previous Contraception

Only 33% of the women have had some form of birth control measures for a year or more. The lack of contraceptive practice amongst these women is probably an important cause of their high parity.

Previous Contraception

Duration	Percentage
Nil	67
1 year	13
2 years and over	20

COMPLICATIONS OF LAPAROSCOPIC STERILISATION

Ten out of 142 patients developed complications. Difficulty with intraperitoneal insufflation of carbon dioxide was met with in 2 obese patients. In both cases laparoscopic sterilisation was abandoned.

Two cases of skin burns at the site of insertion of the trocar in the right ilias fossa were recorded. This can happen when the coagulation forceps comes in contact with the metal cannula, causing a short circuit at the skin level. It may be avoided by using fibreglass cannula.

The uterus was perforated by the insufflator in 2 patients. Fortunately, bleeding promptly stopped after the cannula was withdrawn.

3 cases of bleeding were encountered. Bleeding from the mesosalpinx was seen in 1 patient. This may be avoided by careful use of the coagulation forceps. In the second case bleeding from the trocar wound in the right iliac fossa was noted. This may be avoided by inspecting the peritoneum through the laparoscope before closing the incision. A third patient developed haemorrhagic shock 4 hours after the operation as a result of bleeding from a torn right inferior epigastric artery. Injury to the vessels may be avoided by trans illumination before inserting the trocar. One patient developed general peritonitis on the second day after operation. However she recovered promptly with antibiotic therapy.

DISCUSSION AND CONCLUSION

Laparoscopic tubal sterilisation is a relatively simple procedure. Complications are uncommon, varying from less than 1% to about 7%.[1.2.3.5.6] Bleeding, uterine perforation, skin burns and bowel injury are the 4 most frequently quoted complications, but insufflation difficulties are probably underreported. Bearing in mind our relative inexperience with the technique, 10 complications out of 142 cases performed by us may be accepted as within the normal limts.

Although an evaluation of the long term success or failure of our cases will not be possible for some time, nevertheless we have reasons to be optimistic. Larsen[4] (1972) in a literature review of 3658 cases has found only 5 true failures. Even so, the success and safety of the procedure depend not only on the skill and training of the surgeon but also the availability of general anaesthesia, the maintenance of surgical asepsis and the proper selection of patients. In our view, the operation should only be done in a hospital with facilities for immediate laparotomy in case of complications.

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Road Accidents

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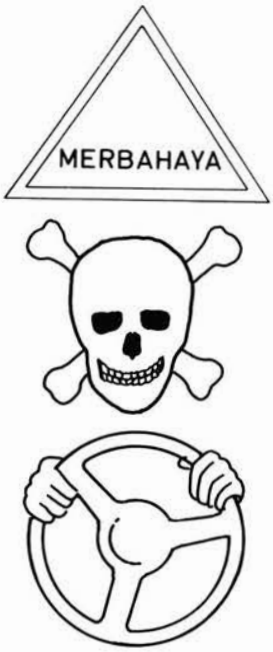


INTRODUCTION:

In a previous presentation it was observed that road accidents was singly, the major contributory factor in the genesis of femoral shaft fractures[2].

In 1952, when the driving test was resumed after the national emergency, the Annual Report of the Federation of Malaya, showed there were 82,591 registered vehicles spread over 6,062 miles of road surface. No mention was made about any fatal road accidents in this report[1]. In 1971 however, of the total number of 2,211 deaths resulting from all accidents death in Peninsular Malaysia, 1914 were certified. Of these, certified road accidents accounted for 77 deaths and this is considered to be only about a third of the actual registerable figures[9].

At the same time, perusal of the achieve, Medical Records Office, University Hospital, Kuala Lumpur, reveal that for the period under study, the mortality rate among victims, only those admitted into the wards, accounted for 3.4% of all deaths in this hospital. The average age at the time of death was 34.6 years for the accident victims and 40.8 years for the others[5]. The low age group for the latter is to some extent due to the fact that a third of the death rate are under 14 years age group.

These findings themselves were considered to present sufficient reason for undertaking this study. And, when attention is focussed on the rapid urbanisation and industralisation, effective at present and envisaged in future with the inevitable increase in fast vehicular traffic and its attending sequelae, the relevance of this study becomes substantially magnified and self evident.

This presentation does not pose to be a comprehensive paper. Instead, it represents the results of study of all long bone fractures, wherein road accident was the aetiologic factor and seeks to present the pertinent features as adduced from the study of these cases encountered in the Orthopaedic service of this hospital. Furthermore it hopes to draw attention to the possible long term, clinical and economic, impact it may have on the victims at large.

METHOD AND MATERIAL:

The series includes all cases of long bone fractures, treated or admitted, in this unit from June 1967 upto year ending 1971 inclusive. Cases with eranio-facial, thoracic and abdomial injuries resulting from road accidents, in accordance with the rules of the hospital practice were admitted to separate disciplines; hence, are not included in the study. Likewise, spinal injuries due to road accidents have been also excluded for convenience of enabling a better study of long bones only.

VICTIM	PEDESTRIAN		VEHICULAR	
SEX	MALE	FEMALE	MALE	FEMALE
No. OF CASES	79	34	435	64

Table 1 SEX DISTRIBUTION AMONG PEDESTRIANS AND OTHER ACCIDENT VICTIMS

SIDE OF FRACTURE	PEDESTRIAN	OTHER ROAD TRAFFIC ACCIDENTS
Left.....	55	233
Right.....	55	256
Bilateral.....	3	10
TOTAL.....	113	499

Table 2 SIDE OF FRACTURE IN PEDESTRIANS AND VEHICLE OCCUPANTS

Of the 1965 fracture cases studied, 612 fractures have their origin in road accidents, thus yielding a figure of 39.13%. Of these 514 (84%) were males and the remaining 98 (16%) were females. All case histories and roentgenograms have been personally scrutinised. The relevant informations were punched on IBM cards and data obtained thereof. Features, considered noteworthy and pertinent to this study, are broken down in tabular forms to help enable a rapid and critical evaluation.

AGE (YEARS)	PEDESTRIAN	MOTOR CYCLE/ PEDAL CYCLE (RIDER / PILLION)	FOUR-WHEELED VEHICLE (DRIVER/ PASSENGER)	MOTOR VEHICLE (TYPE OF VEHICLE UNSPECIFIED)	TOTAL
0-10.....	15	19	1	5	40
11-20.....	17	90	17	7	131
21-30.....	17	160	21	16	214
31-40.....	13	51	11	10	85
41-50.....	10	28	8	6	52
51-60.....	18	22	6	2	48
61 and above...	23	9	5	5	42
TOTAL	113	379	69	51	612

Table 3 PROVIDING BREAK DOWN IN AGE GROUP AGAINST THE TYPE OF VEHICULAR ACCIDENTS

TYPE OF VICTIM / BONE	Motor cycle/ Pedal cycle Rider	Motor cycle/ Pedal cycle Pillion	Motor cycle/ Pedal cycle Victim Unspecified	Four-wheeled Vehicle Driver	Four-wheeled Vehicle Passenger	Four wheeled Vehicle Victim Unspecified	Type of Vehicle Unspecified	Pedestrian	Total
CLAVICLE	56	6	0	6	3	3	14	15	103
HUMERUS	31	3	2	5	4	3	5	3	56
RADIUS/ULNA	76	7	0	7	9	1	10	14	124
NECK OF FEMUR	26	0	0	1	2	0	2	9	40
SHAFT OF FEMUR	58	16	0	8	8	1	5	14	110
TIBIA/FIBULA	83	14	1	3	3	2	15	58	179
TOTAL	330	46	3	30	29	10	51	113	612

Table 4 SHOWING THE ETIOLOGIC FACTOR IN FRACTURES OF EACH OF THE BONES, IN THE FIRST THREE AND ONE HALF YEAR OF INCEPTION OF THE UNIVERSITY HOSPITAL, KUALA LUMPUR

PLACE	No. OF CASES
Buit-up area	240
Rural area	34
Highway	30
Garage	1
Unspecified	307 •
TOTAL	612

• 50·2 %

Table 5 PRESENTING A BREAK DOWN OF THE SITE OF ROAD TRAFFIC ACCIDENTS

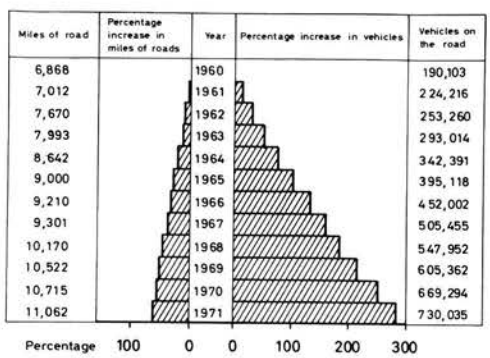
Table III shows fracture incidences are commonest in the twenties and thirties age group when majority are essentially wage earners. Table IV reveal that in the majority of cases (53.8%) the lower extremities are involved, mostly among riders of two wheeled vehicles (62%). During the period included in the study, the ethnic ratio of attendance/ admittance was three Malays to nine Chinese to six Indians and to one others.

DISCUSSION:

Available data, presented in the tabular forms are self explanatory. The variations in age sex, side, site and osseous disposition, as seen from tables I thru V, are but few of the variable features not peculiar to this study. On the contrary, these are well established features, long since recognised[4] and in keeping with the earlier findings of analogous studies available from the older industralised societies[6].

The salient feature of this study is in the fact that 39.13% of long bone fractures have their origin in road accidents. The age of accident predeliction as seen in Table III is an important though not a remarkable feature.

It is perhaps regretable, that such large number of accidents should have been allowed to prevail, for this lead to suggest that the legislative and cautionary measures, long since implemented in the technocratic countries on the advice of previous expertise seems to have received little attention. It is feared that if these findings should be the representative of hospitals at large which it may well be then the economic impact on the populace and the clinical effect on the victims is likely to be profound.



Showing the percentage increase of road milage and circulating vehicles over one decade in Peninsular Malaysia

Table 6

In 1960, Peninsular Malaysia sported 190,103 motorised vehicles over 6868 miles of road surface[7]. In 1970 the vehicular traffic increased to 669,294 and road mileage to a total of 10,715[8]. Over a decade therefore, whereas the road mileage has increased by 56% the number of motorised vehicles compounded by 252%. To an extent, therefore this imply, that the accident pattern is a numerical expression of this gross mathematical discrepancy. Besides, these roads have undergone little if any, qualitative alterations since the time its use was limited to the accommodation of a more gentle road traffic system.

The total period of hospitalisation needed for the sample of cases under study was in the order of 14,226 days or 36.6 days per case. The expenditure incurred by the hospital was at the rate of $51.00 per diem per case[5]. When calculated, amounted to a total of $725,526:00 or $1867:00 per case To this value, when the loss in wage earning, in work hours and compensation payment are added, it is suspected that this will add to a sizeable amount.

In a recent study, undertaken to evaluate the quantum of cash compensation in claim settlement among road accident cases, numerous case examples, involving all bones, both from the Federation and Singapore, have been cited. Based on these precedents, an almanac designed to give working formulae for computing the compensation eligibility is provided. Broadly speaking, for permanent disabilities resulting from accidents in a person earning $100.00 per mensem with an expected 15 year future period of workability, after making allowance for natural contingencies, the amount computes to $12,406.00. Likewise for those earning $500.00 and $1,000.00 for the same period, the amounts would be $62,280.00 and $124,560.00 respectively[2a].

If it is realised that this study emanates from a single handed legal practice in a moderate sized district town where over 98% of clientele seeking legal aid receive favourable settlement[2b] then the sum of money involved must pose an economic encumburance, within forseeable future on the community at large. Furthermore, it is feared that when long term clinical evaluation of these victims will be made, the "quality of life and limb" resulting from the legacy of such accidents may leave residual disabilities severe enough to undermine the earning potential of the individual.

As a result, the state will increasingly inherit larger number of citizens with financial liabilities who may well impose a drain on the national budget.

Fig. 2: Man with a red flag who had, by law, to walk in front of the car in 1890's
(British Information Services, – by kind permission) London.

In a relatively short space of time the car has made meteoric progress from its humble origin when its arrival at the cross roads was formally announced by a bearer exhibiting a red flag.

Fig. 3a: Kuala Lumpur, 1920's
(Film Negara – by kind permission)

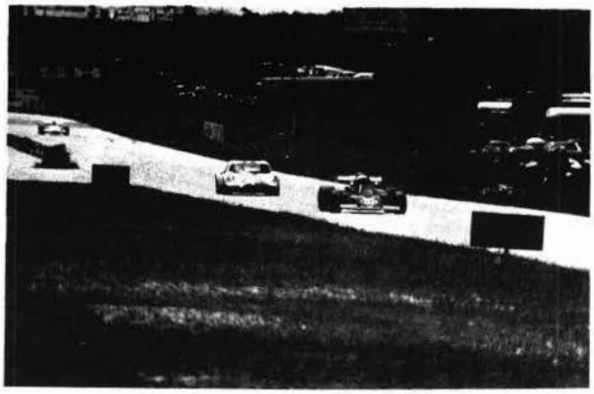


Fig. 3b: Batu Tiga, 1973.

It is expected, that in not too distant a future the modern car will be made to work faster and the road traffic system will have to learn to accommodate to these changes. How close is this past and how the future changes in the ecology of the road traffic system looms over us. The organism is the car and the disease is in its infancy. Unless the problem is reckoned with now, doctors in general and orthopaedists in particular, will be increasingly involved in the rescue of the victims and the rehabilitation of the maimed.

SUMMARY:

Six hundred and twelve road accident victims, treated at the Orthopaedic Service of this hospital, during the initial three and one half year of its establishment, are presented. From the parameters studied, an insidious but definite increase in the number of such victims is evident. It is pleaded, that unless pragmatism replaces the present day complacency and adequate measures devised and incorporated early in the formulation of the Malaysia Plans, the nation will be encumbered with misfortunes arising from increased vehicular traffic as encountered in the older industrialised societies.

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The Anatomical and Physiological aspects of vasectomy

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SUMMARY

The anatomy and physiology of the vas and the physiological changes that occur after vasectomy is discussed.

DEVELOPMENT

The testis develops from the genital ridge of the intermediate cell mass medial to the mesonephros. The primitive germ cells arise from the yolk sac area. They are entodermal in origin and the initial 500-1,000 cells migrate to the genital ridge where they multiply and later form the germ cells.

In the male the medulla which is the inner component of the genital ridge develops to form the testis while the outer cortex is compressed to form the tunica albuginea.

Communication between the testis and the Mesonephric duct which becomes the vas deferens is established by means of the mesonephric tubules which also form part of the epididymis and efferent ductules. The mesonephric duct which first opens in the urogenital sinus is slowly displaced caudal-wards after the development of the ureter to the prostatic part of the urethera. It is then called vas deferens.

VAS DEFERENS

The vas deferens which is developed from the mesonephric duct is the continuation of the duct of the epididymis and extends to the seminal vesicle where it joins the duct of the seminal vesicle to become the ejaculatory duct. It is 45 cm. in length and 2.5 mm. in diameter with a lumen which is 0.5 mm.

It is divided into five portions:–

(1) the tunica vaginalis (epididymal) portion where it runs on the medial side of the epididymis – this part is coiled and the site of the incision should not be near it for it may render re-anastomosis in a later period, if necessary difficult,

(2) the scrotal portion,

(3) the inguinal portion where it runs along the spermatic cord in the posterior part of it and reaches the deep inguinal ring where it bends lateral to the inferior epigastric artery and goes upwards in front of the external iliac artery to form,

(4) the pelvic (retroperitonial) portion. Here it goes backwards and downwards into the lesser pelvis crossing the obliterated umbilical artery, obturator and vesical vessels, the ureter anteriorly and runs medially over the upper end of the Seminal vesicle where it then forms,

(5) the ampullary portion. Histologically it is lined by non-ciliated columnar epithelium lying on a basement membrane. In certain areas in the epididymal portion it contains ciliated epithelium. It is then covered by an outer longitudinal and a thick inner circular muscle fibres. External to this is an areolar coat. The presence of this thick muscle coating aids in the macroscopic identification of the vas during vasectomy with ease.

In vasectomy the portion of the vas that is involved is the scrotal part where it is in the spermatic

cord. To reach the vas here, it has to be dissected from the various layers as follows:– Skin along with the Dartos muscle, membranous part of the superficial fascia (Scarpas fascia), external spermatic fascia, Cremasteric muscle and fascia and the internal spermatic fascia.

These fascial layers are utilised to bury either the testicular (proximal) end or the distal end of the cut vas so as to prevent recanalisation of the cut vas. This interposition of the fascial layer may account for the great effectiveness of vasectomy (Population Report 1973). The vas does not have a separate fascial layer. As mentioned earlier it has an areolar coat.

The vas in the spermatic cord is accompanied by the testicular artery, pampiniform plexus of veins, artery to the vas, Cremasteric artery which is a branch of the epigastric artery, lymphatic vessels, genital branch of the genito femoral nerve and the testicular plexus of the symphathetic nerves. The vas is supplied by the artery to the vas which is a branch of the superior vesical artery. If this artery is avoided during vasectomy, avascular necrosis of the upper and lower stumps is minimal. This helps when reanastomosis is considered later.

PHYSIOLOGY

The vas acts as a conveyor of sperms from the testis. Sperms develop from the seminiferous tubules of the testis through the action of FSH & LH from the Anterior Pituitary. The spermatozoa are propelled along the vas by the secretory pressure and by the contraction of the muscle fibres in the surrounding fascia.

Isolated vas deferens has been shown to demonstrate spontaneous motility. Nor-adrenaline produces vas contractility in vitro experiments (Ventura and associates). Hence it is possible that the sympathetic nervous system may be responsible for the powerful contraction of the vas, in vivo. So during ejaculation co-ordinated contraction of the vas, propel sperms from the epididymis to the urethra by the release of noradrenaline (Hackett and Waterhouse). Hence longitudinal incisions over the vas may prevent severance of the symphathetic nerves.

The sperms from the epidiymis are immature and have limited motility. By the time they reach the ampullary portion of the vas, they attain maturity.

PHYSIOLOGY AFTER VASECTOMY

It takes approximately four to twelve weeks for the sperms to disapper from the semen in most of the patients, but it may take as long as six months (Population Report 1973). Azoospermia has been reported after six ejaculations but most require twelve ejaculations (Freund and Davies).

The vas proximal to the ligation becomes dilated and filled with a milky fluid containing large numbers of live and dead spermatozoa and macrophages. The spermatozoa ingested by the macrophages then degenerates. As a result of this the cells of the epididymis are rich in lipofusion (Phadke).

Due to the obstruction and degeneration of the spermatozoa, some antigenic components are absorbed and transfered to basal capillaries and this may be responsible for the development of antibodies against the sperms.

Sperm agglutinating and sperm immobilizing antibodies have been demonstrated in vasectomised patients (Ansbacher). About 30 – 50 per cent of the vasectomised individuals show these antibodies within a period of six months. The significance of these antibodies is still unknown.

Vasectomy does not change the sexual potency or ejaculation or any change in seminal volume. The endocrine status remains the same. This is supported by the normal plasma testosterone after vasectomy. Moreover there is normal spermatogenesis as shown by testicular biopsy (Hackett & Waterhouse 1973).

Failure to propel sperms and to fertilise an ovum after a successful reanastomosis may be due to the interference of the nerve supply to the vas, as mentioned earlier and to the production of antibodies after vasectomy, although success rate, varies from 30 – 90 per cent.

CONCLUSION

Male sterilization in the future may play a major role in population control. It is becoming impossible to have adequate economic development to keep up to the pace of population growth. So, better understanding of the anatomy and physiology of vasectomy is essential before one ventures into it.

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The Laboratory diagnosis of veneral diseases — II — The Laboratory diagnosis of gonorrhoea

by
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Kuala Lumpur.

Gonorrhoea is caused by *Neisseria* Gonorrhoeae, a Gram negative diplococcus which was first described by Neisser in 1879.

The prevalence and incidence of gonorrhoea in Malaysia is difficult to ascertain since most patients would seek medical attention from private practitioners rather than from government institutions. Furthermore many cases may be treated by quacks or are self treated. Therefore statistics collected from government hospitals and clinics in this country do not present the true picture of venereal disease prevalence (Tow, 1964).

There is also the problem of undiagnosed or "hidden" cases. This is particularly so in the case of females where 75% of those affected may be asymptomatic (Fiumara, 1972) and therefore would seek neither diagnosis nor treatment. It is these "hidden" cases who form the main reservoir of infection, as they remain infective for long periods. An attack of gonorrhoea confers no immunity to subsequent re-infections and a person can often have repeated episodes caused by the same untreated partner ("ping-pong" gonorrhoea). Often even in cases where a correct diagnosis is made treatment may be inadequate and the patient may continue to be an asymptomatic carrier. The only sure way of ensuring that treatment has been adequate is to perform a laboratory test of cure.

The above emphasises the need for good laboratory support if the incidence of gonorrhoea is to be reduced.

It is the purpose of this paper to review recent trends in the laboratory diagnosis of gonorrhoea.

1. Direct smear examination.

Diagnosis of gonorrhoea in the male is relatively simple as perhaps 99% of those affected are symptomatic (Fiumara, 1972) and Gram staining of a direct smear from urethral discharge will show characteristic Gram negative intracellular diplococci. This constitutes sufficient basis for a diagnosis of gonorrhoea in the male (U.S. Dept. of Health, Education and Welfare 1970).

In the male there is normally no commensal gram negative diplococci in the genito-urinary tract.

Direct smear examination the male in 99% sensitive and specific in cases of acute gonorrhoea.

Direct smear examination however has a different significance in the female. 75% of those affected may be asymptomatic. While direct smear examination may have some value in the diagnosis of acute cases in the female it is about 30 – 40% less sensitive than culture (Caldwell et al 1971). Furthermore, as the female genital tract may have commensal *Neisseria,* the possibility of false positives cannot be ruled out.

It can thus be seen that while gram stained direct smears are useful in the diagnosis of gonorrhoea in most male patients it is of questionable value in females. For them diagnosis depends on the demonstration of *Neisseria gonorrhoeae* by culture methods.

2. Culture of Neisseria gonorrhoeae

Culture of *N. gonorrhoeae* is essential for diagnosis of gonorrhoea in females, in males where direct smear examination has been negative and as a test of cure for both males and females.

N. gonorrhoeae is a fastidious organism needing special growth requirements for in-vitro culture. Difficulties experienced in culturing may be due to sensitivity to inhibition rather than complexity of nutritional requirements (Reyn 1965). Another difficulty encountered is the inability of the gonococcus to withstand the delay of transporting specimens from the doctor to the laboratory. A suitable transport medium has therefore to be used in situations where direct culture is not possible.

A culture medium suitable for the isolation of gonococci from clinical specimens should not only be enriching to the gonococcus but selective as well. Unless their growths is checked, the commensal organisms normally found in the female genital tract will overgrow the gonococcus. This is also true for sites such as the rectum and the pharynx in cases of suspected infections of these regions.

In 1964 Thayer and Martin introduced a selective medium (Thayer and Martin, 1964) which they modified in 1966 (Thayer and Martin, 1966). This medium consists essentially of a conventional chocolate agar base to which is added enrichment such as "Supplement B" or "isovitalex" and three antibiotics, Vancomycin, Colistin and Nystatin. This combination makes the medium highly useful for the primary isolation of gonococci from conspicuously contaminated sites. The Vancomycin inhibits the Gram positive contaminants, Colistin the Gram negative contaminants and Nystatin the yeasts. Thayer – Martin medium therefore achieves the objective of allowing the growth of N. gonorrhoeae and N. *meningitidis* while suppressing the growth of contaminants including commensal *Neisseria.*

For subculturing and for isolation of gonococcus from sites which are normally sterile conventional chocolate agar medium would suffice.

Method of collecting specimens and inoculation of culture media:–

In men specimens of urethral discharge are obtained using a sterile bacteriological loop. In females cervical cultures are obtained using an ordinary cotton tipped swab which is introduced into the cervix after the cervical plug is removed. In females an additional specimen taken from the anal canal will be useful as some of them may only have rectal involvement (Schmale et al, 1969).

To inoculate the culture plate, the swab or loop is rolled directly to the prewarmed medium in a large "Z" pattern as soon as it is taken. The plate is then cross streaked immediately with a sterile wire loop. If this is not possible in the clinic, cross-streaking may be done on receipt of the specimen at the laboratory. Specimens after collection and inoculation are placed as soon as possible into a candle jar to provide a carbon dioxide atmosphere.

At improvised candle jar would simply consist of a tin with a tight fitting lid. After plates are placed in the tin, a candle is lit and the cover replaced. Consumption of oxygen within the tin by the lighted candle will provide the necessary carbon dioxide.

Incubation of the plates at 35.0 to 36.0°C is begun as soon as they reach the laboratory which should be on the same day.

In situations where specimens cannot reach the laboratory on the same day the above method is not suitable and transport media will have to be used.

The most widely used transport medium in Malaysia at the moment is Stuart's medium (Stuart et al, 1954) which is a non-nutrient, non toxic, holding medium which is designed to eleminate oxidation as a cause of death of the gonococcus. The usefulness of this medium is somewhat restricted for transport periods longer than 24 hours.

In 1971 the "Transgrow" medium was intro-

duced (Martin & Lester, 1971) and has been found to satisfy all the requirements of a good transport medium. Transgrow medium represents a further evolution of the Thayer – Martin medium differing from it in that it is contained in a flat screw capped bottle in which a controlled atmosphere of 10 per cent carbon dioxide is obtained by gassing, an increased amount of agar to lend rigidity to the medium and an increased percentage of dextrose. In transgrow, the transport and culture medium are one and the same and survival of gonococci occur even after 48 – 96 hours at ambient temperatures.

The transgrow medium is inoculated directly from the patient, incubated at 34-37°C at the clinic for 16-18 hours after which it is mailed to the laboratory for further processing.

Identification of N. gonorrhoeae

An oxidase test is carried out on colonies on both Thayer-Martin and Transgrow media. Oxidase positive colonies are gram stained and a preliminary report can be given based on oxidase reaction and characteristic gram staining.

For confirmation, fermentation tests are carried out on glucose, maltose and sucrose. Gonococci ferment only glucose and can thus be differentiated from the meningococcus and from commensal *Neisseria.*

The direct fluorescent antibody technique may also be used to confirm strains isolated in the laboratory as N. gonorrhoeae. This technique however is not recommended for the identification of *N. gonorrhoeae* on smears from clinical specimens although it has been used by some workers for this purpose because it lacks the necessary sensitivity (Shroeter and Lucas, 1972).

3. Test of cure

A test of cure is essential to ensure that treatment has been successful. This is particularly important in the case of females because remission of clinical symptoms is not synonymous with total eradication of the gonococcus.

The only test of cure is to culture specimens from infected sites. To preclude the possibilities of re-infection this is usually done at 7 and 14 days after treatment is completed (Shroeter & Lucas, 1972).

In males a urethral specimen would suffice. However in females both cervical and rectal cultures should be taken because 60% of all infected females have gonococcal proctitis and 30% of all treatment failures occur at the rectal site (Shroeter & Reynolds 1972).

4. Antibiotic Sensitivity Testing

With the current increase in strains of gonococci resistant to many antibiotics, antibiotic sensitivity testing may be of use in the treatment and control of gonorrhoea.

This will also assist in elucidating the cause of treatment failure. A suitable laboratory method would be to determine the minimal inhibitory concentration of the relevant antibiotics against the strain in question. This may be achieved using tubes of enriched chocolate agar medium containing several concentrations of the antibiotic to be tested (Djuanda & Warsa 1973).

5. Serological Tests

Tests to detect serum antibody levels against the gonococcus have not been very rewarding in the diagnosis of gonorrhoea. In acute cases, antibody is rarely present, and although it may be of some value in chronic infections, its value is diminished by the lack of specificity and the fact that antibodies tend to persist for many years in spite of clinical cure (Reyn, 1965).

SUMMARY

The laboratory has a useful role to play in the diagnosis and control of gonorrhoea.

In males majority of cases may be diagnosed on direct smear examination alone but in the case of females culture on Thayer-Martin medium and subsequent identification of colonies is essential.

A test of cure by culture should be done on both males and females after therapy. In the case of females both cervical and rectal cultures should be taken.

In situations where a laboratory is not at hand a suitable transport medium like Transgrow should be used. If this is not available Stuart's medium may have to be used although it is less efficient.

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Sporotrichosis

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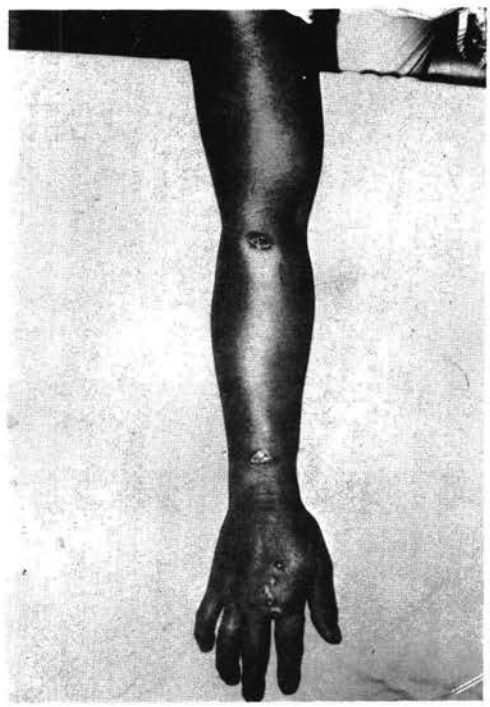
INTRODUCTION

Sporotrichosis, a subcutaneous fungus infection, was first reported in 1898 by Schenck from Eruope. The fungus, Sporotrichium schenckii is a saprophyte on various plants and has been isolated from soil. Human infection is usually due to contamination of an injured skin. Many clinical types of sporotrichosis have been described and of these the localised lymphatic type is the commonest. It occurs sporadically in all parts of the world, and this is the first report of an incidence from Malaysia.

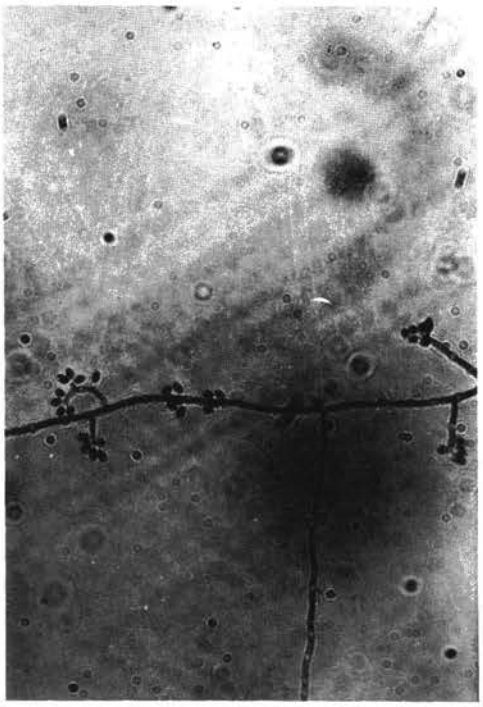
CASE REPORT

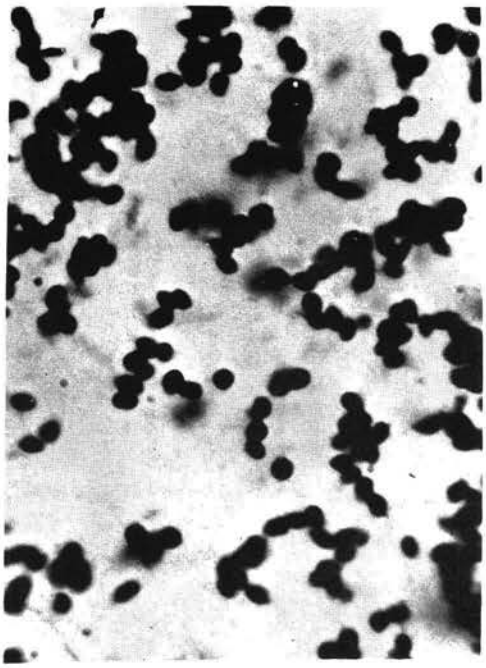
A 45 year old Chinese housewife, about nine months before the date of her visit to the Skin Clinic, sustained a superficial abrasion of the skin on her right index finger near the metacarpophalangeal joint, while opening a rusty tin. The abrasion healed but a month later she noticed a small painful nodule in the vicinity of previous injury. This grew in size and soon the skin over the nodule ulcerated with a purulent discharge. Over the duration of the next eight months, similar nodules appeared in a linear distribution, first on the dorsum of the right hand, then the wrist, over the lateral aspect of the elbow and finally on the upper arm. There were both intact and ulcerated discharging nodules (Fig. 1). There was no lymphadenopathy. The lesions had been unsuccessfully treated elsewhere as pyodermas.

Investigations: Hb. 8 gm %. WBC 7,000 per cu. mm. ESR 15 mm/hr. VDRL: negative. The serum protein electrophoretic pattern was normal and radiological examination showed no bone or pulmonary lesion.

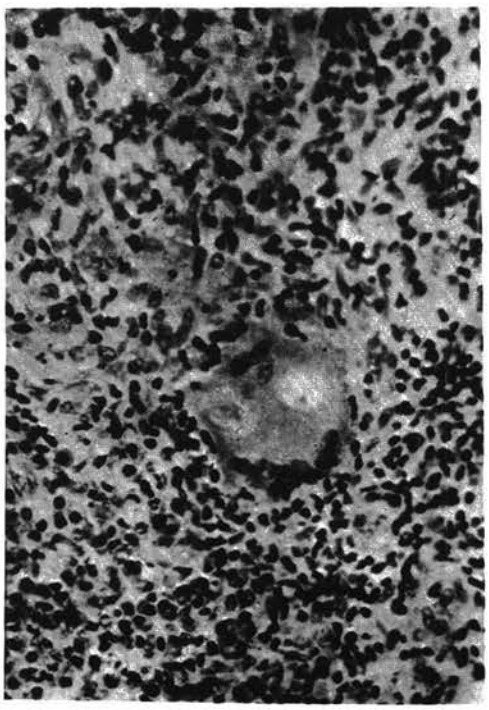


Mycology: The purulent material from an ulcerated lesion was inoculated onto Sabouraud's medium but no fungal growth was noticed. An intact nodule was excised and a half of this was homogenised, and then inoculated onto Sabouraud's medium and kept at room temperature. After five days fungal growth was seen. Initially, the colonies were brownish in colour and had a moist wrinkled surface. After two weeks the colonies turned black and there was no aerial mycelium. Microscopic examination of the young colonies showed delicate, branching and septate hyphae with conidia borne laterally on the hyphae or in clusters at the end of lateral branches. The shape of the conidia were





pyriform, ovoid, or spherical (Fig. 2). The fungus was subcultured in Sabouraud's medium at 37°C. The hyphae were converted into the yeast phase with elliptical and ovoid bodies which exhibited budding (Fig. 3).



Histology: The other half of the skin nodule was blocked in paraffin, sectioned and stained by Haemotoxylin and Eosin, Weighert Van Gissen and Ziehl-Neelsen methods. Ptyalin and maltase digested preparations were subjected to periodic acid Schiff reaction and Gomori's silver impregnation for fungi. The H & E preparation showed a dermal lesion composed of fibrogranulomatous tissue exhibiting a few Langhan's type of giant cells which were surrounded by a dense infiltrate of lymphocytes, plasma cells and neutrophils. Ill-defined pale staining round structures were present in some of the giant cells (Fig. 4). Acid-fast bacilli and Nocardia were not seen. Despite the special methods used, neither fungal bodies nor asteroid structures were found in the skin nodule.

DISCUSSION

Sporotrichosis presents such a characteristic clinical picture that the diagnosis, especially of the localised lymphatic variety, can be established from the clinical findings alone (el-Mofty, et al, 1965). Further in our patient, the history of preceding trauma, and the mode of development of the linear distributed lesions were helpful in an accurate clinical diagnosis. The associated cord-like thickening of the lymphatic vessels between the nodules and the regional lymphadenopathy reported by Mikkelsen, et al (1957) were absent in this patient.

Sporotrichium schenckii is a dimorphic fungus, existing in mycelial form in saprophytic life and in yeast form in animal tissue. Though there have been reports of identifications of tissue forms of this fungus, the asteroid bodies (Moore et al, 1946) and cigar bodies, demonstrations in tissue sections even with periodic acid Schiff reaction is difficult, and definitive diagnosis is dependent on cultural studies. The histologic appearance of the lesion is that of a non-specific granulomatous process .with central necrosis and is not diagnostic.

Though isolation of the organism by culturing the exudate alone is possible, it is necessary to use materials from intact nodules, as was done in our patient, for a higher positive rate of mycological cultures. The colony appearance of the fungus in mycelial phase is characteristic but conversion into the yeast phase is necessary for identification of the fungus.

SUMMARY

A patient with lymphatic variety of sporotrichosis is described. The history and the clinical appearance of the lesion were of diagnostic significance. Unless fungus infection is thought of and specimens are cultured, the lesions may be mistaken for pyodermas, as had been in our patient. Mycological identification is easy as the fungus grows readily in the commonly available Sabouraud's medium. Potassium iodide by mouth is the most effective drug and the patient's lesions healed in six weeks from starting the therapy.

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Efficiency of the cytoplasmic incompatible (D3) strain of culex pipiens fatigans to infection with the rural strain of wuchereria bancrofti

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INTRODUCTION

Two strains of *Wuchereria bancrofti* have been recognized in Malaysia (Wharton, 1960). The urban strain, restricted to the cities, has been introduced into Malaya over the last 100 years or so by immigrant Chinese and Indians (Poynton & Hodgkin, 1938; Wilson and Reid, 1951). At present this strain occurs in small foci in Singapore, Kuala Lumpur and Penang. This is transmitted by *Culex pipiens fatigans* as in other neighbouring countries. The second strain, the rural strain of *Wuchereria bancrofti,* is mostly found among the Orang Asli (aborigines) and to some extent in rural Malays and it seems to be the indigenous strain. The local strains of *C. p. fatigans* are considered to be poor vectors as they are mostly refractory to the development of the rural strain of *W. Bancrofti,* although a few will support the development of microfilariae up to the infective stage (Wharton, 1960; Ramachandran et al., 1964; Thomas & Ramachandran, 1970). The natural vectors of this strain in Malaysia are *Anopheles letifer* and *Anopheles* maculatus (Wharton, 1960).

Rapid urbanization in many developing countries, without the necessary sanitation has accelerated the rate of increase in numbers of *C. p. fatigans.* This poses the imminent threat of bancroftian filariasis transmission in these countries. *C. p. fatigans* is a very hardy mosquito which has developed in a high degree of resistance to many insecticides and has shown gene potentials for developing resistance rapidly to all types of synthetic organic compounds. Therefore, the insecticides which are now in use are not suffciently effective for the control of this species. This has necessitated the search for alternative or supplementary methods of control of this species.

Among the varius methods known at present, genetic control using cytoplasmic incompatibility seems to be the most advanced and a feasible method against this species as shown by Laven (1967) in Okpo, Burma. With this view in mind, studies were carried out on the cytoplasmic incompatible strain (D3). The males of this strian have been found to be imcompatible with females of 19 strains collected from various States in West Malaysia, Indonesia, Sabah, and Singapore (Thomas. 1971). Furthermore, recently conducted cage experiments indicated clearly that local females have no special preference for local males but would mate with incompatible males freely and would bring about 90% incompatibility among local females, if the ratio of the incompatible males to local males in the cages was about 10:1 (Thomes, 1972).

If incompatible males are released in the field daily in very large numbers over a period of time, it is then possible that some females may also inadvertently be released at the same time. Under such circumstances, this incompatible strain of

mosquitoes which is well adapted to local conditions, would sooner or later, partly or completely replace the local indigenous strain of *C. p. fatigans* or would establish themselves side by side with them. Therefore, it is absolutely essential that the incompatible strain which is used against local *C. p. fatigans* is not a vector of any mosquito-borne disease.

The most important prerequisite was, therefore, to study the efficiency of this species in transmitting the rural and the urban strains of *Wuchereria bancrofti* in West Malaysia. With this view in mind, studies on this strain were undertaken using a donor who was infected with urban strain of *W. bancrofti* (rural strain). It was not easy to find a donor who was infected with urban strain of *W. bancrofti* and therefore no studies were conducted with this strain.

Furthermore, selections were carried out over a few generations to obtain pure susceptible and resistant lines of the incompatible *C. p. fatigans* to rural *W. bancrofti* with a view to study the inheritnace of suceptibility of infection in this mosquito to the filarial parasites.

MATERIALS AND METHODS

The incompatible strain of *C. p fatigans* (D3) was obtained from Professor Laven, Director, Institut Fur Genetik, Mainz, Federal Republic of Germany in 1968. This strain has the cytoplasm of Paris strain and the genome of Fersno strain (Laven, 1967). This was the strain which Laven (1967) has successfully used to eradicate the inidgenous *C. p. fatigans* from Okpo. Burma.

The larvae were reared under laboratory conditions at room temperatures between 72° and 80°F. The adult mosquitos were maintained at the same room temperature and at a relative humidity of 70-80%. Female mosquitos which were about a week old were fed on a *W. bancrofti* donor between 20.30 and 22.30 hours. Microfilariae counts per Cu mm in the peripheral circulation of the donor were taken before and after a batch of mosquitos were fed. The average of these two were taken as the mean microfilariae count per cu mm. in the blood during experimental feeding.

After feeding, the blood-fed mosquitos were taken out and kept individually in 9 cm x 4.5 cm tubes provided with wet cottonwool. No sugar solution was supplied in the tube until after egg laying was completed. On the fourth day after the blood meal, water was given to each mosquito for egg laying. After a mosquito had laid eggs, both the adult and the egg raft were given the same code number. All mosquitos were dissected 12-14 days after the infective blood meal. The percentage of infectivity and the number of infective larvae per mosquito were determined.

Selection of the susceptible (+) strain was carried out by isolating four to five egg-rafts which were laid by the females from F10 of D3 stock colony which supported the highest numbers of infective larvae. Similarly the resistant (−) strain was also selected by isolating a few (four to five) rafts deposited by resistant females of the same generation. Adults which emerged from each individual raft were kept together in individual cages and were allowed to be together till feeding to enable 100% brother-sister matings. Just before feeding, females from all selected susceptible strains were taken out and were put together in a single cage. Similarly females from all resistant lines were collected in one cage just before feeding. This method enabled strict sib-mating and as they were put together before feeding, sufficient numbers of adults were obtained. This would have been impossible if females from single rafts only were pooled together. However, in this method it was not possible to trace the exact parentage, unless some artificial markings were made on the females. Due to strict brother-sister mating, however, inbreeding depressions were observed and experimental feedings of one or two generations had to be interrupted. When such inbreeding depressions were noticed out-breedings were made with very closely related lines.

RESULTS

Females isolated from F_{10} to F_{13} generations of the D3 stock colony of *C. p. fatigans* were fed on the donor. The results of the experiments are given in Table 1. The mean number of microfilariae per cu mm of peripheral blood of thedonor at the time of these series of experimental feedings, varied form 1.8 to 2.3. The percentage of infectivity of these mosquitos to the rural strain *W. bancrofti* were 82.8% in F_{10}, 75% in F_{11}, 86.4% in F_{12} and 85.5% in F_{13}. The dissections of the mosquitos after 12-14 days showed that the number of infective larvae in susceptible mosquitos varied from a minimum of one to a maximum of 21 larvae per mosquito. The mean number of larvae per mosquito in F_{10} to F_{13}

generations were about 5.3, 6.6, 6.0 and 3.7 larvae respectivley. Wharton (1960) has shown that the intake of *W. bancrofti* microfilariae by *C. p. fatigans* was three times the number of microfilariae that would be expected in a full blood meal. This would explain the high rate of infective larvae in some of the suceptible mosquitos.

TABLE 1. SUSCEPTIBILITY OF D3 STRAIN OF CULEX PIPIENS FATIGANS TO INFECTION WITH A RURAL STRAIN OF WUCHERERIA BANCROFTI

Colony and generation	Mean No. mf/cumm of blood at the time of feeding	No. of mosquitos that took blood from the donor	No. of mosquitos that died before dissection	No. of mosquitos dissected	No. of mosquitos with infective larvae	Percentage of mosquitos which are susceptible to infection	No. of infective larvae per mosquito		
							Min.	Max.	Mean
D_3									
F_{10}	2.2	73	9	64	53	82.8	1	21	5.3
F_{11}	1.8	48	8	40	30	75.0	1	15	6.6
F_{12}	2.3	55	11	44	38	86.4	1	16	6.0
F_{13}	2.0	49	7	42	36	85.7	1	21	3.7

These results showed that the infectivity rates of the females were high and varied form 75% to 86.4%. In a previous study, the percentage of five local strains of *C.p.fatigans* to rural *W. bancrofti* varied only from 6.6% in the Kuala Lumpur strains to 28.1% in a dieldrin selected colony (Thomas & Ramachandran, 1970). These mosquitos were also fed on the same donor when the microfilariae counts ranged from 2.7 to 3.1 per cml of blood. Results of the present studies therefroe have shown clearly that the incompatible strain of *C. p. fatigans* is an extremely efficinet vector of the rural strain of *W. bancrofti.*

SELECTION OF INCOMPATIBLE COLONY OF *C.p. FATIGANS* TO INFECTION WITH RURAL STRAIN OF *W. BANCROFTI.*

Four or five egg rafts laid by the most susceptible females (F_{10}) of the D3 stock colony of C.P. fatigans were used as parents (P). The method of selecting, rearing and feeding have already been described in an earlier paper (Thomas & Ramachandran, 1970). Selection was continued for seven successive generations except in F4. The results are tabulated in Table 2.

TABLE 2. SELECTION OF SUSCEPTIBLE D3 STRAIN OF CULEX PIPIENS FATIGANS FOR FURTHER SUSCEPTIBILITY TO INFECTION WITH A RURAL STRAIN OF WUCHERERIA BANCROFTI

Colony and generation	Mean No. of mf/cumm of blood at the time of feeding	No. of mosquitos that took blood from the donor	No. of mosquitos that died before dissection	No. of mosquitos dissected	No. of mosquitos with infective larvae	Percentage of mosquitos susceptible to infection	No. of infective larvae per mosquito		
							Min.	Max.	Mean
D3 F_{10} (P) Selected susceptible strain	2.2	73	9	64	53	82.8	1	21	5.3
F_1	2.7	41	3	38	33	86.8	1	24	7.2
F_2	1.5	42	8	38	29	76.3	1	12	3.0
F_3	2.2	45	12	33	28	84.8	1	8	3.5
F_4	-	-	No FEEDING		-	-	-	-	-
F_5	1.4	15	11	4	3	75.0	1	7	3.3
Microfilarial count in peripheral blood of donor fell to 0.3 larvae/cml blood									
F_6	0.3	50	14	36	6	16.7	1	1	1.0
F_7	0.3	30	11	19	2	10.5	1	1	1.0
EXPERIMENTS DISCARDED									

In the first three generations, the percentage of infectivity among adult mosquitos were high: 86.8% in F_1, 76.3% in F_2 and 84.8% in F_3. The microfilarial counts in the donor's blood at the time of feedings were 2.7, 1.5 and 2.2 larvae percumm espectivaly. The number of infective larvae in the susceptible mosquitos varied from 1-24 in F_1 with a mean of about 7.2 larvae; 1-12 (3.00 mean) in F_2 and 1-8 (mean 3.5) in F_3 respectively.

Due to the very small number of adults in F_4 the females were not fed on the donor but the experimental feedings were continued in F_5, F_6 and F_7. At the time when F_5 adults were fed on the donor, the microfilarial count in his peripheral blood dropped to 1.4 larvae per cumm The microfilarial level further dropped to 0 3 larvae per cml when F_6 and F_7 generations were offered blood meal.

Further experimental feedings on the donor had . to be discontinued due to the very low microfilarial count in the donor's peripheral blood (below 0.1 larvae per cml of blood). The percentage of infection among F_5 adults was 75%. The number of infective larvae per susceptible mosquito varied from 1-7 with a mean of about 3.3 (Table 2). The percentage of infectivity among F_6 and F_7 adults of the selected susceptible strain fell to a low level of 16.7% and 10.5% respectively. These rates were very much lower than those originally shown by the normal parental colony, and were most probably due to the low microfilarial rate in the donor's peripheral blood.

Similarly, the selection for resistance to infection with *W. bancrofti* was carried out on the

normally susceptible incompatible strain. For this, resistant parents were obtained from the females of F_{10} incompatible colony which were refractory to infections. The results are given in Table 3. All through the experiments, the two selected strains (susceptible and resistant strains) were fed simultaneously on the same night on a single donor.

TABLE 3. SELECTION OF SUSCEPTIBLE D3 STRAIN OF CULEX PIPIENS FATIGANS FOR RESISTANCE TO INFECTION WITH A RURAL STRAIN OF WUCHERERIA BANCROFTI

Colony and generation	No. (Mean) mf/cmm of blood at times of feeding	No. of mosquitos that took blood from the donor	No. of mosquitos that died before dissection	No. of mosquitos dissected	No. of mosquitos which are refractive to infection	Percentage of mosquitos resistant to infection	No. of infective larvae per susceptible mosquito		
							Min.	Max.	Mean
D3 F_{10} (P) Selected resistant strain	2.2	73	9	64	11	17.2	1	21	5.28
F_1	2.7	60	8	52	14	26.9	1	23	5.76
F_2	1.5	15	1	44	34	77.3	1	11	1.71
F_3	2.2	45	7	38	22	57.9	1	6	2.06
F_4	-	-	No feeding (due to insufficient number of adult mosquitos)						-
F_5	-	-	No feeding (due to insufficient number of adult mosquitos)						-
Microfilarial count in donor's peripheral blood fell to 0.3 larvae/cml blood									
F_6	0.3	105	62	43	40	93.1	1	1	1.00
F_7	0.3	45	22	33	30	90.0	1	1	1.00
Experiments discarded									

The resistance of the F_{10} females of D3 strain (P) was 17.2%and the microfilaria rate per cu mm blood of the donor was 2.2 (Table 3). Feeding was continued for three successive generations. The microfilarial count at the time of experimental feeding of these adults in these generations were the same as those when the suceptible strains were fed, i.e. 2.7 1.5 and 2.2 per cu mm respectively (Table 2 and Table 3). During these three generations, the resistance of the selected strain increased to 26.9% in F_1; 77.3% in F_2, and then dropped to 57.9% in F_3.

The F_4 and F_5 adults were not fed on the donor due to the shortage of females. The experimental feedings commenced again with F_6 adults and continue in the F_7 generation but later the feeding experiments were abandoned due to the sharp fall in the microfilarial count in the donor's peripheral circulation. The resistance in F_6 and F_7 generations, when the microfilarial count was 0.3 larvae per cu mm of blood was 93.1% and and 90.0% respectively.

As the rate of infectivity of the mosquitos of a given colony has been shown to be directly related to the rate of microfilaria (Wharton, 1960) it was not possible to compare the susceptibility/resistance of the F_6 and F_7 generations of the two selected colonies with their parent generations.

DISCUSSION

These studies have shown very clearly that the D3 strain in *C.p. Fatigans* is an extremely efficient vector fo the rural strain of *W. bar crofti.* If the D3 strain were used in the control of *C. p. fatigans*, in Malaysia, it is possible that this strain would replace or coexist with the indigenous strain of *C. p. fatigans.* Being an excellent vector of the rural strain of *W. bancrofti* which is the more predominant of the two strains present in Malaysia the introduction of this strain would have very serious and far-reaching consequences. Therefore, this species should not be released into the field to control *C. p. fatigans* in Weast Malaysia.

No feeding experiments were carried out with the D3 strain of *C. p. fatigans* to estimate its susceptibility to the urban strain of *W. bancrofti.* It is therefore, difficult to predict its efficiency with accuracy. However, in most countries *C. p. fatigans* is an excellent vector of *W. bancrofti* and probably it would be so in Malaysia too.

Wharton (1960) estimated that a female *C. p. fatigans* would consume about 4 cml of blood during a single meal but the intake of *W. bancrofti* microfilaria by the mosquito would be equivalent to the number present in 12 cumm of blood. He also reported that many larvae were lost during development, and that many infective larvae left the mosquitoes even though no blood meal was taken. Therefore, although the mosquitos were susceptible to infection, unless the donor has a constant and an optimal number of microfilaria in the peripheral blood at the time of feeding, it would not be possible to select out susceptible strains or to estimate with certainty the vector susceptibility of the strain or compare its susceptibility with that of another strain. Therefore, when comparisons of vector suceptibilities were made, between strains, or between species or among various generations of a single strain, it is of prime importance to feed them on a single donor who supports a constant number of microfilaira per cumm of the peripheral blood. This factor was very clearly indicated in this series of experiments. When the mean microfilarial count was about 2 or more per cumm of peripheral blood the percentage of suceptibility of the incompatible strain was always above 80%. When the average microfilarial count fell to about 1.5larvae per cumm the infectivity rate inthe normally susceptible incompatible strain of *C. p. fatigans* showed a corresponding drop to 75%. The

same pattern of results was obtained in the substrain of *C. p. fatigans* which was selected for susceptibility to infection. In this selected substrain, the rate of susceptibility to infection after selection increased while the mean number of microfilaria was high (about two larvae per cumm of blood). When this count dropped to about 1.5 larvae per cumm of peripheral blood a corresponding fall in susceptibility to infectivity was also noticed among the adults. Subsequently, when the microfilarial count fell to 0.3 larvae per cumm of blood, the infectivity rate in the naturally susceptible strain which had already been selected dropped to about 16.6% and 10.5% in F_6 and F_7 respectively. Ramachandran et al. (1964) found a greater range of variation (12% to 53%) in infectivity rates among five strains of indigenous *C. p. fatigans* which have been collected form different localities in Malaysia and which were fed on the same donor at different times when the microfilarial counts per cumm of blood were not constant at the time of feedings. On the other hand, when these strains were fed simultaneously on the same donor when the microfilarial count in the blood was relatively constant, the rate of infectivity varied only from 11% to 30%.

The necessity of studying the vector ablity of all genetic strains to local parasites before they are considered as potential genetic weapons against the local strains of mosquitos should be emphasized here. It is extremely important that such studies are undertaken before rearing them in large numbers for release into the field. If such genetic tools are vectors of local strains of parasites, the release and their subsequent establishemnt would have far-reaching adverse effects.

SUMMARY

The feeding experiments with the D3 strain of *C. p. fatigans* on a donor showed that this strain, unlike the local strains of *C. p. fatigans,* is a very efficient vector of the rural strain of W. *bancrofti*. Therefore, it is not a suitable strain to use as a genetic weapon against local *C. p. fatigans*. The susceptibility of adults of four generations F_{10} to F_{13} of the D3 strain was above 80%.

Experiments were carried out to select out two substrains of *C.p. fatigans* one of which was susceptible and the other resistant to the rural strain of *W. bancrofti*. When the mean microfilarial counts in the peripheral circulation was about two larvae or more per cumm blood, susceptibility to infection in various generations remained high-around 85%. However, when the microfilarial count dropped to 0.3 larvae per cu mm blood, the susceptibility of the selected adutls in F_6 and F_7 also dropped to 16% and 10% respectively. Similar and comparable results were also obtained when experiments were carried out to select out resistant mosquitos to this infection.

These results showed that when a strain of *C. p. fatigans* adults is naturally susceptible to W. *bancrofti* infection, the number and percentage of mosquitos which become infected and the number of infective larvae that they carry are related directly to the number of microfilariae in the blood at the time of feeding.

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Book Reviews

AN AID TO CLINICAL SURGERY

by Peter R.Scott: Churchill Livingstone, Edin. & Lond. 1971 Paper back edn. 1973. pp. 324. Figs. 60.

The author, a member of the surgical staff of the Royal Melbourne Hospital, is engaged in clinical teaching of undergraduates and post-graduate trainees preparing for the Australian Fellowship Examinations in surgery. Accordingly, his approach has been to provide a concise aid to the study of clinical surgery with deliberate restriction of the subject matter to common conditions. Much of the subject matter is considered in relation to commonly encountered symptoms, such as upper abdominal pain, rectal haemorrhage, or nipple discharge making the volumne most useful as a clinical guide.

It is recommended as a reliable student handbook for use in conjunction with the fuller standard texts on clinical surgery.

ANATOMY AND PHYSIOLOGY APPLIED TO NURSING

by Janet T.E.Riddle. Churchill Livingstone, 4th Edn. 1974 pp. 149.

This is an attempt to give the student nurse a simple overall picture of the human body and physiology made interesting by stressing the practical application of the knowledge to nursing in the wards. It is based on lectures given to the nurses at Killearn Hospital but other students as well as their teachers will find this well written and excellently illustrated little book very useful.

FAMILY PLANNING HANDBOOK FOR DOCTORS

published by International Planned Parenthood Federation. 4th Edn. 1974 pp. 173, USA $ 3.75 or £ 1.50

This book is available free of charge to doctors and is a handy little book to have in the library. This is the fourth edition and the title is new. It used to be called the IPPF Medical Handbook. In the last 12 years the book has grown considerably in size. It covers a very wide range of Family Planning topics. In fact it is virtually an encyclopaedia in Family Planning work. However, it is strictly a handbook in the sense that it is more for quick reference than for academic studies. In addition the book also has chapters on sub-fertility, Sexually transmitted diseases, cervical and vaginal cytology, the equipping and running of Family Planning clinics.

As is expected, Induced Abortion takes a prominent place in this Handbook. Induced Abortion wheter legal or otherwise, whether termed termination of pregnancy or menstrual regulation is now an importnat procedure for doctors in the world over. This is very evident from the papers presented in the recent 6th Asian Congress of Obstetrics & Gynaecology held in Kuala Lumpur. At the exhibition in this Congress, the one stall which sold Karmen suction curettes had roaring business and in fact the curettes were sold out before the Congress was over.

The book is very readable and very complete in the sense that it does not ignore commonly practiced methods of Family Planning like Coitus interruptus, the Condoms, the Caps and Spermicides. However, this book fails in many instances to give an idea of the safety of each method with regards to protection from pregnancy. For instance it discusses the rhythm method in great detail and mentions that

varying results have been reported. If fails to mention that the rhythm method can be a 100% safe in animals caged in separate cages separately; but where the human emotions of two people are concerned it requires very strong will-power. My personal experience is that the rhythm method is frought with failure unless the couple in question have very strong will-power. The chapter on systemic contraception brings forth a new idea. This is a community-based distribution of the oral contraceptive. Whilst the idea is very good and has worked in many places, it is susceptible to unscruplous businessmen. Here in Malaysia we have already known of fake contraceptive pills being sold to the public. If this community-based system is introduced, there will be wide spread sale of fake pills. The only way to avoid this will be to make the pill so cheap that it is virtually impossible for anyone to imitate and yet make a profit.

Vasectomy is also discussed in fair detail as it should be. Unfortunately, it describes the two incision method which few of us now practice.

The one incision method is just as easily done. The other point is, it does not lay stress on any special treatment for the cut ends of the vas. This is a very important aspect of the operation. If the ends are not properly managed, re-canalisation of the vas will take place very easily.

All the information given in the book may be found in one's reading elsewhere. It is seldom that such a vast amount of information on one topic is found in a little handbook.

This book is worth reading for all ancillary medical staffs, medical students and general practitioners who are involved in Family Planning work.

The gynaecologists may perhaps find parts of the book somewhat boring.

K.B. KUAH.

ANAESTHESIA AND THE E.M.O. SYSTEM
by John V. Farman. 1st Printing, The English Universities Press Ltd. 1973, pp. 184, illus. 89.
UK £1.00 nett.

The use of cylinder gases for the administration has largely superceded all other forms of apparatus in almost all parts of the world. However, on occassions, even in Malaysia, the supply of gases has been interrupted by transportation problems or non-cooperation by the supplier's employees over wage disputes.

During such "gas-less" occassions, anaesthesiologists have invariably resorted either to the use of the Epstein-Macintosh-Oxford (EMO) apparatus to provide general anaesthesia or to the application of local block for analgesia.

In this well-written book, a whole chapter has been devoted to the detailed description of the EMO system, including its possible faults and suggested remedies. Further, in page 107, the reader is given help in setting up the apparatus with numerous accessories which are principally products of the Oxford School of Anaesthesia. Trainees in anaesthesiology would, in my opinion, be doing themselves a favour to read this account of the EMO system carefully.

As expected, the first half of the book features a precise presentation of circulatory and respiratory physiology, fluid balance, pharmacology of the commonly used anaesthetic drugs and the practical aspects of controled ventilation of the lungs. Medical practitioners who give the occassional anaesthetic will find particularly helpful the later chapters of the book in which the author treats in sequential order the anaesthetic procedure ordinarily followed, that is, the pre-operative preparation and assessment, induction techniques, maintenance and end of anaesthesia. A liberal list of references and a useful index have also been included.

Altogether, this well-illustrated and informative book on the essentials of anaesthesia should be read by all practitioners who fear that they may be called upon to administer an anaesthetic in situations or occassions where the familiar piped gases or cylinder gases are unobtainable.

LIM SAY WAN

OBSTETRICS FOR THE FAMILY DOCTOR published by International Planned Parenthood Federation.

This Book is a very useful and concise one for the Family Doctor practising Obstetrics. The Author avoids theories and writes in details a guide to Antenatal Care and Management of Patients. A careful selection of cases for deliveries and close liaison with the Specialist in Hospitals is stressed. The various chapters of complications during pregnancy and labour are lucidly written and practical guide to management detailed. The author stressed that with systematic management and care tc pregant mother and the close harmony between the Family Doctor and Specialist will greatly reduce the Maternal and Perinatal mortality.

This Book is a must for the General Practitioners practising Obstetrics.

S.LOURDENADIN

PRACTICAL OPHTHALMOLOGIST by Arthur Lim Siew Ming and Khoo Chong Yew, published P.G. Medical Book Store, Singapore. Ref. 170 pg.

The first of the four volumes of Practical Ophthalmologist has just appeared. Both the authors are local ophthalmologist and are to be congratulated on its production as this is the first medical text to be published by local authors. This first volume is dedicated to Professor Ida Mann, who has been described as the "greatest ophthalmological woman in the World", by none other than Sir Steward Duke Elder, the Presidnet of the Institute Ophthalmologist, London.

The first volume discusses four subjects with sections on Cataract Surgery, Acute Primary Closed-Angle Glaucoma, Soft Contact Lenses and Acupunctural Anaesthesia. After giving brief introductions on these subjects the authors have been able to obtain the views of number of experienced ophthalmologist spread round the world to discuss these subjects in question and answer form. Very candid and precise opinions on many practical points and details in treatment are given by the ophthalmologists from their own experiences.

The book is very readable, well illustrated and should form a valuable addition to the library of an ophthalmologist.

KESHMAHINDER SINGH