# Acute appendicitis in West Malaysia

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A STUDY OF 292 consecutive, unselected cases of acute appendicitis was made with particular emphasis as regards its early diagnosis and treatment. The aetiology and symptomatology are reviewed. The results show that the traditional methods of diagnosis are outdated. A line of management is proposed.

Acute appendicitis is now the commonest acute abdominal emergency in West Malaysia and nearly 25% of cases come into hospital with perforation of the appendix. A study of 292 consecutive, unselected cases was conducted with the view to establishing early diagnosis and treatment. The survey was carried out by a group of registrars and medical officers under the supervision of the senior author to establish uniformity of clinical findings. These 292 cases were admitted to the General Hospital, Seremban, West Malaysia.

## Materials and Methods

### Race Distribution

Figure 1 shows the racial composition of the patients whilst Figure 2 denotes the racial distribution of West Malaysia. It can be seen that there were 67 Malays (23%), 130 Chinese (44.5%) and 95 Indians (32.5%) amongst the 292 patients.

Since the population in West Malaysia comprises nearly 50% Malays, 40% Chinese, 9% Indians and 1% other races, acute appendicitis therefore, is far commoner amongst Chinese and Indians than amongst Malays. This is so even when we consider that a smaller percentage of Malays seek treatment by Western medicine in hospital.

### Age and Sex Distribution

Figure 3 denotes the age distribution in males. The commonest age group was between 10 to 20 years, the next commonest being between 20 to 30 years. The youngest male patient was 4 years old and the oldest male 52 years old.

Figure 4 shows the age distribution among the females. As in the male group, the commonest age group was between 10 to 20 years, the second commonest age group being 20 to 30 years. The youngest female patient was 3 years old, the oldest female 58 years old.

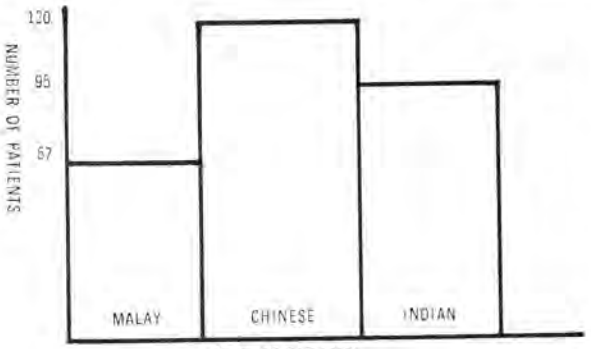


FIGURE 1: RACIAL DISTRIBUTION OF PATIENTS

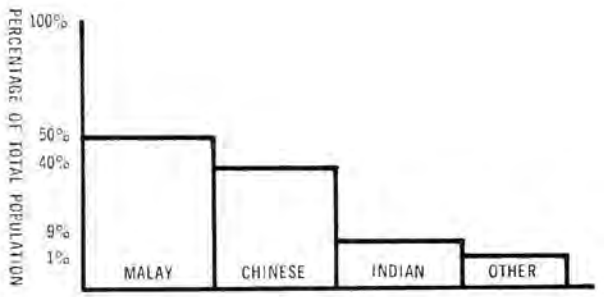


FIGURE 2: RACIAL DISTRIBUTION IN WEST MALAYSIA

There were 136 male patients and 156 female patients. This represented a male to female ratio of 1 to 1.15. There were slightly more female than male patients.

**Pain**

All patients complained of abdominal pain, which was either colicky or constant in nature. In 170 cases (58.2%), the pain originated in the epigastrium, the umbilical or peri-umbilical area and radiated to the right iliac fossa. In 102 patients, (35%), the pain was localised only to the right iliac fossa. In 20 cases (6.8%), the pain originated elsewhere in the abdomen, such as the supra-pubic region, the right upper quadrant of the abdomen or the right loin and then radiated to the right iliac fossa.

**Tenderness on Deep Palpation**

In every single case of this series of 292 patients, there was tenderness on deep palpation of the right iliac fossa. When in doubt about the diagnosis of acute appendicitis, tenderness on deep palpation in the right iliac fossa was regarded by the authors as the single most important factor which made urgent operation for appendicitis imperative.

**Case Report**

A 12-year-old Chinese girl was admitted to the ward with a two days' history of vague generalised abdominal pain. There was no nausea or vomiting. Her bowel actions were normal. The temperature and pulse were not elevated. The total white cell count of the blood was within normal limits. On examination, she was not toxic but her tongue was slightly coated. The abdomen was soft, with no guarding, rigidity or rebound tenderness. However, deep palpation of the right iliac fossa revealed definite tenderness. On rectal examination, no mass or tenderness was felt. Appendicectomy was immediately done. The appendix was lying retrocaecally and was acutely inflamed with early gangrene at its tip. She made an uneventful recovery following the operation.

**Vomiting and Nausea**

These were present either singly or together. Some patients were nauseated only but did not vomit whilst others felt nauseated and then vomited. These symptoms were present in 98 patients (33.5%) of the cases.

**Fever**

Seventy-three cases (25%) had fever. This was usually in the region of 99°F to 101°F. A significant feature of the fever was that quite often it subsided within an hour or two of admission to the ward and subsequent bed-rest.

**Diarrhoea and Constipation**

Twenty-three patients (7.8%) stated that they had diarrhoea in the preceding 1 or 2 days prior to admission to hospital. Constipation was a much more frequent complaint and was present in 42 cases (14%).

**Tachycardia**

One hundred and ninety two cases (65.4%), on admission to the ward, had a raised pulse rate. Tachycardia was present in all those cases which were febrile.

**Tongue and Breath**

The tongue was coated or furred and the breath was foul smelling in 201 cases (69%). These complaints were more pronounced in those patients with pyrexia.

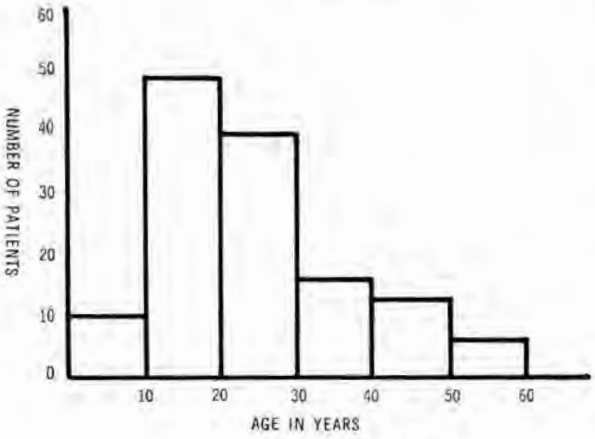


FIGURE 3: AGE DISTRIBUTION IN MALES

### Rectal Examination

Per rectal examination revealed tenderness in 205 (70%) of the cases (Table 2). Of these 205 cases, the tenderness was on the right side in 164 cases, anteriorly in 33 cases and all around the rectum in 8 cases.

### Urine

Only 11 cases (3.6%) had urinary symptoms, frequency and pain on micturition. Three cases showed pus cells and red cells in the urine. In these 11 cases, the appendix at operation was found to be inflamed and lying close to or on the lower end of the right ureter.

### White Cell and Differential Count

The number of white cells in the blood was raised in 32 cases (11%) with a predominantly polymorph leucocytosis. There was no correlation between the degree of leucocytosis and the severity of the appendicular inflammation as seen at operation.

### Rebound Tenderness (Blumberg's Sign)

This is an acute discomfort felt by the patient on sudden removal of the examining hand after pressure on the anterior abdominal wall (Shepherd, 1960). In only 52 cases (17.8%) was this sign positive.

### Rovsing's Sign

Rovsing's sign is positive when pain is felt in the right iliac fossa by pressure on the left iliac fossa (Shepherd, 1960). Only 2 cases (0.7%) showed this sign.

### Diagnostic Error

The clinical pre-operative diagnosis of acute appendicitis was confirmed or otherwise by examination of the appendix obtained at appendicectomy. In 14 out of the total of 292 cases, the appendix was found to be normal at operation. This represented a diagnostic error of 4.8%.

## Discussion

It is apparent from Figures 1 and 2 that, although the Malays form the largest racial group (50%) in multi-racial West Malaysia, the incidence of acute appendicitis is lowest amongst them. In West Malaysia, the Malays are the most underdeveloped economically of the three major races. As a result, the Malays eat more vegetables and other plant products which are relatively inexpensive. Thus their intake of cellulose is high. For the same economic reasons, the Malays are able to eat lesser amounts of meat than the other races since meat is expensive in West Malaysia. This conforms well with the experiences of Burkitt who has reviewed the incidence of acute appendicitis in both the rural and urban populations of Africa (Burkitt, 1971). In the rural areas of Africa, where the people have a high intake of cellulose, the incidence of acute appendicitis is very much lower than in urban Africans who consume less cellulose. It was Short who wrote as long as 1920 that the main cause of acute appendicitis was the removal of much of the cellulose content of the diet (Short, 1920).

It is also postulated that increased meat consumption runs parallel with an increased incidence

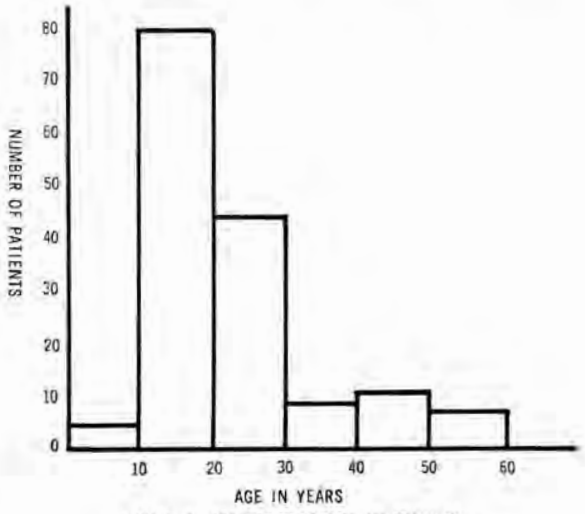


FIGURE 4: AGE DISTRIBUTION IN FEMALES

**TABLE I**
**Sites of Pain**

| Site of Pain | Number of Cases |
|---|---|
| Epigastrium or umbilical area or peri-umbilical area with radiation to right iliac fossa | 170 (58.2%) |
| Right iliac fossa only | 102 (35%) |
| Other areas of abdomen | 20 (6.8%) |

**TABLE II**
**Results of Rectal Examination**

| | | |
|---|---|---|
| Normal | 87 | (30%) |
| Pain on right wall ... ... ... | 164 | |
| Pain on anterior wall ... ... ... | 33 | |
| Pain all round rectum ... ... | 8 | |
| TOTAL | 205 | (70%) |

of appendicitis (Wilkie, 1914), (Williams, 1910). This idea is supported by our figures which show that the Chinese and Indians, who eat much more meat, have a higher incidence of acute appendicitis than the Malays who eat far less meat.

The age distribution of our patients with acute appendicitis generally conforms with that of Western statistics (Shepherd, 1960) in that most of our patients are in the second and third decades of life.

Regarding the sex incidence, Western figures show a slight preponderance of males (Shepherd, 1960). In our Malaysian patients, it is reversed, with a slight female preponderance in the ratio of 1.15 to 1.

Figure 5 shows the relative frequency of the various signs and symptoms and positive tests. The only really consistently significant findings which were elicited were pain and tenderness. These were present in all our cases. The classical complaint of pain, which originated in the epigastrium, umbilical or peri-umbilical area radiating to the right iliac fossa, was present in only 58.2% of our cases (Table 1). We especially relied in tenderness on deep palpation of the right iliac fossa. When this sign was present, there was no hesitation in making the diagnosis of acute appendicitis and deciding on urgent operation.

Our cases were all operated upon within 6 hours of admission to the ward. In this large series of 292 consecutive unselected cases, there was not a single mortality. This is gratifying to note since even today acute appendicitis and appendicectomy carries a definite, albeit small, mortality.

The next commonest findings were tachycardia, coated tongue and foul breath and per rectal tenderness (Figure 5). Surprisingly, in our series, fever was only present in 25% of cases.

Only 0.7% of our cases showed a positive Rovsing's Sign. This coincides with the observation of Davey (1956) who could find a positive Rovsing's Sign in only 5 cases out of 303 patients with acute appendicitis. Indeed, it is clear that undue

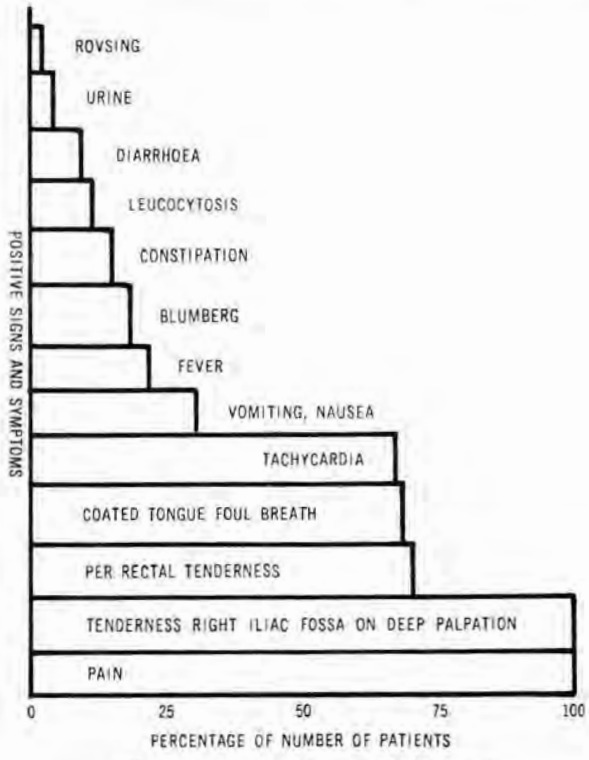


FIGURE 5: FREQUENCY OF SIGNS AND SYMPTOMS

importance has been attached to Rovsing's Sign in the past (Shepherd, 1960).

Contrary to textbook descriptions, leucocytosis was not a diagnostic aid, being present in only 11% of our cases. There did not appear to be much correlation between the degree of leucocytosis and the severity of the appendicular inflammation as found at operation.

Rebound tenderness in the right iliac fossa was present in only 17.8% of our cases. This is contrary to the views of Shepherd who considered it a fairly constant sign (Shepherd, 1960).

The rate of wrong diagnosis in this series of

292 cases was only 4.8%. This compares favourably with the 20% error in diagnosis reported by Thieme (1954). We feel that our interpretation of tenderness on deep palpation as the cardinal sign of acute appendicitis is responsible for the low rate of diagnostic error.

We do not accord with the views of Coldrey (1956) who routinely treated all cases of acute appendicitis of more than 24 hours' duration by non-operative methods. All our cases were operated on within 6 hours of admission to the ward. These included cases of 4 days or longer duration and with evidence of generalised peritonitis.

## Conclusion

Acute appendicitis is the commonest acute abdominal emergency. In a record of 1,179 operations for acute abdominal emergencies, Shepherd stated that 472 were cases of acute appendicitis, a rate of 40% (Shepherd, 1960). Acute appendicitis is becoming an increasingly common surgical problem in Malaysia with the rapid increase in the living standards of the people, with consequent fall in cellulose consumption, and rise in meat intake. We have stressed that pain on deep palpation in the right iliac fossa is the cardinal diagnostic point. Early operation in all cases is recommended to lower the mortality and morbidity rate.

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