Neuroleptanaesthesia using pentazocine and propanidid

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IT MUST be fairly obvious to any practising anaesthetist that there is no such thing as the ideal method of anaesthetising patients, for if there were, there would not be such a spate of articles in the journals advocating this or that method for routine use. Most of the methods satisfy the two basic requirements of any anaesthetic technique viz:-

(1) Safety and comfort of the patient,

(2) Good operating conditions for the surgeon,

but at this point, all similarity ends. All that can be said of a particular technique is that it is good when Dr. X does it, but when Dr. Y tries it, the results may not come up to expectations. This is so because consistently good results can only be produced by someone who does the particular technique routinely, and who can cope with any eventuality that may arise. Having used neuroleptanaesthesia in various combinations since 1962, the author has come to the conclusion that pentazocine (Talwin) and propanidid (Epontol) are eminently suitable for routine use in this form of anaesthesia.

Neuroleptanaesthesia

Neuroleptanaesthesia is simply the addition of a neuroleptic drug and an analgesic agent to general anaesthesia, except that "smelly" and expensive vapours are not used.

Neuroleptanaesthesia = neuroleptic drug + analgesic agent + general anaesthesia (induction agent, nitrous oxide, oxygen and relaxant only). Neuroleptanaesthesia, like transcendental meditation, is not a new or revolutionary concept. When Laborit and Huguenard in Paris began using their "lytic cocktail", they were in fact pioneering the use of neuroleptanaesthesia because their cocktail comprised chlorpromazine (Largactil), a neuroleptic drug, pethidine, an analgesic drug, and promethazine (Phenergan), an antihistaminic drug with marked sedative properties. This technique did not find favour with the majority of anaesthetists, because the patients, whilst they were rousable to some extent after the operation, did not really come round till the next morning. However, they looked and felt so well that no one would have thought that they had such major procedures as gastrectomies or lobectomies performed on them. Despite this, the "lytic cocktail" soon passed into oblivion.

Pharmacology of neuroleptic drugs

In the late 1950's, a new group of neuroleptic drugs were synthesized. They were all butyrophenone derivatives, and amongst this group, dehydrobenzperidol (Droperidol) has been found to be the most satisfactory for routine anaesthetic use. At this juncture, it would be germane to state what is meant by a neuroleptic drug. Such a drug will produce, in animal experiments:-

1. Loss of voluntary movement – cataleptic.
2. Apomorphine antagonism.
3. A diminished sensitivity to adrenaline and nor-adrenaline.
4. Apomorphine antagonism.

Clinically, a neuroleptic drug:-

1. Will produce intense psychomotor sedation without loss of consciousness – this is said to be due to a partial blockade of the reticular formation, possibly by way of the candate nucleus.
2. Has a pronounced anit-emetic effect, probably due to a direct action on the vomiting centre in the medulla.
3. Provides for a stable cardio-vascular system. After the administration of dehydrobenzperidol, there is a moderate dilatation of the peripheral vessels, leading to a slight fall of the blood pressure and slightly increased peripheral circulation. The low peripheral resistance facilitates good cardiac function, the intravascular space is constant, and unless the circulating blood volume changes, the pulse rate and systolic and diastolic blood pressures remain stable. This is mainly due to the selective blocking action of the alpha-receptors of the sympathetic nervous system, thereby suppressing the vasoconstrictive action of the catecholamines.

Amongst the neuroleptic drugs that have been used are chlorpromazine, a phenothiazine derivative, now mainly employed in psychiatry; chlorprothixene has very similar properties to chlorpromazine, except that its atropine – like action is stronger, and it has marked anti-depressive properties; haloperidol, a butyrophenone derivative, which may cause marked extra-pyramidal side-effects.

Analgesic Drugs

Up to date, the analgesic drugs used in neuroleptanaesthesia have been fentanyl and dextromoramide, both piperidine derivatives, and phenoperidine, a derivative of pethidine. All three are potent narcotic analgesics, but they have certain disadvantages. Except for a few instances, when only a short duration of action is required, a drug must possess two qualities:-

(1) Efficacy, the ability to produce its desired effect

(2) Tenacity, the ability to maintain this action for a certain minimal period of time.

Whilst fentanyl is certainly efficacious where its pharmacological action of producing analgesia is concerned, it can hardly be termed tenacious; and whereas both phenoperidine and dextromoramide are efficacious, they are also so tenacious that their analgesic action lasts for a long time, as would also their side-effects common to all narcotic analgesics, like respiratory depression, slowing gastro-intestinal motility and difficulty with micturition.

Pentazocine

Pentazocine, which is a narcotic antagonist with analgesic properties, appears to be a happy mean with regard to both efficacy and tenacity. It is derived from phenazocine (Narphen), being its n-dimethyl allyl analogue, and is about one-third as potent as morphine, with a similar duration of action. Being a narcotic antagonist, pentazocine will produce withdrawal symptoms if administered to a narcotic addict; it would, therefore, be prudent to avoid its use on known addicts. Pentazocine has little effect on the pulse rate, blood pressure or the electrocardiogram in man. However, it is a respiratory depressant in large doses; narcotic antagonists, like nalorphine and levallorphan, cannot counteract this, but methyl phenidate (Ritalin) will cancel this side-effect. It has no effect on the intra-ocular tension, making it suitable for use in ocular surgery. However, its most interesting property is that it does not cause any significant constipation or urinary retention after its administration. Ordinary people are not usually preoccupied with physiological mechanisms like defaecation and micturition, but these two excretory processes become very important to the patient lying in bed after elective surgery; these patients do not understand why they are unable to perform these two functions after simple surgery in no way connected with the abdomen at all. Since using pentazocine for anaesthesia and the post-operative phase, these complaints have become the exception rather than the rule.

The question of drug addiction assumes great importance, especially in hospitals where kind-hearted staff, who do not wish to see patients in pain, administer narcotic analgesics liberally whenever there is the slightest complaint. The average doctor would not be very upset if addiction were produced as a result of indiscriminate use of narcotics in a person who had an incurable malignant condition, but to produce addiction in a person who has renal colic, for example, is sure to weigh heavily on one's conscience. Whilst pentazocine addiction has been reported after massive dosage over a long period, the chances of addiction developing are remote, as in this technique patients require only one to two doses post-operatively, even after long and extensive operations.

Induction agents

Amongst the agents used for induction are:-

Thiopentone
Methohexitone
Gamma Hydroxybutyric Acid
Diazepam (Valium)
Propanidid

Thiopentone and methohexitone, even in small doses, appeared to negate the desirable post-anaesthetic effects expected of the patient who has had neuroleptanaesthesia – his ability to respond and co-operate was obscured by his somnolence, thus making this method no different from other general anaesthetic procedures.

Induction with Gamma Hydroxybutyric Acid took 10 to 15 minutes; and the patients took about 6 to 10 hours to regain consciousness. The use of diazepam was abandoned because it was highly irritant to the veins.

Propanidid

Propanidid is an eugenol derivative presented as a 5% solution in ethoxylated castor oil, which makes it rather viscous; it is usually diluted to a 2½% solution to facilitate its administration. It acts quickly and effectively, the patient being completely unconscious during intubation. Propanidid has almost no tenacity and acts for only a short time. However, its purpose in this technique is to provide a swift and pleasant induction as anaesthesia is maintained by nitrous oxide, oxygen and a relaxant (alcuronium was used in all the cases), thus assuring prompt return of consciousness at the termination of surgery.

Complications

Amongst the complications noted were:-

(1) **Awareness during anaesthesia:** A few patients have complained that they were aware of what was going on during the operation; however, they did not feel any pain. This was in the main due to the fact that nitrous oxide and oxygen were used in one to one or three to two ratios. With a nitrous oxide-oxygen ratio of seven to three, there have been no complaints and this is the ratio now employed.

(2) **Respiratory depression:** In a few cases, respiratory depression of the central type occurred; they were in patients who had more than 60 – 90 mgms. pentazocine during surgery. They were adequately reversed with methyl phenidate.

(3) **Intense Mental Agitation:** This occurred in a few cases who received the following premedication:

hyposcine 0.45 mgm.
dehydrobenzperidol 5 mgms.
pentazocine 30 mgms.

The patients were intelligent and well-adjusted individuals, who knew the "score" so to speak and who had no reason to be perturbed or agitated. After the above premedication, they were intensely anxious and worried, but did not know why they were in that particular state of mind.

Premedication was then changed to:-

atropine 0.6 mgms.
dehydrobenzperidol 5 mgms.

and there have been no complaints since.

In summary, then the technique that has been evolved is as follows:-

Premedication

atropine 0.6 mgms.)
) given i/m 1 hour pre-operatively
dehydrobenzperidol 5 mgms.)

Induction

Dehydrobenzperidol	10 – 15 mgms. i/v
Pentazocine	30 – 60 mgms. i/v
Alcuronium (Alloferin)	10 – 20 mgms. i/v
Propanidid	150 – 200 mgms. i/v

Intubation

Maintenance

Nitrous oxide, oxygen (7 – 3)
Intermittent positive pressure respiration

Post-operatively

dehydrobenzperidol 2.5 mgms.)
) i/m 6 hourly p.r.n.
pentazocine 30 mgms.)

The regime would appear to be a suitable one for routine anaesthetic use because:-

(1) It is technically simple
(2) It is safe, and in scaled-down doses, can be even used in emergencies; this technique has not been used in children under 12.
(3) It is economical as no expensive vapours together with their equally expensive vapourisers need be used.