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ANAESTHESIA AND NURSING

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Anæsthetics are used to cause abolition of the capacity to appreciate pain with such diminution of reflex activity as will allow a Surgeon to perform his task.

It is only recently that ideal anæsthetics have been discovered after painful and interesting researches by various scientists throughout the world. It cannot be, however, denied that major operations like trephining of skull, amputation, etc. were not in vogue in good old days: 2,000 years B.C. Surgeons were bold and confident and they were not subdued by the confronting problem of anæsthesia. In the sixteenth century 'Valverdi' and others operated on patients stupefied by compression of carotid arteries—so depriving the brain of blood. 'Wardrop' in 1832 proposed to operate on patients rendered unconscious by bleeding them to syncope. Opium, Cannabis Indica, Cocaine etc. are known to induce narcotism from days immemorial. In 1584 'Cardon' recounted Hypnotism to abolish pain. Dr. J. Esdaile, I.M.S. used hypnotic-trance in 1845 at Calcutta for painless operation. He left a record of 261 painless operations in the District of Hooghly done under mesmerism including many Elephantiasis of Scrotum, one of them weighed 105 lbs.

The ideal means of surgical anæsthesia were, therefore, practically unknown till 'Well' introduced Nitrous Oxide gas, Crawford Long employed Ether Vapour, but Sir James Simpson, in 1847, found them far from satisfactory and eventually discovered Chloroform for the purpose of general anæsthesia. Later on within the last 25 years the inhalation method of chloroform, ether and gas was gradually supplemented with Regional (local and spinal), Rectal, and Intravenous methods of anæsthesia.

Choice of Anaesthesia

It frequently happens that the most convenient anæsthetic is not the safest. The choice is made by considering anæsthetic risk of the patient, toxicity of the drugs, and convenience of the Surgeon. Local and Regional anæsthetics is undesirable in patients of highly strung temperament. Inhalation anæsthetics are also dangerous and unnecessary in old people, where spinal route should be the one, of choice, to avoid hypostatic pneumonia.

(1) Simple minor injuries are conveniently cleaned and repaired by dilute carbolic acid (1:40) both as an anæsthetic and an antiseptic.

(2) Crushed severe injuries demand general anæsthesia, e.g. Evipan Sodium and regional (local, nerve-block) may be given preference in cases of amputations, e.g., Sciatic-block for amputation of leg.

Routes of Administration

Local, Nerve-block and Spinal.

(1) Cocaine—for application on mucous membrane, e.g., in ear, nose, throat and eye cases: e.g., aural polyph, myringotomy, nasal polyph, quinsy, retropharyngeal abscess, œsophagoscopy, bronchoscopy. Local application of cocaine is not without danger as convulsions and syncope are not very rare complications.

(2) Ethyl Chloride spray: for dental extraction and opening of small abscesses but it has a devitalising effect on the tissue and abscesses opened with it take a longer time to heal.

(3) Local anæsthesia by injection of novocaine (2–4%) and percaine (1–1000) solution when supplemented with basal narcotics, e.g., avertin and paraldehyde or with splanchnic block are good enough for opening any abdomen, and removal of tumours, e.g., cancer breast, etc. Its special indication are cases of Empyema chest, thyroidectomy, cystoscopy, cystotomy, setting of fractures, head injuries and in grave toxic cases. If the injections accidentally enter into a vein it lowers B.P. and even may cause death.

(4) Nerve-block: It has a limited field of application and very safe, e.g., Teeth extn. by mandibular nerve-block, amputation of leg by Sciaticablock, incision of whitlow by digital nerve-block, abdominal operation by splanchnic block. It is indicated in cases of severe and uncompensated cardiac disease where no other anæsthetic can be used with impunity.

(5) Spinal Anæsthetic: Novocaine, Percaine, Spinocaine, Planocaine, Stovaine, and Pantocaine, etc.

High spinal anæsthesia is still a disputed question because of its many unpleasant reactions.

Low spinal is the route for lower abdominal operations (specially where good anæsthetists are not available) e.g. Cæsarian Section, Prostatic operation, Cystotomy, Hernia, Hydrocele, Rectal cases, etc., and in patients with acidotic condition. It is specially indicated in old people with congestive lungs and low B. P. even up to 85/45. These people are accustomed to low B. P. and, therefore, do not manifest untoward symptom with the still lowered B. P. due to spinal inj. Complete relaxation of muscles is specially attained in spinal anæsthetic.

II. General Anaesthesia.

(1) *Inhalation method*: Nitrous oxide, chloroform, ether, or any combination of them with oxygen, and ethyl chloride.

Most commonly employed and necessitates no great requirements and with skill can be carried on in all variety of cases except those specially indicated for local or nerve-block.

(a) Gas and Oxygen: Purely non-toxic and causes no lesion to the vital organs, e.g. Liver, Kidneys and Lungs and therefore used in cases with severe shock, hæmorrhage, grave sepsis (carbuncle), gravely toxic and jaundiced and cardiac cases with lowered tolerance, cases with hypertension, rectal diseases or acidotic cases.

(b) Chloroform: *Quick in induction*, much stronger than any other, concentration in blood up to 0.05 per cent. Stages of surgical anæsthesia is very short and depth of anæsthesia may easily cross over the limits of safety. The idea that pregnant women and children take chloroform fairly well is unfounded rationally, as it is unequally protoplasmic poison for all.

Induction by Ether: Very prolonged, suffocating and dangerous. Requires ten times more conc. in air (2–5 per cent.) than chloroform

to raise blood concentration up to 0.13 per cent. Stage surgical anaesthesia longer and therefore safer for operation than chloroform.

Both chloroform and ether can be used in mild cardiac cases when light anaesthesia is required. Ether is contraindicated in children with catarrh in the lungs and chloroform should, therefore, carefully be substituted. It is specially contraindicated where diathermy and cautery are used to avoid explosion and burning of patients.

(c) *Ethyl Chloride Inhalation*: Proved to be more toxic in heart cases and with caution be administered for quick induction among children before Ether is substituted.

(2) *Rectal route* of Ether in combination with chloral hydrate and olive oil has been much advocated in cases of neck surgeries, e.g. block dissection of glands in the neck, thyroidectomy, pharyngotomy and laryngotomy etc. The depth of anaesthesia cannot be immediately adjusted should the patient show signs of poisoning. Cases of severe proctitis are also not unknown after such rectal anaesthesia.

(3) *Intravenous Route*: Evipan Sodium.

Ether (0.1%) given I. V. induces anaesthesia but met with serious untoward sequelae, so given up.

Evipan Sodium has been lately introduced to the medical profession by 'May and Baker' in course of last ten years, and since been used so extensively without untoward symptoms that it may be accepted as the sheet-anchor in the art of anaesthesia. It is well indicated where anaesthesia is required for 15-20 minutes. It abolishes all reflexes of pain though not deep enough to cause adequate relaxation of muscles and opening of rectal and urethral sphincters (contra-indicated in rectal and urethral operations and examinations.)

Continuous intravenous dribbling of Evipan Sodium with glucose and saline in multiple of normal (single) dose can produce prolonged anaesthesia for major operation, but stiffness of rectus always remains a drawback to its methods for abdominal operation.

(4) *Endo-pharyngeal route*: Chloroform, Ether or combination of them: indicated in cases of neck surgeries, e.g. Tonsillectomy, cleft palate under one year of age, tumours of jaw, etc.

(5) *Endo-tracheal route* with or without preliminary tracheotomy: Not much seen at Calcutta, requires expert hand to manipulate the special apparatus: indicated where both thoracic cavities are opened, respiratory obstructions, tumours of lungs, and also in neck and mouth surgeries.

Premedication of General Anaesthesia

Drastic purgatives and continued starvation has been thoroughly condemned in the present days, as it is liable to cause acidosis and gives undue weakness to the patient who is going to face a stormy and rough time during and after operation. In abdominal cases glucose with sodi-bicarb and barley sugar in children should be administered for 24 hours previous to the operation so that should circumstances arise these will act as storage of energy and give strength to the patients. Three hours starvation with an enema in the morning is all that is required for ordinary cases. Field of operation is to be kept clean and to meet this end stomach wash for gastric operations and bowel wash for rectal cases. Stomach wash in intestinal obstruction cases saves from anaesthetic vomit and locking of bowel with Tr. Opii after rectal operations protects the wound from being infected. Scrutiny of food for two days previous to rectal operations is also important to save from spore bearing organisms infecting the wound, e. g. Tetanus Bacillus.

Veronal gr. vii is given to encourage mental rest and promote sleep on the previous night. Children and those with dilapidated health are susceptible to these as they are respiratory depressant drugs and cause respiratory embarrassment invariably during anæsthesia.

Bladder must be evacuated before the patient goes to sleep.

Atropine inj. is absolutely necessary in cases of Chloroform and ether. (1) It helps in reducing the mucous secretion in the lungs but big and repeated doses in children who already show signs of bronchial catarrh are liable to cause sudden stoppage of respiration by collapsing the soft tracheal walls glued together with sticky mucous secretion. These conditions must be diagnosed immediately and the anæsthetist should introduce the finger or a soft rubber catheter into trachea to relieve the mechanical obstruction without delay. (2) Chloroform is reputed to cause sudden syncope by stimulation of vagal endings to the heart. Atropine paralyses the vagal endings and arrests the serious though not infrequent disaster.

The anxiety for operation, the general horror chloroform suffocation and the preliminary preparation have necessitated the use of Basal Narcotics.

Basal Narcotics

With its effects patient goes to sleep half an hour before he is taken to theatre, and does not appreciate what is done since the time of his somnolence. These basal narcotics put the patients to deep sleep but not sufficient to remove his sensibility and therefore, insufficient for actual operative procedure.

Drugs: Inj.: Hyoscine Co., morphine, nembutal, omnipon etc.; per oral: avertin, paraldehyde etc.; or rectum, evipan sodium, etc.

Rectal administration of basal narcotics requires cleaning of lower gut, for absorption by mucous membrane of rectum, by a thorough bowel wash in the morning instead of an ordinary enema. It may be mentioned here that light diet on the previous night and moderate cleaning of the bowel in the morning should be good enough for all ordinary cases; patients showing signs of hyper-motility of bowel should be treated with more elaborate cleaning and may require a purgative. Pints 2-4 of fluid for wash is sufficient for all purposes. No fluid must be retained after bowel wash as it is this retained fluid after bigger bowel wash that ejects forcibly on surgeon's face.

Induction of General Anaesthesia

This is primarily anæsthetist's work but the nurse should be careful about greasing the face, loosening the clothes, keeping the room quiet, tying the loose teeth if any with a thread. A good anæsthetist will never require more than a nurse to attend to the patients during induction period. He can and should abort the struggling by giving air and then hastening the induction period by stronger medication at hand. It is routine now that A. C. E. (1:2:3):: (alcohol, chloroform and ether) is used for induction in most of the cases and as soon as the patient becomes vague and cloudy in mind and inclined to struggle, the anæsthetist can shorten the period of struggling by stronger medication e.g., C. E. i.e., A. C. E. without the alcohol, or even pure chloroform.

(b) Induction by Ether, as already stated, is not satisfactory and prolongs the induction stage which is dangerous for sudden heart failure.

The nurse should therefore be alert to watch the pulse till the patient is tided over to the safer stage of surgical anaesthesia.

The closed method of 'Yankers' or 'the puff-puff' method of chloroform has been obsolete for sometime for obvious reasons. The anæsthetist,

therefore, barely requires more than a 'rag and a bottle' for his ordinary work of open mask of anaesthesia.

(c) Ethyl Chloride: good for quick induction in children only and stimulates bronchial secretion enormously.

(d) Pure chloroform: Ideal in expert hands.

(e) Sodium Evipan: Immediately puts the patient to sleep and unknown of any untoward symptom. It is liked by all kinds of patients.

(f) Nitrous Oxide with oxygen, with chloroform, or with ether or a combination: requires special skill for induction. It acts as an indifferent gas and causes asphyxia leading to cyanosis and, therefore, followed by high mortality.

Stage of Anaesthesia.

The nurse stands as an assistant to the anaesthetist during this stage, she watches the pulse and respiration frequently and specially when intestines are handled roughly and for prolonged time, bleeding occurs profusely and other causes which tend to weaken the pulse. Cardiac and respiratory stimulants, e.g. strychnine, pituiturin, adrenalin, digitalin, Icoral, normal saline etc. are kept ready for emergency. Should respiration fail immediate cessation of anaesthetic, CO₂ inhalation, putting finger in rectum, artificial respiration, are to be resorted to. Intra cardiac adrenaline or even cardiac massage through diaphragm have been seen to resuscitate cases of complete stoppage of heart.

The depth of anaesthesia are conveniently varied with the different stages of operation, thus exploration of abdominal cavity demands very deep anaesthesia. Moderately deep and uniform anaesthesia is always safe and vouchsafes against shock, post-operative complications of vomiting and bronchitis, etc., etc.

Post-Operative Care

Lying on back with head turned to one side would prevent swallowing or breathing of vomiting matter. Stout patients with short neck may cause anxiety by becoming cyanosed but it is never known to cause death, because CO₂ concentration in cyanosis stimulates the respiratory centre and respiratory muscles therefore works violently to establish breathing unless there is any absolute mechanical obstruction. Holding lower jaw forward and upward will create patent airway by lifting up the fallen tongue.

In rectal cases (medication) a bowel wash immediately after operation would help in recovering the patient soon. Some people do not deem it necessary as concentration of the drug always attains its maximum in circulation during operation.

Morphia comes again as panacea for relieving pain when patient wakes up. One school of thought administer morphia sulph. gr. $\frac{1}{4}$ hypo. every 4 hours for 48 hours in all abdominal cases together with continuous and automatic stomach-wash by means of Ryle's tube through one of the nostrils. It keeps the patient asleep for two days when pain, flatulence, vomiting are generally the worst trouble.

The field of operation should always be kept in rest and in long muscles relaxation is needed. Fowler's position will relax abdominal, back and thigh muscles. It also prevents draining up of any septic material intra-abdominally along its gutters on its two sides. Propping up the back relieves strain on the lungs and chest muscles.

Flatulence: Troubles more or less all abdominal cases. Bowels being opened, solid food is generally pushed to thwart the attacks of flatulence. General anaesthetics are always followed by a *purgative* on the next day. In