

case, and only those pathological conditions directly affecting the anaesthesia need be considered in detail. Broadly speaking, the special points which concern the anaesthetist are as follows: (1) Anatomical conditions obstructing free respiration, e.g. nasal obstruction, adenoids and tonsils, enlargement of the thyroid gland, oedema of the glottis. (2) Heart disease with symptoms of myocardial decompensation, especially when associated with mitral stenosis or aortic incompetence. (3) Reduced vital capacity due to pulmonary disease, e.g. pneumothorax, empyema, bronchiectasis, lung abscess, tuberculosis, emphysema and other lung affections. (4) Conditions interfering with the transport of oxygen by the blood, e.g. anaemia, blood diseases, haemorrhage or shock. (5) Acidosis and ketosis due to starvation, diabetes or nephritis. (6) Alkalosis and dehydration resulting from prolonged vomiting, e.g. acute intestinal obstruction, pyloric stenosis, cerebral tumor. (7) Toxaemia or septicaemia complicating acute surgical conditions, e.g. cellulitis, osteomyelitis, peritonitis. (8) Lowered vitality due to malignant cachexia, chronic sepsis or general debility. (9) Impairment of hepatic or renal function. (10) Injury or disease of the central nervous system." 2 references.

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ARROWOOD, J. G.: *General Anesthesia in Dentistry and Oral Surgery*. Am. J. Orthodontics 29: 652-657 (Dec.) 1943.

From the point of view of anaesthesia, procedures of dentistry and oral surgery can be divided into two groups: (1) those of short duration necessitating only analgesia or light anaesthesia, which can be done in office or outpatient clinic; (2) major operations demanding hospitalization and deep anaesthesia.

Many dental procedures performed in the office require analgesia only. Since 1844, nitrous oxide has been used by preference for this purpose. With the use of nitrous oxide, it has to be borne in mind that it is not possible to produce deep surgical anaesthesia and maintain adequate oxygenation at the same time with this agent, and it is a mistake to try to use this gas without the admixture of adequate amounts (at least 15 to 20 per cent) of oxygen. Henegan and also Gavel advocated the use of nitrous oxide and oxygen mixtures which contained sufficient oxygen and were still suitable for the performance of very painful preparations. Recently Chapman, Arrowood and Beecher studied the pain threshold lowering effect of nitrous oxide and oxygen mixtures containing 10, 20 or 30 per cent of nitrous oxide respectively. They found that 20 per cent nitrous oxide had approximately the same analgesic effect as 15 mg. of morphine without showing any of the unwanted side effects (nausea, vomiting) of morphine. They also point out that optimal results can be obtained with any given nitrous oxide concentration after ten to fifteen minutes. This time is necessary for the patient to reach a state of saturation.

In cases where surgical depth of anaesthesia is necessary in ambulatory patients, it is imperative to evaluate the physical condition of the patient. This evaluation should consist of a careful questioning of the patient, especially with regard to allergic conditions, heart and pulmonary diseases influencing cardiac reserve and vital capacity. Pulse and blood pressure should also be observed. The two agents most commonly used for ambulatory patients requiring surgical anaesthesia are again nitrous oxide and pentothal.

Chapman, Arrowood and Beecher have shown that no patient retained consciousness beyond 75 per cent ni-

trous oxide. This means that often extractions can be performed with this concentration of nitrous oxide. For procedures where this concentration of nitrous oxide does not produce satisfactorily deep anesthesia, it is not safe to increase the concentration beyond 85 per cent of nitrous oxide. Four out of 26 accidents with nitrous oxide reported by Courville occurred after dental extractions. Three of these, lasting thirty to forty-five minutes, resulted in death and the fourth, lasting ten minutes, recovered only after extensive complications. Other workers have also shown that it is potentially dangerous to reduce oxygen concentration below 15 to 20 per cent. If deeper anesthesia is necessary, instead of increasing the concentration of nitrous oxide, it is better to supplement it with some other agent. Ether, vinethene, or pentothal is suitable for this purpose. If it is recognized beforehand that the patient is likely to be resistant, premedication with 8 to 10 mg. of morphine, given intravenously, is very helpful. Atropine in doses of 0.4 to 0.5 mg. is useful to reduce salivation. It is contraindicated in glaucoma.

If pentothal is used for dental anesthesia, then adequate premedication with atropine is imperative. Otherwise, manipulations around the airway or irritation of the larynx by the saliva may result in spastic closure of the glottis with extreme cyanosis. Depression of the parasympathetic system with atropine helps to protect against this type of accident. If such an accident should occur, tracheal intubation should be promptly resorted to. If pentothal is chosen, it should be administered by a professional anesthetist. Pentothal is also used advantageously for the treatment of reactions due to hypersensitivity or overdose of local anesthetic agents.

For major oral surgery, ether with nitrous oxide-oxygen induction is usu-

ally employed. Patients are premedicated in the usual way, as before any major surgical operation. In order that the anesthetist may be as far off of the operative field as possible, and to avoid respiratory obstruction and aspiration of any foreign material, the patients are intubated.

If possible, the tracheal intubation should be done by the oral route. Nasal intubation should be resorted to only if the oral tube would inconvenience the surgeon. Oral surgery does not necessitate deep plane of anesthesia. Cough reflex should be present after the removal of the tube and return to consciousness should be prompt.

In certain groups of cases (where diathermy is used, fixation of fracture jaw, etc.) where the use of inhalation anesthesia is undesirable, pentothal can be employed. In these patients, the pharynx and trachea are anesthetized locally before induction with pentothal to facilitate the insertion of the intratracheal tube. The administration of a mixture of 50 per cent nitrous oxide and oxygen through the intratracheal tube helps to give a generous supply of oxygen to the patient and also reduces the amount of pentothal to be administered. Occasionally the duration of postoperative unconsciousness after pentothal is prolonged. These patients should be watched carefully to prevent aspiration of secretions or respiratory obstruction and they should be turned frequently to prevent pulmonary complications. Intravenous fluids can be given to prevent dehydration. After recovery has proceeded to a point where the patient responds to stimuli, moderate doses of picrotoxin or benzedrine help to hasten complete recovery. These drugs are also useful when recovery from barbiturate anesthesia is characterized by excitement or delirium.

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