

## ANESTHESIA TRENDS IN NAVAL HOSPITALS \*

COMDR. JOHN L. CARDWELL

*Medical Corps, United States Naval Reserve*

CIVILIAN anesthetists entering the military service usually discover that their routine anesthetic procedures have to be modified to fit the needs of the service and service personnel. Certainly this has been true in my case and, as a result of several years' experience as an anesthetist at two of our large Naval Hospitals, I have formed some rather definite impressions as to the most suitable procedures for the more common operations. Before the war actually started, the almost routine use of local and spinal anesthesia in the Navy as contrasted to the occasional use of inhalation anesthesia was rather surprising. However, one soon realized that the Naval peace-time patient was the best type of patient for local and regional anesthesia and the most difficult to handle under general anesthesia. This was primarily the result of the vigorous physical make-up of the Navy personnel, and also their willingness to accept treatment without question. Another factor that tended to increase the relative percentage of local and spinal anesthesia was the large number of appendectomies and the hernioplasties performed in the Navy as compared to the more varied operative procedures of civilian hospitals.

With the outbreak of war and the great influx of patients with varied types of wounds, the use of general anesthesia gradually began to increase, and at present about one-third of the anesthetics administered at this hospital are inhalation anesthetics, and about one sixth are given intravenously. Before the war inhalation anesthetics averaged only about 3 to 5 per cent of all anesthetics administered. Another striking change has been the great increase in the use of the intratracheal technic. About 20 per cent of all inhalation anesthetics are now given through a Magill intratracheal tube. This technic is justly popular since many of our casualties have wounds involving the neck and head and the use of an intratracheal tube greatly facilitates the work of the surgeon and anesthetist. In fact, the use of the intratracheal tube has made possible the satisfactory administration of inhalation anesthetic agents which otherwise could not have been used.

The vast amount of skin grafting in Naval Hospitals, with many of the patients having multiple operations, has demonstrated, at least to my satisfaction, that any grafting too formidable for local anesthesia can best be done under inhalation anesthesia. Many of these patients have been burned so extensively that there are no accessible veins and, in conformity with the experiences of others, our cases of grafting when done under intravenous anesthesia have forced the anesthetist to use an abnormally large amount of sodium pentothal, even when the surgeon was willing to put up with the patient moving

\* U. S. Naval Hospital, Oakland, Calif.

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## ANESTHETIC AGENT OR METHOD

Operative Procedure	First Choice	Second Choice
Craniotomies	Drop ether (with Magill intratracheal tube)	Local
Dental operations in which local is contraindicated	Intravenous pentothal for short operations. Intratracheal inhalation anesthesia for long operations	Inhalation anesthesia through nasal mask
Thyroid operations	Superficial cervical block plus infiltration of line of incision and skin flap	Inhalation (cyclopropane)
Thoracoplasties	Inhalation anesthesia (cyclopropane) through Magill tube	Paravertebral block plus intravenous pentothal
Intrathoracic operations	Inhalation (cyclopropane) through intratracheal tube	Nitrous oxide-oxygen-ether through intratracheal tube
Minor rib resections or thoracentesis	Local	Local plus intravenous pentothal
Gastric operations	Inhalation anesthesia through Magill tube	Continuous spinal
Cholecystectomies and duct operations	Spinal or continuous spinal	Inhalation anesthesia through Magill tube
Splenic operations	Inhalation anesthesia with ether	Local plus inhalation
Appendectomies	Spinal	Local plus intravenous pentothal
Intestinal obstruction	Spinal	Inhalation anesthesia
Hernioplasties	Field block	Spinal
Combined abdominoperineal resections	Spinal or continuous spinal	Inhalation anesthesia through Magill tube
Colostomies	Spinal	Inhalation anesthesia
Prostatic resections	Spinal	Sacral block
Cystoscopic examinations	Local instillations	Intravenous pentothal
Hydrocelectomies	Spinal	Local
Varicocelectomies	Spinal	Local
Hemorrhoidectomies, operations for fissures and fistulas	Sacral block (caudal plus transsacral block)	Spinal
Excision of cyst teratoma	Spinal	Inhalation anesthesia
Insertion of pins for fractures of extremities	Intravenous pentothal	Local
Operations on knee	Spinal	Inhalation anesthesia
Bunion operations	Bunion block	Intravenous pentothal plus local
Circumcisions	Local	Intravenous pentothal plus local
Reduction of fractures and dislocations	Intravenous pentothal	Inhalation anesthesia
Operations on the eye	Local (instillation or infiltration or both)	Intravenous pentothal plus local
Tonsillectomies	Local (adults)	Inhalation anesthesia through Magill tube
	Ether vapor (children)	Inhalation anesthesia through Magill tube
	Local	
Submucous resections and reduction of fractures of the nasal bones		
Repair of tendons of the hand	Brachial plexus block	Wrist block

a bit. The general impression of our surgical staff has been that the patient's condition during and after operation is more satisfactory with inhalation than with intravenous anesthesia. This observation applies primarily to skin graft cases, as we have had satisfactory results with intravenous anesthesia in most other surgical procedures. However, we have attempted to be prudent in the selection of cases and have not attempted long major operations under intravenous anesthesia. For a while we did attempt to explore and repair damaged peripheral nerves under intravenous and local anesthesia but it soon became evident that inhalation anesthesia was safer and more satisfactory to both the surgeon and anesthetist. Apparently the stimuli transmitted through damaged nerves and painful neuromas are so strong that large amounts of pentothal are necessary to keep the patient quiet enough to proceed with the operation. The use of large amounts of pentothal over a relatively short period unduly increases the danger of the anesthesia and materially increases the nursing care needed during the first few hours after operation.

Recently there have appeared several articles advising against the use of sacral block (caudal plus transsacral) anesthesia for rectal surgery. The authors maintained that the block did not give sufficient anesthesia for young, vigorous, military personnel. Our experience has been contrary to this idea. We have had excellent relaxation and freedom from pain in every case in which the block was properly performed. We have had two partial failures in the last year, and these were in female patients weighing over 200 pounds. In these cases the block was technically very difficult and was not properly completed. Our enthusiasm for the use of sacral block has increased progressively with our experience in its use.

The following table listing my choice of anesthetic agent and technic for some of the most commonly performed operations has been found practical for use in a large base hospital with an active surgical service. It is based on the presumption that there will be available one or more experienced anesthesiologists and several assistants, such as nurse anesthetists or medical officers with at least a basic training in anesthesia.

#### SUMMARY

During the past three years there has been a marked increase in the use of inhalation anesthesia at Naval Hospitals. This is due chiefly to the fact that the war has greatly enlarged the scope of naval surgery. However, some of the increase can be explained by the fact that many operative procedures necessitated by shell fire, burns, etc., can be performed safely only under inhalation anesthesia, and very frequently the intratracheal technic is required.

Intravenous anesthesia has not proved practical for skin grafting or operations on the peripheral nerves. Sacral block has been found to be ideal for rectal surgery on military personnel.

A table listing my choice of anesthetic agents and technics for the more commonly performed operations is included.