having the inexperienced intern or the doctor who refers the patient to the surgeon administer the anesthesia? God forbid! The best solution to the problem then is to encourage the training of the nurse anesthetist until there are enough physician anesthesiologists to fill the demand. There has been no opposition, as far as I know, to the idea of the laboratory or x-ray technician. Why should there be opposition to the nurse anesthetist technician? In the larger hospitals she should be under the direction of an anesthesiologist who holds the M.D. degree and has spent several years in graduate training in his field. But in the smaller hospitals, or in those in which a physician anesthesiologist is not available, she will prove invaluable. There is no doubt that already she has saved the lives of thousands who would have died if they had been subjected to the kind of anesthesia which the unskilled physician gives. The possession of the M.D. degree by itself certainly does not qualify one in a professional sense to administer an anesthetic drug safely.’’ 5 references.

F. A. M.


Although war is the greatest calamity that befalls mankind, there has been an associated remarkable increase in medical knowledge during most wars. The professional status has been markedly advanced. The supply of qualified anesthetists was inadequate to supply the needs of the army alone. An active educational program was instituted. Courses of twelve weeks’ duration were started in five civilian institutions. Later the training was taken over by the Army General Hospitals. A large number of medical officers was trained both in this country and overseas. It was possible to in-clude only the fundamental methods but the training resulted in a group of anesthetists who made a brilliant record in combat areas. Many of the men who were trained in this program will form the backbone of the profession in the future. The older anesthetist has been broadened by his military experience.

Nitrous oxide was found to have a great field of usefulness, especially in combination with ether or pentothal. Sodium pentothal, because of its portability and convenience, seemed to be the ideal wartime anesthetic. At Pearl Harbor, however, the results were disastrous. The mortality was one in 450 (.22 per cent), when it was given for a wide variety of operations by men who were not familiar with the limitations and dangers. After study of the fatalities a list of restrictions on the use of pentothal sodium was made and following this guide the mortality was reduced to 1 in 5,500 (.018 per cent). No war was necessary to demonstrate the practicability and simplicity of open ether. When ample oxygen was supplied ether was found to be safe for those in shock. Local anesthetic agents were limited to those proved safest and the concentration of each agent was limited for various uses.

For non-transportable patients inhalation anesthesia proved to give the best results. Endotracheal methods were life-saving in major cranial, thoracic and abdominal cases. Over half of the transportable casualties were anesthetized with sodium pentothal. Local and regional methods were used in an additional 30 per cent; specific regional blocks proved more successful than field blocks. Nerve blocking for diagnostic and therapeutic purposes was given impetus during the war. The improved treatment of shock resulted from the use of plasma, whole blood, oxygen and other supportive treatment. Lessons learned in wartime anesthesia
must be publicized and used in daily practice. 4 references.

F. A. M.


Some neurologic complications follow spinal anesthesia while others are more frequent after general anesthesia. Headache, septic and aseptic meningitis, arachnoiditis, neuritis, myelitis and the cauda equina syndrome have been the complications most frequently reported following spinal anesthesia. The cauda equina syndrome is usually brought to the anesthesiologist's attention when the patient fails to regain the use of his lower extremities at the usual time after spinal anesthesia. Loss of motor and sensory function is usually found to involve the lumbosacral nerve distribution. Loss of bladder and bowel function is the most ominous part of the clinical picture and return of function, if it occurs, is slow.

The cause of each of the neurologic complications which follow spinal anesthesia in man is difficult to determine. When the cat or dog is the subject of experiments, there seems to be little doubt that the toxicity lies within the spinal anesthetic agent itself.

The clinical manifestations of the lesion of the cauda equina might be explained by damage to the lumbosacral region of the cord, to the conus medullaris or to the nerves of the cauda equina. In most cases the damage has occurred immediately following the operation under spinal anesthesia. Direct trauma seems unlikely as the sole cause of the damage. There seems to be a definite relationship, however, between the traumatic spinal puncture which causes pain to radiate down the leg and which is combined with the injection of a spinal anesthetic drug, and a permanent neurologic complication. The rapid onset of symptoms, lack of symptoms or signs of an inflammatory process, and failure to culture organisms from the spinal fluid in these cases seem to preclude infection as the etiologic factor. In animals the nerves exposed to the greatest concentration of the anesthetic drug are most affected. Another possibility in the etiology of these complications is that the spinal anesthetic may act as a precipitating factor in the evolution of preexisting neurologic affections such as, pernicious anemia with combined sclerosis, multiple sclerosis, tabes, general paresis, toxic psychosis, metastatic carcinoma with impending spinal fluid blockage.

Reports from the literature show a great variation in the incidence of these complications. Thirteen cases in which neurologic complications followed spinal anesthesia have been obtained from the records of the Lahey Clinic and from records of other sources outside the Lahey Clinic.

To prevent postspinal neurologic complications the apparatus used in the administration of spinal anesthesia should be carefully cleaned and sterilized. Rinsing of syringes and needles with sterile isotonic solution of sodium chloride is an additional precaution. Drugs should be used from manufacturers' ampules. The labels should be legible, the contents clear and free from particles and the ampules should be intact. Ampules should be sterilized by immersing in a non-irritating, colored solution such as 1 to 1,000 Zephiran. Spinal puncture should not be made through or near infected areas. Spinal anesthesia should not be given to patients with known spinal cord disease or with known virus infections. Delayed return of motor function or severe paresthesias following a previous spinal anesthetic should be considered a contraindication to spinal anesthesia.