

jection of any foreign substance into the subarachnoid space produces an aseptic meningeal reaction characterized principally by pleocytosis and increased protein content. Reactions to purely diagnostic lumbar puncture have been reported, including headache, nuchal stiffness, stupor, delirium and fever.

Each new drug and antiserum introduced and used intrathecally has been followed by reports of serious damage to the nervous system.

Neurologic disturbances following the injection of alcohol and spinal anesthetics are examples of complications of a previously normal nervous system. There is a case of Brown-Séquard paralysis following paravertebral alcohol injection for angina pectoris. One case receiving 16 cc. of absolute alcohol intrathecally between the fourth and fifth thoracic vertebrae developed a complete paraplegia below that level.

In Thorsen's series of 5493 cases of spinal anesthesia, one in 800 had aseptic meningitis, while symptoms pointing to injury of the medullary substance, nerve roots or cauda equina occurred at least once in every 200 cases. Many types of neurologic disorders have occurred following spinal anesthetics.

It is usually accepted that a history of some previous disease or injury involving the nervous system, particularly the spinal cord, is a definite contraindication to the use of spinal anesthesia. A case history of a 44 year old woman receiving a spinal anesthetic with following spastic paraplegia is cited. Patient had poliomyelitis at two years of age.

Spinal anesthetics may also precipitate the appearance of symptoms and signs of some neurologic disorder previously latent. A case is cited in which an unsuspected spinal cord tumor was lighted up by a spinal anesthetic.

Cases of well defined vitamin deficiency should not be given a spinal

anesthetic. A case of adhesive arachnoiditis mentioned in a debilitated patient given a spinal for gastric resection.

Intrathecally sulfa drugs have caused paraplegia and many neurologic disorders. Penicillin, when given with a carinamide, will give a high spinal fluid concentration even via the intramuscular route.

Penicillin intrathecally has caused many neurologic disturbances and the neurotoxic action of penicillin has been investigated.

Fatal neurological reactions have resulted from the intrathecal use of streptomycin.

In conclusion, one must consider whether intrathecal administration is necessary, and, if it is, whether the benefits derived therefrom outweigh the potential hazards. In reference to spinal anesthesia Kennedy has stated that "the gravity of possible spinal arachnoiditis and subsequent paralysis must enter into the mediations of surgeons and anesthetists when determining procedure." Certainly an adequate neurologic history and examination should be completed for every patient considered for spinal anesthesia and another anesthetic should be chosen if any abnormalities are observed. 23 references.

R. M. J.

HINGSON, ROBERT A.: *Continuous Caudal Analgesia in Obstetrics Surgery and Therapeutics*.* Brit. M. J.; 2: 177-181 (Oct. 8) 1949.

"Continuous caudal analgesia has returned to womankind the privilege of being present in comfort for the baby's birth. Its judicious use provides the safest labor and delivery available for the patient with cardiac disease, nephritis, pulmonary disease, metabolic disease and toxæmia.

* Read in opening a discussion in the Section of Anaesthetics at the annual meeting of the British Medical Association.

"Continuous caudal analgesia through its control of nerve impulses to blood vessels . . . and viscera . . . can be utilized as a major therapeutic measure. Its most promising field of usefulness lies in: (1) the control and treatment of eclampsia; (2) oliguria and anuria on the basis of reflex renal ischemia; (3) postsurgical abdominal distention and paralytic ileus; (4) arterial embolus of abdomen and lower extremities; (5) thrombophlebitis and phlebothrombosis, and (6) prognosis of and indications for sympathectomy.

"Purely on an anatomical basis we can effectively block the afferent nerve pathways from the respective organs with the indicated dosage:

Hemorrhoids and rectum	10 ml.
Prostate and perineum	20 ml.
Bladder and uterus	30 ml.
Appendix and intestine	40 ml.
Stomach, spleen, gallbladder	50 ml.

"The most common complication is slow or arrested labor that develops from two factors: (1) too early institution of the technique before progressive dilatation of the cervix to 5 cm., and (2) overdosage extending the level of analgesia into mid thoracic and upper thoracic levels thus interfering with the motor innervation of the uterus. In my clinical experience approximately a third of labors are retarded to a varying degree with standard dosage; one third are unaffected; and one third suggest improvement in progress and dilatation. The second stage is definitely prolonged since the compulsion desire to push and the abdominal somatic tone are both diminished.

"The second highest complication is . . . maternal hypotension . . . this is mechanical through the production of a bloodless phlebotomy into the dilated vessels of the lower extremity . . . usual range of systolic reduction from 120 to 90 mm. of mercury. Hypoten-

sion may be combated by: (1) intravenous vasopressor drugs in minute 10 mg. doses of ephedrine or the equivalent *pro re nata*; (2) intravenous fluids containing glucose; (3) high atmospheres of inhaled oxygen, and (4) autotransfusions by raising the lower extremities to right angles with the long body axis.

". . . Inadvertent puncture of the spinal canal . . . has occurred only about once for each 500 cases. In some we elect to abandon the procedure, in others we prefer to institute continuous spinal.

". . . The incidence of infection is now about 1 in 1000 caudal deliveries. The majority of these are simple pinpoint pustules from the needle puncture.

"The fifth type of complication is due to individual toxicity of various local analgesics. It is characterized by immediate and persistent nausea or vomiting accentuated by each dose of the local analgesic by tachycardia, dizziness and hyperirritability. In nearly every instance satisfactory results have been achieved by the substitution of another local analgesic.

". . . The contraindications are: (1) inadequate training or skill; (2) substandard . . . conditions which do not provide . . . oxygen, vasopressor drugs, intravenous fluids, and proper asepsis; (3) local infection or skin irritation . . . ; (4) gross abnormalities . . . of sacral hiatus . . . or vertebral column; (5) disease of the central nervous system or of the vertebral column; (6) previous laminectomy; (7) prolonged relief of postoperative traumatic pain, and (8) sciatica and neuralgia of the lower extremities and pelvic girdle.

"The substitution of continuous caudal analgesia for narcotic and magnesium sulphate therapy in eclampsia provides the most effective method of control of the blood pressure and convulsions and permits the highest incidence of live births in this group. . . .

"As continuous caudal analgesia exerts its most profound influence from below upward . . . so does lumbar peridural analgesia exert its influence from above downward. Either of the techniques presents the anatomical avenue for anaesthesia or for therapy of the organ or segment involved.

"Continuous caudal analgesia is the safest and most effective technic . . . for operative and postoperative pain relief in haemorrhoidectomy, prostatectomy and for operations on the perineum. By extending the levels of nerve block into the low thoracic plexus, adequate anaesthesia is produced for hernioplasty, appendectomy and cesarean section. . . . We have extended dosage schedules and optimum concentrations of procaine, "metycaïne," "pontocaine," "nupercaine" and the safe and effective local analgesic from Sweden . . . "xylocaine." No references."

D. K. K.

SEEVERS, M. H.: *Symposium: Anaesthesia in Otolaryngologic Surgery. I. The Preparation of the Patient.* Tr. Am. Acad. Ophth. 281-287 (March-April) 1949.

"Drugs are used prior to anesthesia for four principal purposes. 1. The induction of mental equanimity. 2. The abolition of pain. 3. Correction of existing physiologic and biochemical abnormalities related to disease or to the condition for which surgery is indicated. 4. Protection of the patient from the potential toxicity of the agents used for anesthesia. Of the compounds available for the relief of apprehension and for the induction of a proper mental state prior to anesthesia, morphine is unsurpassed and remains the standard for comparison. Its congeners, dilaudid, pantopon, and other opium preparations, possess little or no outstanding advantage over morphine except possibly as a concession to

those individuals who are purportedly sensitive to morphine. . . . Their value is enhanced if used in conjunction with scopolamine. . . . The resulting amnesia is especially valuable in patients who are to receive only local or regional anesthesia. Furthermore, scopolamine in appropriate dosage in adults tends to counteract to some extent the respiratory depression of morphine and its derivatives. Codeine and demerol hydrochloride are poor substitutes for the more potent agents in most adults. . . .

"Methadon hydrochloride, . . . is a disappointment for purposes of premedication since it does not possess the required sedative properties except in doses which seriously depress respiration and other vital mechanisms. . . . The barbiturates as a class are greatly inferior to the opiates except for certain specific purposes. Although sedatives in the broad sense of the term are useful to induce restful sleep the night prior to operation and as possible adjuncts to morphine in individuals who are to receive only local or regional anesthesia, they do not induce the desirable dreamy and euphoric states which result so characteristically and desirably from the opiates. . . . It is futile to attempt to offer here, as it is dangerous to apply in the clinic, a rule of thumb for premedication. It is the inevitable tendency to err on the part of too much, rather than too little, premedication. . . . It must be appreciated that the distinction between analgesic, sedative, and anesthetic agents is a man-made one and is entirely arbitrary. Qualitatively the action of these compounds on vital mechanisms is more or less the same, with the result that summation of the effects of several drugs may result in overwhelming depression of some vital structures. . . . It is largely in the province of the internist to see that individuals with the common metabolic and endo-