performing this maneuver while appearing to pass easily. We believe the first two punctures were caused by the needle. The catheter then advanced superficially to the ligament, coiled around in a knot, and then fortuitously pierced the ligament once to enter the epidural space. Withdrawal of the needle then left the catheter passing through the ligament three times.

Shearing of the end of the catheter within the epidural space by erroneously retracting the catheter with the needle still in the patient is probably not an uncommon occurrence. Surgical removal is almost certainly unnecessary. However, when the catheter cannot be removed and the end of the catheter is outside the skin, a potential tract for infection into the epidural space is present. In our case, the end of the catheter had been outside and in contact with the skin and subsequently retracted into the tissues. As such, these catheters should be removed.

REFERENCES

Stellate Ganglion Block for Sudden Profound Hearing Loss

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The onset of a sudden sensorineural hearing loss in a practicing anesthesiologist stimulated a review of the pathophysiology of labyrinthine structures and the recommended treatment for sudden deafness which is often referred to as sudden profound hearing loss (SPHL). Although a stellate ganglion block has been recommended for therapy of SPHL,1–4 clinical experience has not been reported. The following is a case report of the use of stellate ganglion block in a patient with SPHL.

REPORT OF A CASE

A healthy, 34-year-old man was swimming and noticed tinnitus in his right ear after diving into 12 feet of water. There was no associated vertigo or ear pain. During the next three days, the tinnitus persisted and increased. On the evening of the third day, the patient noted inability to hear the telephone ring while listening with his right ear and sought consultation the following day. An audiogram was performed on the fourth day which revealed a pure tone average in the right ear of 65 dB (fig. 1). The patient was not vertiginous, had no perforation of the tympanic membrane, hemotympanum or fluid in the middle ear space. He had a negative fistula test and a normally mobile tympanic membrane by tympanometry. Since there was no clear-cut evidence for a round or oval window rupture, surgery was not performed and a series of stellate ganglion blocks were planned.

A series of stellate ganglion blocks were performed using the anterior paratracheal approach. Because of the success of Haug,4 the blocks were repeated every 12 hours utilizing 0.5 per cent bupivacaine, 10 ml. There was rapid improvement in his hearing documented by serial audiograms (fig. 1). A visible Horner's syndrome (miosis, ptosis, anhidrosis) with unilateral nasal congestion gave evidence of an effective block. These unpleasant side effects were successfully reversed following instillation of 1–2 drops of 10 per cent phenylephrine HCl in the affected eye. A block of the recurrent laryngeal nerve was elicited twice and a partial brachial plexus block once during the series. Upon completing eight blocks, full recovery was noted by audiogram (fig. 1). Three months later, this was still present without relapse.

DISCUSSION

Although the cause of SPHL has not been elucidated, conditions that are known to produce abrupt, usually unilateral sensorineural losses are mumps, measles, meningitis, encephalitis, acoustic tumors, ear surgery, skull fracture, ototoxic drugs, and perilymphatic fistula from exertion or barotrauma. There are several reports of idiopathic sensorineural hearing loss.5–4 The basic mechanisms are broken down to either a viral or vascular etiology responsible for 25 and 75 per cent of cases, respectively. They all have a similar clinical picture. The typical patient is one with serviceable hearing bilaterally who suddenly becomes deaf in one ear. The abruptness of onset may

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be exaggerated somewhat, but with careful review of events, the patient can usually recall that the first symptom was not deafness, but tinnitus. It may have its beginning hours or even days earlier. Vertigo, which can be severe, is an inconstant symptom. Its presence, especially when severe, indicates a poorer prognosis for recovery of hearing than if it were not present. Occasionally, the patient may complain of a sensation of pressure in the affected ear and intolerance to loud noise because of recruitment and displacus.

Regardless of the etiology, the basis for the use of the stellate ganglion block arises from its effect as a vasodilator via sympathetic blockade. The primary neurons of the eighth cranial nerve are perfused by end arteries (without collateral circulation). There are two main divisions of the labyrinthe artery, the vestibular and cochlear branches. A disturbance of this region of end arteries results in vasoconstriction (ischemia) causing hypoxia and subsequently endothelial damage. This damage allows transudation between endothelial cells. The increased interstitial fluid compresses the lymphatic channels and produces localized stasis. The resorption of edema is promoted by arteriolar relaxation from sympathetic blockade.

The same therapeutic end result has been attempted with variable results using high doses of histamine and nicotinic acid. Steroids were used by Byl who reported 32 cases of which only 30 per cent achieved full recovery. The wide spectrum of modes of treatment varying from simple bed rest to multiple drugs, including histamine and other vasodilators, anticoagulants such as heparin and coumadin, and intravenous infusions of local anesthetics (procaine and lidocaine), reflects the fact that no one modality has achieved overwhelming success. Our approach was based on the pathophysiology of the disorder, the high success rate as reported by Haug, and the patient's own familiarity with the block procedure. Even though trauma was the probable etiology and a good probability existed that spontaneous remission might have occurred, we speculated that recovery may be more rapid and complete, allowing the patient to return to practice sooner.

It is interesting to note that health professionals appear to make up a major portion of affected individuals (25 per cent in Simmons series). This may represent that their incidence is truly higher or (more likely) that their access to otologists and audiograms is more readily available.

The true value of stellate ganglion block in SPHL is unclear both in therapeutic and prognostic situations; however, more experience in these areas may support its routine use.
An Automated Oscillometric Technique for Estimating Mean Arterial Pressure in Critically Ill Newborns

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A variety of noninvasive techniques are currently available for the measurement of blood pressure in the neonate, but each method has significant shortcomings. Flush and palpation methods are critically dependent upon technique and skill, and are not sufficiently accurate to justify continued use.1-3 Auscultatory methods are usually not feasible in the critically ill neonate, particularly in the noisy environment of the newborn intensive care unit.1-3 A number of electronic devices are capable of accurate noninvasive measurement of systolic arterial pressure, but measurement of diastolic pressure is either much less accurate or impossible with each of them.4-8

Many centers continue to rely upon invasive techniques of blood pressure monitoring in the sickest neonates. As improved methods for direct measurement of arterial pressure have become available, there has been an increased practice of recording mean arterial pressure (MAP), perhaps because simultaneous continuous fluid administration and continuous monitoring of nondamped systolic pressures cannot be easily accomplished in newborns. While the superiority of MAP to systolic or systolic/diastolic pressures as a basis for clinical decision making remains debatable, a noninvasive technique for direct, rather than calculated, measurement of MAP would be of value. Oscillometric techniques first described by Marey,9 and most recently applied by Yelderman and Ream10 in adult patients undergoing cardiac surgery, can provide accurate noninvasive measurements of MAP. A commercial instrument which automatically determines MAP using this technique is also available.** A detailed description of its mode of operation has been previously reported.††

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