Local Anesthesia in Posterior Cervical Surgery

O. P. Nygaard, M.D., B. Romner, M.D., Ph.D., J. Thoner, M.D.,‡ B. Due-Tonnessen, M.D.*

POSTERIOR cervical surgery is associated with the risk of serious neurologic damage. In most circumstances, this procedure is performed during general anesthesia. A potential advantage of local anesthesia includes the ability to derive information from the patient during manipulation and handling of the spinal cord and nerve roots. We report an illustrative case and our experiences caring for 60 patients undergoing posterior cervical surgery performed during local anesthesia.

Case Report

A 60-year-old man (American Society of Anesthesiologists physical status 1, weight 65 kg) suffering from neck and shoulder pain and numbness and paresthesia in his arms and legs presented for cervical laminectomy. Cervical myelography and magnetic resonance imaging demonstrated cervical spinal stenosis, confirming the clinical suspicion of cervical spondylotic myelopathy. The technique of the local anesthesia and the anticipated perioperative conditions was explained to the patient the day before surgery. Care was taken to emphasize the importance of communication if discomfort, pain, or paresthesia should occur during the operation. He was premedicated with 25 mg oxazepam orally. Conventional monitoring, which included oximetry, electrocardiography, and noninvasive blood pressure, was applied, and supplemental oxygen was administered via a nasal cannulae. End tidal carbon dioxide was not monitored. No central venous catheter was inserted. The patient was operated on while in a 20° head-up prone position, with his neck in a flexed position and his face resting in a cotton-padded Mayfield "horse-shoe" headrest. Great care was taken to minimize discomfort due to pressure on the face, knees, and elbows, using gel padding. To prevent the patient from sliding down the table, his knees were flexed 45°.

A total of 75 mg meperidine, combined with 5 mg midazolam, was given intravenously during the surgical procedure. The patient was awake and communicative throughout the procedure. With the patient lying draped on the operating table, the skin overlying the incision was infiltrated with 20 ml 0.5% lidocaine (Xylocain) with epinephrine (5 μg/ml). The needle was then placed perpendicular to the skin in an approximately 5° caudal direction 2.5 cm lateral to the midline to avoid entering the spinal canal. Ten milliliters 0.5% lidocaine with epinephrine was infiltrated close to the lamina at each level. A total of 110 ml 0.5% lidocaine with and without epinephrine was used for the entire procedure, which lasted 85 min. Laminctomy was performed from level C3 to C7. After the procedure, he was taken to the recovery room. He was neurologically intact, and the outcome, when he was discharged, was good, with less numbness and paresthesia in his arms and legs. He was satisfied with the result and had no complaints about the surgical procedure.

This procedure has been performed in a selected series of 60 patients during the period 1988 to 1995. The patients comprised three main categories.

The 59 patients in group A had cervical spinal stenosis, found on cervical myelography or magnetic resonance imaging, that demonstrated multilevel medullary compression, in some cases combined with root involvement. The ten patients in group B had instability in the atlanto-occipital joint, caused by rheumatoid arthritis in six patients and by cervical trauma in four patients.

Group C consisted of 11 patients with instability in the midcervical spine after trauma.

In group A, a simple cervical laminectomy was performed, whereas in groups B and C, the procedure was circumferential wire fixation combined with bone transplants.

In all 60 patients, the procedure was completed without complications. The mean duration of surgery was 117 min (range 60–190 min), and the mean volume of local anesthesia (0.5% lidocaine) was 110 ml (range 60–210 ml). No patient had any sign of lidocaine toxicity.

Discussion

Posterior cervical surgery is one of the most common spinal procedures. These procedures are almost uniformly performed during general anesthesia. Smith et al. evaluated complications of upper cervical spine fusion in 47 patients and noted 7 cases (14%) with increased neurologic deficits after surgery. Yonenobu et al. reviewed cases of 384 patients operated on for cervical myelopathy (including 134 anterior interbody fusions) and noted 21 patients (5.5%) with neurologic deterioration related to surgery.

To avoid inadvertent neurologic injuries during pos-
terior spinal surgery, we set out to determine whether the procedure could be performed during local anesthe-
sis. The case report and the series described here
demonstrate the practical feasibility of such an ap-
proach. Although this series is too small to prove any advantage over general anesthesia, we have not
encountered any major complications, including local anesthetic toxicity venous air embolism. Theoretical-
tly, the risk of air embolism development should be
greater in the awake patient breathing spontaneously
compared with the anesthetized patient whose lungs
are ventilated with positive airway pressure. How-
ever, the posterior approach to the cervical spine
must not be confused with posterior fossa surgery,
where there is a potential risk of opening venous
sinuses. However, this has been overemphasized in
the past. According to Michenfelder, the risk of a
major embolic event is virtually nil, unless the body
is placed in a distinct, head-up position. The position
of our patients is prone, and the elevation of the head
does not exceed 30°.

No patient had to undergo general anesthesia because of
their inability to tolerate this procedure under local
anesthesia. However, we recognize that local anesthesia
may be inappropriate for all patients. Indications for the
use of general anesthesia in posterior cervical surgery in
our department are age <15 yr, inability to tolerate
surgery during local anesthesia, severe obesity, and se-
vvere cardiac or pulmonary disease. The potential risk
of hypoventilation developing due to sedation is why
we recommend general anesthesia for the latter group.

Prevention and early detection of neurologic deterio-
ration during surgical treatment in cervical spondylotic
myelopathy is necessary for optimal results. Local anes-
thesia forces the surgeon to take exquisite care in the
handling of the dural contents, and offers immediate
information from the patient when sensory or motor
disturbances occur. Using local anesthesia, Drummond
et al. reported a case that demonstrated the possibility
of reestablishing neurologic function in a patient in
whom paraplegia developed during posterior surgery.
Their case report also illustrates the value of having an
awake patient during these procedures. In our own
experience, excellent communication between the pa-
tient and the surgical team is critical.

In conclusion, the case report and series described earlier
demonstrate the feasibility of safely carrying out posterior
cervical surgery during local anesthesia. This possibility
should be kept in mind when treating such patients.

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