Epidural Anesthesia in a Pediatric Patient with Congenital Tracheal Stenosis

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An 8-year-old child was scheduled for an ileocondut operation. Congenital tracheal stenosis was incidentally found during induction of anesthesia. The case report describes in detail the subsequent anesthetic management of this patient by use of continuous epidural anesthesia.

**REPORT OF A CASE**

An 8-year-old white boy, weighing 23 kg, sought medical attention because of recurrent urinary-tract infections. The history included surgical correction of numerous urologic anomalies discovered at birth. These procedures had all been carried out with general anesthesia, without complication.

The patient was scheduled for a cystoscopic examination with general anesthesia. The anesthesia was uncomplicated, and consisted of thiopental, nitrous oxide, oxygen, and halothane by mask. An ileocondut diversion was deemed necessary. On this occasion some problems were encountered. After four attempts at endotracheal intubation with tubes of decreasing diameters, a 4.0-mm uncuffed endotracheal tube was advanced into the trachea. A trachogram revealed diffuse hypoplasia of the trachea with moderate stenosis of the distal two thirds (fig. 1). The process extended into the left main-stem bronchus. There was no evidence of arytenygle involvement.

The operation was deferred. After careful consideration, continuous lumbar epidural anesthesia was selected, and the operation was rescheduled several days later.

Premedication with morphine sulfate, 5 mg, im, had the desired effect. On the patient’s arrival in the operating room, an intravenous infusion of dextrose, 5 per cent, in lactated Ringer’s solution was commenced.

The patient was placed in the left lateral decubitus position and the skin over the lower lumbar area was prepared. An 18-gauge Hustead needle was placed in the epidural space at the level of L4 by use of the loss-of-resistance technique. Following a 1.5-ml test dose with lidocaine, 1 per cent, 5 ml of 0.75 per cent bupivacaine with epinephrine, 1:200,000, were injected slowly through the needle. A 20-gauge radiopaque Teflon catheter (Deseret) was advanced with ease through the needle. The needle was removed and the catheter was securely taped. The patient was placed in the supine position and the sensory level was assessed. A more profound block had developed on the left side. A further 6 ml of 0.75 per cent bupivacaine was then injected through the catheter. Soon thereafter, an upper level to T5 was evident bilaterally.

The operation commenced about 15 minutes later and continued for a further five and a half hours. Additional sedation was given at intervals. Oxygen with varying concentrations of nitrous oxide (not >50 per cent) was administered throughout.

At two-hourly intervals further increments of bupivacaine, 0.75 per cent, with epinephrine, were injected. The object was to maintain an even level of anesthesia throughout. Towards the end of the procedure the surgeons encountered difficulty in closing the peritoneum. Lidocaine, 2 per cent, with epinephrine, 1:200,000, was selected at this time because of its shorter latency. Within minutes muscle relaxation was adequate. The patient received a total of 142 mg bupivacaine, 0.75 per cent, and 115 mg lidocaine over a six-hour period. Vital signs remained stable throughout the procedure. There was no episode of hypotension. Recovery was uneventful, and the patient was discharged several days later.

**DISCUSSION**

Most pediatric operations involve general anesthesia. The reasons for this have been reviewed by Eather.1 In the present case, it was clear that there were few alternatives. The duration of operation was expected to exceed four hours; consequently, a continuous method of regional anesthesia was selected.

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uous caudal anesthesia, although technically easier to perform in pediatric patients, is not recommended for procedures above the umbilicus. A few investigators have described the use of epidural anesthesia in pediatric patients. However, the use of continuous methods for patients in this age group seems limited. Success with the technique depends on careful attention to detail.

Good rapport between the anesthesiologist and the patient must be established during the preoperative visit. In the operating room the patient should be warned in advance of the sensations to be expected. A hypnotic type of positive suggestion is very useful, particularly when the predictions become reality. The level of the block should be assessed by the anesthesiologist as objectively as possible. A final assessment of the adequacy of the block should be sought by the surgeon before the patient is subjected to the incision.

The dose of local anesthetic agent administered to this patient was selected on a mg/kg basis. Bromage studied the question of dosage in a group of patients ranging in ages from 4 to 102 years. He concluded that in children less than 10 years old, and adults more than 88 years old, the dose requirement based on age became less reliable, and recommended titration of small amounts of local anesthetic agent through the catheter until the desired level is achieved.

In the present case the initial dose necessary to provide adequate surgical conditions (11 ml of 0.75 per cent bupivacaine with epinephrine) was slightly in excess of 3 mg/kg. This is the maximum dose recommended by the manufacturers. The literature contains little, if any, information about the uptake and distribution of local anesthetics in children. There was no symptom or sign of toxicity during the procedure or postoperatively.

Congenital tracheal stenosis is a very unusual anomaly. Perelman, from Russia, provides the most comprehensive up-to-date report on this topic.

REFERENCES