A case report: Epidural anesthesia for cesarean section and tubal ligation in an achondroplastic dwarf

WYNNE R. WAUGAMAN, CRNA, PhD
JOSEPH J. KRYC, MD
MADELEINE J. ANDREWS, MD
Columbus Ohio

This report describes the anesthetic management of an achondroplastic dwarf who underwent cesarean section and tubal ligation with epidural anesthesia utilizing bupivacaine hydrochloride.

The anesthetic management of the achondroplastic dwarf presents a challenge to the anesthetist whether the selected technique is regional or general. The gravid dwarf presents with a more compromised cardiorespiratory status than the gravida of normal stature. Because of a small maternal pelvis and normal size infant, these patients have a greater incidence of cephalopelvic disproportion (CPD), and therefore require cesarean section for delivery.

Case report

A 19-year-old, gravida 1, para 0 achondroplastic dwarf was admitted to the hospital for a primary cesarean section and tubal ligation. The pregnancy had been uneventful and was without anomalies. Previous surgery included bilateral proximal tibial osteotomies under uncomplicated general anesthesia. Physical examination revealed a 120 cm, 48 kg healthy female achondroplastic dwarf with a relatively normal trunk, short limbs, large cranium and a depressed nasal bridge (saddle-nose). The lumbar spine appeared essentially normal with landmarks easily palpated. Preoperative blood pressure was 90/60 in the supine position with manual left uterine displacement. Results of preoperative laboratory studies were unremarkable.

The patient received 30 cc of sodium citrate one hour preoperatively. A 16 gauge intravenous catheter was inserted and 1000 cc of lactated Ringer’s solution was infused. She was placed in the left lateral position and the lumbar area was prepared with providone-iodine (Betadine®) solution. Following local infiltration, an 18-gauge Crawford needle was easily placed at the L2-3 interspace by paramedian approach without difficulty, using the loss-of-resistance technique. The epidural catheter passed easily to the 3 cm mark at which time paresthesia was elicited. The needle was removed and the catheter was withdrawn approximately 2 mm. Gravity drain and aspiration through the catheter were negative for return of cerebrospinal fluid and blood. A test dose of 2 cc of 0.75% bupivacaine HCl* was administered without evidence of subarachnoid injection and the patient was returned to the supine position with left lateral uterine displacement.

After five minutes, another 3 cc of 0.75% bupivacaine HCl was administered. Small incremental injections of 0.75% bupivacaine HCl were given at two minute intervals to a total of 21 cc. Within 25 minutes of the initial injection a T3-T4 dermatome level of anesthesia was obtained. Systolic blood pressure decreased from 90/60 to 78/50, but the patient responded rapidly to greater left uterine displacement, infusion of intravenous fluids and ephedrine 10 mg administered intravenously.

No additional analgesia was required during the surgery which lasted 45 minutes. A 3 kg infant with Apgar scores of 9 at 1 minute and 9 at 5 minutes was delivered without difficulty. The infant showed no signs of achondroplastic dwarfism. Postoperatively, both mother and baby did well, and the mother did not develop any postoperative anesthesia complications.

Discussion

Dwarfism manifests itself in more than 55 distinct syndromes with subtypes.1 Achondroplastic dwarfism is classified as disproportionate short sta-

*This anesthetic was administered when 0.75% bupivacaine HCl was acceptable for obstetrical epidural anesthesia.
ture, with a reported incidence of 0.4% of short-limbed dwarfs in this category. Although the length of the spine is almost always normal, those with disproportionate short stature are more likely to have spinal disturbances such as scoliosis, kyphoscoliosis, kyphosis, extreme lordosis or spinal stenosis. Signs and symptoms of spinal cord and root compression such as weakness cauda equina syndrome or paresis in patients suspected of having spinal stenosis should be assessed and evaluated by appropriate roentgenographic studies. These spinal disturbances may further impair any existing cardio-respiratory dysfunction.

A small narrow chest cage is related to compromised cardiovascular function in achondroplastic dwarfs. The gravid abdominal uterus further compounds any pre-existing cardio-respiratory problems. In these patients functional residual capacity may be decreased severely, particularly when the patient assumes the supine position; the patient should be assessed for respiratory acidosis and hypoxia by preoperative arterial blood gas analysis.

Both general anesthesia and regional anesthesia have been used successfully in dwarfs undergoing cesarean section. The anesthetist must consider the advantages and disadvantages of each technique for patients on an individual basis. Some case reports have described difficulties with endotracheal intubation due to either atlanto-axial instability or problems with extension of the neck, and others have reported technical difficulty in performing regional blocks. Regional anesthesia may not be advised for achondroplastic dwarfs beyond the second decade of life, as neurological problems such as disproportion between the neural contents and the spinal canal space and disc disease often develop in the third and fourth decades.

There are as yet no dosage guidelines for the use of local anesthetics for spinal or epidural anesthesia in achondroplasia. During administration of epidural anesthesia the anesthetist must closely observe the patient for an adequate sensory level of the block without creating respiratory embarrassment. Small intermittent doses of local anesthesia should be titrated until a proper level of analgesia is achieved. Because they have a normal trunk size, these patients may tolerate the same dose as individuals of normal stature. The slower onset of block allows the level of epidural analgesia and anesthesia to be more easily controlled than spinal anesthesia.

Epidural anesthesia may be safely administered to achondroplastic dwarfs. However, the anesthetist must carefully screen each patient to identify all potential risks and hazards. Through the preoperative interview, the anesthetist must establish good rapport with the patient. The anesthetist must carefully explain the risks involved with regional anesthesia as well as provide information about general anesthesia should the need to employ this technique arise.

Care must be taken when placing these patients on the operating table. Because of their short limbs, application of an adult blood pressure cuff may provide inaccurate readings, thus several sizes of pediatric cuffs should be available. Achondroplastic dwarfs may have difficulty extending their arms comfortably on armboards. Additional padding may be necessary to protect pressure points, or the arms may be placed at the patient's side.

The anesthetic management of the achondroplastic gravid dwarf may be a challenge, due in particular to the more compromised cardiorespiratory status as compared to the gravida of normal stature.

However, close attention to specific details and concerns assures quality anesthesia care to achondroplastic mothers.

REFERENCES


AUTHORS

Wynne R. Waugaman, CRNA, PhD, is assistant professor and director of the Nurse Anesthesia Division at The Ohio State University. She received her nursing education at the Western Pennsylvania Hospital and her nurse anesthesia education at Shadyside Hospital in Pittsburgh. She earned her baccalaureate degree from California State University and her master's and doctoral degrees from the University of Pittsburgh. Dr. Waugaman has published several articles and book chapters on geriatric anesthesia and is a contributing author and editor for the upcoming text, Principles and Practice of Nurse Anesthesia.

Joseph J. Kryc, MD, is an associate professor in the Departments of Anesthesiology and Obstetrics and Gynecology at Northeastern Ohio University, College of Medicine. He also is the Director of Obstetrical Anesthesia at Aultman Hospital in Canton, Ohio. Dr. Kryc formerly was the Medical Director of the Nurse Anesthesia Division and was on the faculty of the Nurse Anesthesia Division and the Departments of Anesthesiology and Obstetrics and Gynecology at The Ohio State University.

Madeleine J. Andrews, MD, is a staff anesthesiologist at Riverside Methodist Hospital in Columbus, Ohio. She completed a residency in anesthesiology at The Ohio State University and served as a clinical instructor in the Department of Anesthesiology.