

Anesthetic management of lumbar discectomy in a pregnant patient

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Introduction

Almost 1%–2% of all pregnant women require surgery during their pregnancy. Appendectomy and cholecystectomy are the most commonly performed abdominal procedures [1]. Low back pain is common during pregnancy and has been reported in as many as 56% of pregnant women [2,3]. Anesthetic management is particularly important during pregnancy. The anesthesiologist and the surgeon must consider the effects of the anesthesia, the patient's position (aortocaval compression risk, fetal compression), and the surgery on the fetus [1]. There have been few reports of anesthesia for pregnant women undergoing lumbar discectomy [2]. We describe a patient, with lumbar disc herniation at 20 weeks' gestation in whom sevoflurane was used for anesthetic management, with the patient in the left lateral tilt position; there were no adverse effects on the mother or the fetus.

Case report

The 31-year-old patient was primigravida nulliparous. She was 162 cm tall and weighed 78 kg. At the twentieth week of gestation, she was admitted with pain, weakness, and numbness in her right leg that had lasted for at least 1 month. Neurological examination revealed that she had severe weakness of toe extension and right ankle inversion (muscle strength 0/5) as well as moder-

ate weakness of the right ankle dorsal and plantar flexions (muscle strength 3 and 4/5, respectively) in the right lower extremity. The Achilles reflex was depressed and pinprick sensation was decreased over the right L5 nerve root dermatome. As magnetic resonance imaging (MRI) demonstrated a central disc herniation at the L5-S1 level, causing severe compression to the right L5 root, surgical decompression was planned on the same day. The obstetricians also evaluated her. According to an ultrasonographic examination, the fetus was healthy, and a fetal heart rate of 140–160 beats·min⁻¹ was recorded.

She was then transported to the operating room, in the lateral decubitus position, where standard monitoring by continuous electrocardiography, noninvasive blood pressure measurement, and oxygen saturation (M1094B; Hewlett Packard, Saronno, Italy) were established. A peripheral venous cannula was also inserted. Before the induction of anesthesia, she was preoxygenated with 6 l·min⁻¹ oxygen for a period of 5 min. The operating table was maintained in the left tilt position. Induction was achieved with 2 mg·kg⁻¹ propofol. Vecuronium (0.1 mg·kg⁻¹) was given to facilitate tracheal intubation, with a size 7.5 tube. Anesthesia was maintained with 1%–1.5% sevoflurane in a mixture of oxygen and air (Narkomed; North American Dräger, Telhord, PA, USA) following tracheal intubation. She was placed in the left lateral position and her abdomen was supported with pillows in order to prevent direct pressure on the fetus. Throughout the L5-S1 discectomy operation, which lasted for 2 h, neither fetus nor mother exhibited any hemodynamic change. The fetal heart rate was monitored with Doppler ultrasonography during the induction of anesthesia, emergence, recovery, and whenever possible during surgery. No change was detected in the fetal heart rate (140–160 beats·min⁻¹). At the end of the operation, she was extubated immediately. The postoperative period was smooth and her neurological deficits recovered gradually. Her general

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condition was normal postoperatively and she had complete relief of the leg pain. She gave birth to a healthy male baby of normal birth weight (weight, 3250 g; length, 51 cm) by cesarean section at 37 weeks' gestation.

Discussion

The incidence of symptomatic lumbar disc herniation in pregnancy is very low, occurring in only 1 of 10000 pregnancies [3]. In a series of 48760 consecutive deliveries, LaBan and colleagues [4,5] diagnosed symptomatic herniated lumbar disc by myelography in five pregnant patients. Although extremely rare, cauda equina syndrome and severe neurological deficit caused by lumbar disc herniation may occur during pregnancy [2,3]. Brown and Levi [2] reported two patients at 20 weeks and one patient at 16 weeks of gestation who had cauda equina syndrome or severe neurological deficit who had undergone emergent surgery with epidural anesthesia after being placed in the prone position. In contrast, we preferred to use the lateral decubitus position and general anesthesia in our 20-week pregnant patient who had central disc herniation at L5-S1 and severe neurological deficit. Lumbar disc herniation is most common between the fourth and sixth decades. As more than 30% of pregnant women are over 30 years of age nowadays (our patient was aged 31) [3,4], physicians should be aware of lumbar disc herniation in older pregnant patients with leg pain [3].

The literature clearly demonstrates that pregnancy at any stage is not a contraindication for MRI or for the administration of epidural or general anesthesia [5]. MRI, which we used in our patient, is the definitive diagnostic procedure for lumbar disc herniation and demonstrated a symptomatic lateral disc herniation at the L5-S1 level.

During surgery in a pregnant woman, special attention is necessary to avoid causing fetal injury. The basic objectives in the anesthetic management of pregnant patients are: maternal safety, avoidance of intrauterine fetal asphyxia, and prevention of preterm labor. At present, no anesthetic drug, inhaled analgesic, or local anesthetic has been proved to be teratogenic in humans, although, notably the benzodiazepine group of drugs has been linked to congenital anomalies. However, all agents administered during pregnancy must be used with caution and vigilance. It is clear that the fetus may be influenced by anesthetic effects caused by the perfusion and placental transfer of depressant drugs. With our limited experience with the anesthetic management of such a pregnant patient, we considered how to minimize or avoid fetal exposure to drugs [1,6]. Hypotension, severe anemia, hypoxemia, and marked increases

in sympathetic tone may seriously compromise the transfer of oxygen and other nutrients across the uteroplacental circulation and promote intrauterine fetal asphyxia. The stress of the surgical procedure may also precipitate preterm labor [1,6]. Fortunately, we did not observe any hypotension or severe hemorrhage that could have caused fetal hemodynamic disorders during the operation. Hypotension during pregnancy is primarily due to decreased sympathetic tone and is greatly accentuated by aortocaval compression. Treatment consists of intravenous boluses of ephedrine (5–15 mg), left uterine displacement, and intravenous fluid; small bolus intravenous doses of phenylephrine (25–50 µg) may also be used safely [1].

Many physiologic parameters change during pregnancy. Significant changes in minute ventilation functional residual capacity, and in anesthetic requirements occur during the second and third trimesters and may predispose the mother to increased sensitivity to anesthetics [6]. Physiologic changes associated with pregnancy have taken place by the end of the second trimester. Regional anesthesia may be preferable to general anesthesia to decrease the risks of pulmonary aspiration and failed intubation, and may minimize drug exposure to the fetus [1]. Brown and Levi [2] reported that they used epidural anesthesia in their three patients who suffered from severe neurological deficit and signs of cauda equina syndrome due to lumbar disc herniation. None of the patients experienced adverse effects due to epidural anesthesia and all had delivered healthy infants at full term. On the other hand, general anesthesia guarantees patient comfort and may even suppress preterm labour when a volatile agent is used. Also, general anesthesia offers potentially less hypotension and a very rapid and reliable onset [1,6], so that we preferred general anesthesia. Propofol has been evaluated for use both as an induction agent and as a maintenance anesthetic during caesarean delivery [7]. For induction, we administered propofol as a hypnotic. Oxygen-air mixture and sevoflurane were used for the maintenance of anesthesia. In the literature, sevoflurane was used in a caesarean section in a patient with myelodysplastic syndrome [8]. Additionally, sevoflurane had been successfully used in a pregnant patient before the clamping of a cerebral aneurysm [9].

There is a risk of aortocaval compression during the second trimester [1,2], and we used the left lateral decubitus position to avoid it. Furthermore, the abdomen was supported with pillows to prevent fetal compression. However, it has been reported that the same operation could also be performed successfully with the patient in the prone position [2]. In this study, the surgeons did not have much difficulty with the left lateral tilt position and preferred this position to provide fetal safety.

In addition to standard monitoring, fetal heart rate and uterine activity should be monitored by Doppler ultrasonography and with a tocodynamometer [1,2]. Before 20 weeks of gestation, fetal heart monitoring during surgery is not indicated [2,10]. We recorded the fetal heart rate by Doppler ultrasonography during the induction of anesthesia, emergence, and recovery and whenever possible during surgery, because the patient was in the twentieth week of her pregnancy. Fortunately, we did not find any fetal heart rate abnormality during these periods. Vasopressor therapy in obstetrics has been controversial because it may produce uterine vasoconstriction and hypertonus and may have adverse effects on the fetus. Ephedrine is commonly used as a vasopressor during anesthesia. Unlike direct-acting α -1 agonists, ephedrine does not decrease uterine blood flow. This makes it the preferred vasopressor for most obstetric uses [11]. In the literature, there was no reported increase in the rates of congenital anomalies, prematurity, low birth weight, and perinatal death from anesthesia used for surgeries during pregnancy [1,6]. In accordance with such findings, our patient delivered a normal-weight healthy baby 4 months after the operation.

In conclusion, we experienced a patient who required an emergent operation to relieve severe neurological deficits caused by a lumbar disc herniation in pregnancy. Surgery for lumbar disc herniation during pregnancy is rare, but may be performed safely with general anesthesia by considering the physiologic parameters in pregnancy and the effects on the fetus.

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