



## Case Report

# Prone position craniotomy in pregnancy without fetal heart rate monitoring<sup>☆</sup>



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Received 10 December 2015; revised 27 January 2016; accepted 27 February 2016

**Keywords:**

Craniotomy;  
Fetal monitoring;  
Pregnancy;  
Prone position

**Abstract** A pregnant patient in second trimester scheduled for posterior fossa craniotomy in prone position is a challenge for the anesthesiologist. Things to consider are physiological changes during pregnancy, non-obstetric surgery in pregnant patients, neuroanesthetic principles, effects of prone positioning, and need for fetal heart rate (FHR) monitoring. We have described the anesthetic management of this case and discussed intra-operative FHR monitoring including controversies about its role, indications, and various options available as per fetal gestational age. In our case we attempted intermittent intra-operative FHR monitoring to optimize maternal positioning and fetal oxygenation even though the fetus was pre-viable. However the attempt was abandoned due to practical difficulties with prone positioning. Patient made good neurological recovery following the procedure and delivered a healthy term baby 4 months later. Decisions regarding fetal monitoring should be individualized based on viability of the fetus and feasibility of emergency cesarean delivery. Good communication between a multidisciplinary team involving neurosurgeon, anesthesiologist, obstetrician, and neonatologist is important for a successful outcome for mother and fetus. We conclude that prone position neurosurgery can safely be carried out in a pregnant patient with pre-viable fetus without FHR monitoring.

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## 1. Introduction

When a pregnant woman in the second trimester requires urgent craniotomy under general anesthesia in prone position, it poses a challenge to the anesthesiologist. We present such a case followed by a discussion on intraoperative fetal heart rate (FHR) monitoring.

## 2. Case report

A 27-year-old female presented to the neurosurgeon with complaints of acute painless loss of vision in right eye since three days. She was 20 weeks pregnant and her pregnancy was otherwise uneventful.

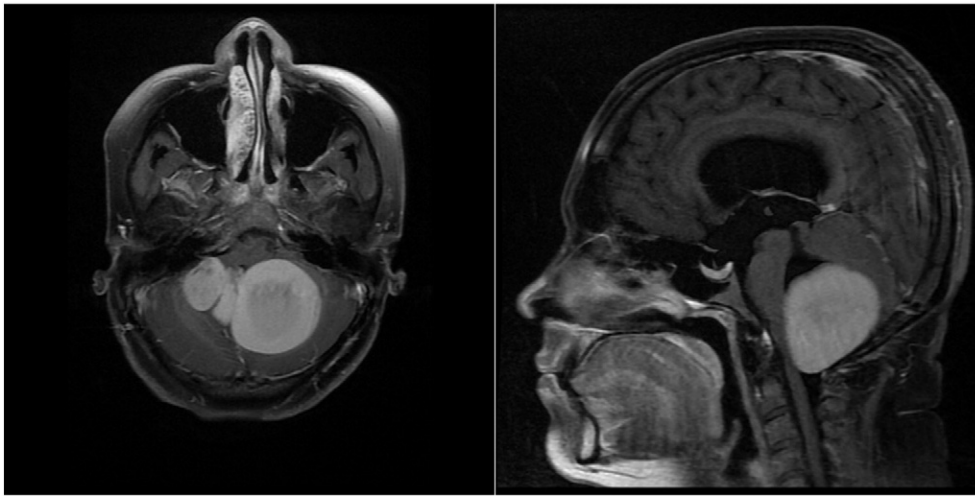
On examination she was conscious and oriented; height was 150 cm and weight was 60 kg. Her vitals were normal. Visual acuity was 6/9 in the left eye and counting fingers at 1 meter in the right. Fundoscopic examination revealed bilateral optic neuropathy. Per abdomen her uterus was about 20 weeks' size, fetal movements were appreciated, and FHR was 154 beat/min.

<sup>☆</sup> Funding sources: nil.

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**Figure 1** Brain MRI revealed mass lesion in posterior fossa.

She was sent for brain magnetic resonance imaging. As seen in [Figure 1](#), there was a  $6.6 \times 4.4 \times 4.5$  cm multi-lobulated cystic lesion in the posterior fossa with evidence of brain stem compression. The mass lesion caused obstructive hydrocephalus and optic nerve sheath tortuosity. Clinical and neuroimaging findings indicated that the patient required urgent neurosurgical intervention.

After consultations amongst a team consisting of the neurosurgeon, obstetrician, neonatologist, and anesthesiologist, the patient was scheduled for sub-occipital craniotomy and tumor excision under general anesthesia the next morning.

Ultrasonography showed a single live intrauterine fetus of 21 weeks and 5 days gestation, weighing approximately 450 grams. It was decided that since the fetus had not achieved period of viability (taken as 24 weeks gestation and weight more than 600 grams), there would be no plans for emergency cesarean delivery in case of crisis.

Patient was started on intravenous dexamethasone 8 mg thrice daily and isoxsuprine 40 units in 500 mL saline infusion at 10 drops per minute and both were continued intra-operatively the next day. Eighth hourly fetal heart sound (FHS) monitoring was started and patient was given thrombo-embolic deterrent stockings to wear.

On the day of surgery intravenous ranitidine 50 mg and metoclopramide 10 mg were given half hour before induction. In the operating room patient was positioned on the table supine with a 15 degree left lateral tilt. Pre-induction monitoring included pulse oximetry, electrocardiogram, non-invasive blood pressure and capnography.

Modified rapid sequence induction with cricoid pressure was performed using intravenous fentanyl  $2 \mu\text{g}/\text{kg}$ , thiopentone  $5 \text{ mg}/\text{kg}$ , and rocuronium  $1 \text{ mg}/\text{kg}$  to facilitate intubation with 7.0 mm cuffed endotracheal tube. Anesthesia was maintained with 60% oxygen in air, isoflurane, vecuronium infusion, and intermittent morphine bolus.

Invasive monitoring was initiated with right radial intra-arterial catheter, central venous catheter in the right subclavian vein, urinary catheter, and esophageal temperature probe.

Intra-operative hemodynamic parameters were maintained within 20% of baseline, central venous pressure was between 10 to 12 cm H<sub>2</sub>O and ventilator settings were adjusted to keep end-tidal carbon dioxide (EtCO<sub>2</sub>) between 30 and 33 mm Hg. Warming blanket was used and blood sugar levels and arterial blood gases were monitored 2-hourly.

Fetal Doppler probe was used to confirm normal FHR post induction and the site on the abdomen where the heart sound was heard was marked. After application of skull clamp, patient was turned prone with supports placed under the shoulders and iliac crests. Attempts were made to monitor FHR after prone positioning but there was failure in locating the fetal heart sounds again. Since maternal hemodynamic parameters were stable and there was visual confirmation that there was no pressure on patient's abdomen in prone position, the decision was made to proceed with the surgery.

Total operative time was 6.5 hours, estimated blood loss was 500 mL, and 4000 mL of Ringer's Lactate was administered. Patient was turned supine after surgery, neuromuscular block was reversed, and she was extubated when fully awake.

Fetal Doppler was used to document normal FHR post-procedure and it was noted that the heart sounds had shifted to the opposite side. Patient was transported to intensive care unit for observation. There was improvement in vision the next day and when the patient was discharged from the hospital a week later, visual acuity was 6/6 in the left eye and 6/60 in right eye. Biopsy of excised mass revealed a benign epidermoid cyst, cerebellar vermis.

Patient came for monthly antenatal check-up since then and she delivered a healthy baby weighing 2.7 kg with APGAR scores of 8 at 1 minute and 9 at 5 minutes, at 37 weeks gestation.

### 3. Discussion

Neurosurgery for the pregnant patient is rare and there is little evidence based guidelines for delivering safe anesthesia for

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