



CASE REPORT: OBSTETRICS

Anesthetic management of combined emergency cesarean section and craniotomy for intracerebral hemorrhage in a patient with severe pre-eclampsia

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S U M M A R Y

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Stroke due to intracerebral hemorrhage is a recognized life threatening but rare complication of eclampsia and severe pre-eclampsia. Literature reporting the anesthetic management of combined emergency cesarean section and craniotomy are scarce. We describe the anesthetic management of a 21-year-old primigravida who underwent combined emergency cesarean section and craniotomy for intracerebral hemorrhage secondary to severe pre-eclampsia. Management of a pregnant woman with an intracerebral bleed and the emergency situation is an anesthetic challenge. A combined procedure as above requires good communication and co-ordination between various specialities and attention to details to ensure successful maternal and neonatal outcome.

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1. Introduction

Stroke is a recognized complication of pregnancy, contributing to more than 12% of all maternal deaths in the United States. Estimated incidence rates vary considerably from 4.3 to 210 strokes/100,000 deliveries. Etiological factors important during pregnancy include hypercoagulability due to maternal physiological changes, pre-eclampsia and eclampsia, cerebral venous thrombosis, paradoxical embolism, postpartum cerebral angiopathy and peripartum cardiomyopathy.¹ Intracerebral hemorrhage (ICH) and subarachnoid hemorrhage are life threatening but rare complications of eclampsia.^{2,3} There are very few cases in literature^{4,5} reporting the anesthetic management of combined emergency cesarean section and craniotomy for ICH secondary to severe pre-eclampsia. We report one such rare complicated case of severe pre-eclampsia with ICH that was managed successfully.

2. Case report

A 21-year-old primigravida at 36 weeks of gestation was admitted with complaints of headache for 3 days, inability to talk, weakness of left upper limb and lower limb for 1 day. There was no history of seizures. She was diagnosed to have pregnancy induced

hypertension in a private nursing home 10 days prior to admission to our hospital and was on treatment, details of which were not available. On examination, she was drowsy and irritable. She was moderately built and nourished. Her pulse rate was 104/min and blood pressure measured in right arm in supine position was 170/110 mmHg. There was edema of all the four extremities as well as face. She was aphasic and there was lower motor neuron type of facial palsy and hemiplegia on left side. Both pupils were equal in size and reactive to light. Rest of the cardiovascular and respiratory system was unremarkable.

Her hemoglobin was 9.2 g/dl and urine examination revealed proteinuria (4⁺). Coagulation profile, liver function, renal function and fundus examinations were within normal limits. Ultrasonography showed a single live fetus with cephalic presentation with estimated weight 2579 ± 214 g and average gestational age of 35 weeks. A non-contrast computed tomography scan (CT scan) revealed intracerebral hematoma in the right temporo-parietal area involving ganglio-capsular region (Fig. 1). She was administered injection Mannitol (20%) 100 ml, Phenytoin Sodium 1000 mg, Ranitidine 50 mg and Metoclopramide 10 mg intravenously. The Obstetrician, Neurosurgeon, Anesthesiologist and Pediatrician together discussed the further management of the patient. It was felt that the emergency cesarean section followed by craniotomy was the best approach for the quick delivery and survival of the two lives at risk (the mother and fetus). Informed consent was obtained and she was taken up for emergency surgery. A nonstress test done

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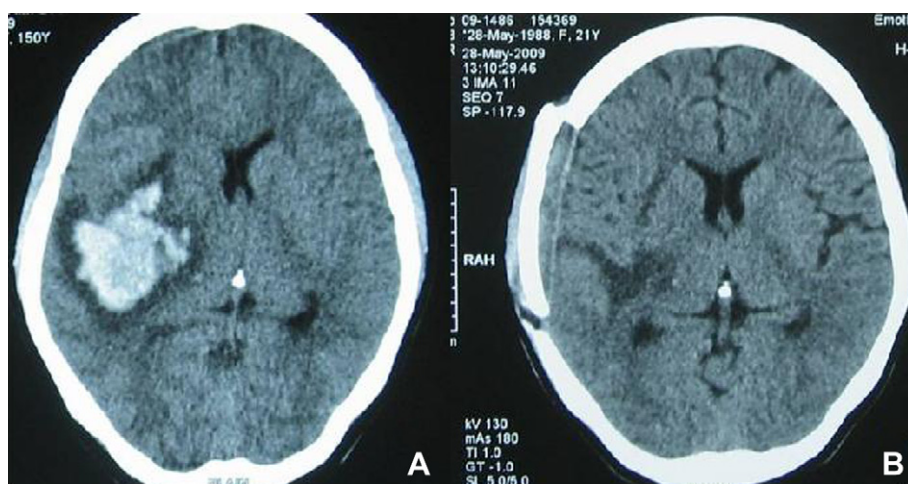


Fig. 1. A non-contrast computed tomography scan of the head A) Pre-operative image showing intracerebral hematoma measuring $5.5 \times 4.8 \times 4.2$ cm involving the right ganglio-capsular region with midline shift of 7–8 mm towards left. B) Post-operative image showing complete evacuation of the hematoma.

before taking her up for surgery was reactive and the fetal heart rate was monitored with a cardiocograph until just before induction of anesthesia.

Her pulse rate was 112/min and the blood pressure 160/114 mmHg just before induction of anesthesia. Following pre-oxygenation with 100% O₂, a modified rapid sequence induction with cricoid pressure was performed using intravenous Fentanyl 150 µg, Propofol 150 mg and Succinylcholine 75 mg with gentle mask ventilation. The trachea was intubated with a 6.5 mm internal diameter cuffed PVC endotracheal tube. Soon after the induction of anesthesia, there was hypotension (mean arterial pressure = 55 mmHg) which was managed by intravenous Ephedrine 6 mg, and she did not require further inotropic support. The maximum heart rate and blood pressure observed post-intubation were 94/min and 136/84 mmHg respectively. Subsequently, the mean arterial pressure was maintained between 80 and 100 mmHg throughout the surgery. End-tidal CO₂ was maintained between 28 and 32 mmHg. Anesthesia was maintained with O₂:N₂O (50:50), Isoflurane (0.5–1%) and Vecuroonium. There was thin meconium stained liquor and a female baby was delivered. The Apgar score was 4 at 1 min which improved with O₂ and bag and mask ventilation to 8 at 5 and 10 min. The baby was shifted to the neonatal intensive care unit for monitoring and there were no further episodes of respiratory depression. Following delivery of the baby, Morphine 9 mg was administered intravenously and Oxytocin infusion 20 I. U. in 1000 ml normal saline at 200 ml/h was started. Right internal jugular vein cannulation was performed after the cesarean section.

The neurosurgery team performed craniotomy and evacuation of the hematoma. Total duration of the combined procedure was 4 h and 45 min and the estimated total blood loss was ≈ 1000 ml. A total of 1500 ml normal saline, 1000 ml Ringer's Lactate and 500 ml of colloid (gelatin) were administered intra-operatively. Urine output was 450 ml. Post-operatively, she was shifted to surgical intensive care unit (SICU) for elective mechanical ventilation.

She was opening her eyes spontaneously and obeying simple commands 12 h post-operatively. Both the pupils were equal in size and reactive to light. Trachea was extubated following administration of Lignocaine 80 mg and Nitroglycerine 200 µg intravenously. Her hemoglobin was 7.9 g and one unit of AB⁺ blood was transfused. Her diastolic blood pressure remained persistently >110 mmHg for which Nitroglycerine infusion was started. Nitroglycerine was tapered and her blood pressure was controlled to diastolic pressure <90 mmHg with tablets oral Amlodipine and Labetolol. Ten doses of mannitol were administered post-operatively.

A contrast CT scan was performed on 14th day post-operatively to find out the primary pathology which did not reveal any intracranial vascular anomaly. She was discharged after 23 days. At discharge, power in right upper limb and lower limb was 2/5 and she could walk with support. She was advised physiotherapy and Phenytoin Sodium tablets. At the time of writing this report (4 months after the surgery), the patient had near complete neurological recovery. She had slight pain in the left frontal area and weakness of the left little and ring finger. Her blood pressure was controlled and she was on Amlodipine 10 mg once daily.

3. Discussion

Intracerebral hemorrhage is an infrequent but life-threatening complication in pregnant women with hypertension.³ Cortical blindness and other visual symptoms are recognized complications of severe pre-eclampsia and eclampsia. Severe pre-eclampsia complicates a small percentage of pregnancies and eclampsia under 0.1%, but they contribute to a large portion of cerebrovascular morbidity and mortality in pregnancy.⁶ A non-contrast CT scan is the most sensitive test to diagnose acute ICH, but contrast CT scan, magnetic resonance imaging or angiography may be needed to exclude structural etiology.⁷ Uncontrolled hypertension is the most likely cause for ICH in our patient as CT scan did not reveal any intracranial vascular anomaly like aneurysm or arterio-venous malformation.

Various risk factors have been reported for pregnancy related stroke which include age >35 years, black ethnicity, hypertension, heart disease, smoking, multiple gestation, greater parity and coagulopathy.¹ Our patient was a 21 year primigravida, a diagnosed case (10 days prior to admission) of pre-eclampsia and was on treatment. Dai et al.³ have reported a case of ICH in a 42 year African American woman at 35 weeks of gestation (twin pregnancy) with chronic hypertension who developed superimposed pre-eclampsia and spontaneous ICH.

Emergency cesarean section followed by craniotomy was chosen in our patient as this would ensure the quickest extraction of the fetus, thereby minimizing the exposure of the fetus to various drugs and maternal hemodynamic fluctuations. Anesthesia for a combined procedure such as this necessitates specific considerations. Because pregnant patients in third trimester are considered to have full stomach, rapid sequence induction and tracheal intubation are of prime importance to prevent pulmonary aspiration. This type of induction is associated with intense sympathetic

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