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Case of A Rapidly Growing Glioma in Near Term Pregnancy: The Dilemma of Baby First or Tumor First?

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Abstract
A 25 year old primigravida, with a history of 37 weeks of gestation, presented with a 7 day history of progressive left sided weakness. Radiological examination revealed a well defined lesion of 6.4×5×6.2 cm in the right frontoparietal region, with evidence of mass effect. After a detailed assessment of all the available options in timing of both surgeries and the nature of emergency, a plan was made to carry out caesarean section and craniotomy for tumour removal in one single sitting. An attempt to balance smooth induction as required in neuroanaesthesia and rapid sequence intubation as required in obstetric anaesthesia was made.
Keywords: *Pregnancy, Brain tumour, glioma, caesarean section.*

Introduction

Pregnancy often masks the concomitant existence of a brain tumour, as the symptoms of headache, vomiting, visual disturbances, etc. are common to both conditions .(1) Such cases although very few, (6 in 100000),often report very late after the tumour Symptomatically, they may present or be exacerbated during pregnancy because of increased tumour growth or edema, increased vascularity or pregnancy related immunotolerance.(2) Some tumours, particularly meningiomas, grow faster during pregnancy because they are known to contain oestrogen and progesterone receptors, similarly, acute neurological deterioration of both suprasellar and cerebellopontine angle tumours during pregnancy, mandating resection has been reported. (3,4)

Enough literature is not available; to be able to practice evidence based anaesthetic management of cesarean section delivery and a neurosurgical procedure in the same sitting. We thus report and discuss anaesthetic management of a full term pregnant patient presenting with a brain tumour and acute deterioration of her neurological condition, who underwent caesarean section and tumour resection both in the same sitting.

Case Report

A 25 year old primigravida, weighing 56 kg, with a history of 37 weeks of gestation, presented to us with progressive weakness in left upper and lower limb, left sided numbness, left sided deviation of angle of mouth, and diminution of vision in left eye, since 7 days. She gave no history of headache

or vomiting. She had been started on Intravenous mannitol 20 grams eight hourly.

Physical examination revealed an alert, oriented young woman with slight slurring of speech. Right pupil was semidilated with sluggish reaction to light, while left pupil was normal in size and reaction.

Obstetric examination was reassuring. Fetal heart sounds were well heard at 130-140/min and fetal movements were normal .Ultrasound examination was satisfactory.

Assessment of airway revealed an adequate mouth opening and a grade 1 modified malampatti classification.

Her blood investigations were within normal limits. Her urine was negative for protein. Magnetic resonance imaging of head and neck revealed a well defined, mixed signal intensity lesion of 6.4×5×6.2 cm in the right front parietal region with cystic areas within and increased choline: creatinine (4:6) ratio on spectroscopy, suggesting high grade glioma, with evidence of mass effect in the form of shift of midline structures to left by 1.5cm, effacement of right lateral ventricle and dilatation of contralateral lateral ventricle with mid subfalcine herniation.

Considering the nature of her neurosurgical emergency and the safety of her well preserved full term baby, an elective low segment caesarean section, followed by tumor excision, both in the same sitting was planned on the subsequent day. She was prepared with Tab Ranitidine hydrochloride150mg, one dose, on the night prior and one, next day morning.

On the day of surgery, she was conscious, oriented, and slightly drowsy than the day before. She had one episode of projectile vomiting on the night prior. Her blood pressure and pulse rate were stable and pupils were same as before.

Pelvic tilt was given to her. Intraoperative monitoring included a 5 lead electrocardiogram, left radial artery pressure, central venous pressure, end-tidal co_2, pulse oximetry and urine output. She was premedicated with Inj.Glycopyrrolate 0.2mg, dexamethasone 8mg, Pantoprazole 40mg and fentanyl 25µg.

After adequate preoxygenation, thiopentone sodium was used for induction and with cricoid pressure, rocuronium 50mg was used for intubation .A small dose of propofol(30mg) and Xylocard 75mg was used before laryngoscopy to curtail the pressor response. Atracurium was used thereafter for muscle relaxation.

Until the delivery of baby, anaesthesia was maintained on oxygen, nitrous oxide and isoflurane (0.6-0.8%) on controlled ventilation, maintaining end-tidal co_2 levels between 28-32. A low birth weight baby (1.75 kg) was delivered, which cried well immediately after birth, with an APGAR score of 7 and 10 at 1 min and 5 min respectively, under the supervision of the attending neonatologist.

Intravenous fentanyl 75µg, midazolam 0.5mg,20 IU of oxytocin in normal saline and 800mg mesoprost per rectum were administered after delivery of the baby. Iv oxytocin was later continued throughout the neurosurgical procedure.

After ensuring satisfactory uterine contraction and hemostasis, we prepared her for neurosurgery.A scalp nerve block with 0.5% bupivacaine (20ml) was given before taking her on Mayfield pin holder.

IV diclofenac sodium was administered in infusion

Mannitol 20% (100ml) was administered just before craniotomy and Sodium valproate 500mg+phenytoin sodium 100mg were given in slow infusions

Anaesthesia for the neurosurgical procedure was maintained on O2+N2O+Isoflurane(0.4-0.6%). A close watch on the state of uterine contraction was kept throughout the procedure by the operating obstetrician. Propofol infusion was used and titrated in order to maintain a MAP of 65±5mm Hg. Haemodynamic parameters were well maintained throughout the surgery. The glioma was completely removed. Total blood loss during the surgery was 800ml which was promptly replaced and a CVP of 8-10 mmHg was maintained.

Intravenous esmolol 10mg as bolus was given to prevent haemodynamic response to extubation. Postoperatively she was put on Phenytoin, sodium valproate, mannitol, antibiotics, intravenous analgesics and vigilant monitoring of her vitals, arterial blood gases and electrolytes. The baby was put on top feeds and was closely monitored. Her pupils attained normal size and reaction on the 2nd postoperative day. She had one episode of transient generalised tonic clonic convulsions on the 3rd postoperative day, which subsided in a few seconds without active treatment following which her antiepileptic therapy was reviewed and changed accordingly.

She was discharged two weeks later. Histopathology report of her tumour biopsy suggested evidence of high grade anaplastic astrocytoma. She subsequently received radiotherapy and was regularly followed up.

Discussion

Concomitant existence of a brain tumour in pregnancy has its own effect on the physiology of the pregnant patient as they make the brain even more susceptible to ischemia or edema with little fluctuations in the cerebral perfusion pressure.(5) Thus, maintenance of an adequate cerebral perfusion pressure was of vital importance in our case.

Management of pregnant patients with brain tumours is complex and a multidisciplinary and co-operative approach involving the neurosurgeon, anaesthesiologist, obstetrician, midwife, and neonatologist is recommended in management of such cases. (6)

According to the available literature, if the foetus does not attain maturity at the time of presentation, neurosurgical intervention can be performed first and the decision regarding subsequent foetal management can be based on obstetric considerations, but if the foetus is viable, decision making is primarily based on, patient's neurological condition, fetal well being and prognosis of the neuropathology.(7)

Our patient had developed new neurological deficits in the last 7 days and had significant mass effect with midline shift on radiological evaluation. This pointed towards the urgency of the neurosurgical procedure.

Chief areas of concern in our management were identified as,

1. Smooth induction as required in neuroanaesthesia and rapid sequence intubation as required in obstetric anaesthesia.
2. Avoidance of increase in intracranial pressure
3. Maintenance of cerebral and uteroplacental perfusion
4. Foetal well being and effects of anesthetic agents used to reduce intracranial pressure on the foetus
5. Risk of uterine atony during the subsequent neurosurgical procedure.

We came across some similar cases in the available literature (8,9). Our management was based on the same guidelines.

Both thiopentone sodium and propofol are good induction agents in neurosurgical cases, as they are known to reduce intracranial pressure, reduce cerebral metabolism and maintain cerebral autoregulation.(10) We used thiopentone for induction, however, we also used a small (30mg) bolus dose of propofol before laryngoscopy ,to attenuate the haemodynamic response to laryngoscopy.

Isoflurane is known to maintain a good depth of anaesthesia and preserve cerebral autoregulation but it is also known to give a certain degree of uterine relaxation. (11) Some investigators have uneventfully used volatile anaesthetics for caesarean section deliveries. (12) Thus, in our case we started propofol infusion after delivery of baby and reduced concentration of isoflurane for maintenance of anaesthesia.

Oxytocin has been reported to have no adverse effects on brain tumours or on intracranial pressure. (13) Use of prostaglandins for uterine contraction is not known to have adverse effect on intracranial pressure. (14)

Although literature suggests slow accumulation of mannitol in the foetus. [15] In view of her deteriorating neurological status and midline shift use of mannitol could not be avoided in preoperative preparation of our patient.

We thus conclude that

In management of a pregnant patient with a brain tumour, timing of delivery of the baby and neurosurgical intervention is one major challenge. Anaesthetic management of brain tumour resection and caesarean section in one sitting demands a proper balance between neuroanaesthetic requirements and obstetric anaesthetic principles, which are somewhat dissimilar to each other.

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