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ORIGINAL ARTICLE

GOAL ORIENTED ANAESTHETIC MANAGEMENT FOR CAESAREAN SECTION IN A PARTURIENT WITH PITUITARY TUMOUR

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ABSTRACT: BACKGROUND AND OBJECTIVE: Anesthesia for Pregnancy with pituitary tumours is a challenge to an Anesthesiologist, requires careful preoperative assessment and meticulous perioperative management to achieve optimal safety of mother and fetus. There are very limited studies in literature to guide the anaesthetic management of such patients. Here we report the successful Anaesthetic management of a parturient with pituitary tumour with epilepsy posted for emergency caesarean section. **PRESENTATION, DIAGNOSIS, MANAGEMENT:** A 25 year young woman, G2P1L1, a known epileptic, diagnosed with pituitary macroadenoma presented at 40 weeks of gestation with severe Oligohydramnios (AFI-4cm) was posted for an emergency caesarean section. Following consultation with the obstetrician, neonatologist and the neurosurgeon the decision was made to proceed with caesarean section under general anesthesia. Rapid sequence induction and intubation was performed with inj Thiopentone sodium and inj Rocuronium and was maintained with Isoflurane, titrated to maintain the stability of mean arterial pressure until extraction. A live 4. 25kgs male child was born with Apgar scores of 8 and 9 at 1 and 5 mins respectively. Following extraction 10U run as infusion in Ringers lactate. Intraoperative analgesia was administered after extraction. Dexmedetomedine infusion was used. Postoperative period was uneventful. **DISCUSSION & CONCLUSION:** Management of obstetric patients with pituitary tumour is complex, requiring knowledge of the physiological effects of pregnancy on tumour size and labour on intracranial pressure. General anesthesia combined with multimodal balanced analgesia is associated with a favorable outcome. General anaesthesia using Thiopentone, Fentanyl, Dexmedetomedine and titrated dose of Isoflurane was used in our case were found to be safe with adequate hemodynamic stability and postoperative pain control. A team approach involving the Anaesthethesiologist, obstetrician, neonatologist and neurosurgeon is recommended for appropriate management of such parturient.
KEYWORDS: Pituitary tumour, Epilepsy, Pregnancy, Caesarean section, General Anaesthesia.

INTRODUCTION: Anesthesia for Pregnancy with pituitary tumours for non-neurosurgical emergencies is a challenge to an Anesthesiologist. Requires careful preoperative assessment and meticulous perioperative management to achieve optimal safety of mother and fetus.[1,2] There are very limited studies in literature to guide the anesthetic management of such patients. Pregnancy may increase the growth of a previously existing intracranial tumor and can even unmask a previously undiscovered tumour.[3] It was suggested that immunological tolerance and steroid mediated growth led to this exacerbation during pregnancy. Here we report the Anaesthetic management of a parturient with pituitary tumour posted for emergency caesarean section.

PRESENTATION, DIAGNOSIS and MANAGEMENT: A 25 year old woman, G2P1L1, a known epileptic, diagnosed with pituitary macroadenoma presented at 40 weeks of gestation with severe Oligohydramnios (AFI-4cm) posted for an emergency caesarean section.

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She is a known case of epilepsy since 7 years-2 to 3 episodes/year. She is on antiepileptic treatment of Tablet Carbamazepine (Tegrital) 400mgBD, Tablet Divonic ER 250mg and Tablet phenobarbitone 60mg since 2 years. She presented following one episode of generalized tonic-clonic seizure which lasted for 1-2 minutes 3 days back, after which she was referred to our tertiary hospital from a peripheral centre. She gives history of vertigo like feeling since then. Antenatal history was uneventful prior to seizure. Specifically, there was no history of Hypertension, or features suggestive of Pre-eclampsia. She was referred to the neurosurgeon for further evaluation. Magnetic Resonance Imaging (MRI) Brain was advised which showed a T2W hyperintense nodular lesion measuring 4×3 mm in antero-superior aspect of pituitary gland suggestive of Pituitary Microadenoma, showed no evidence of Haemorrhage, and a small vascular loop seen abutting the right 7/8th cranial nerve complex in perimesencephalic cistern.

She reported of having history of episodes of severe headache in the bilateral frontal region which used to subside temporarily with pain killers. She admitted to have undergone previous normal vaginal delivery 2 and half years back and there were no reports of any complications at that time. She gives no history of drug allergy, no history of any other comorbid diseases.

General physical examination revealed a young pregnant woman (height-154cm and weight-62kg), who was conscious and alert. Her pulse rate was 92bpm, blood pressure 130/64mmHg and oxygen saturation 99%in room air. Airway examination revealed Mallampatti class 2 airway, thyromental distance was more than 6. 5cms, interincisor gap was 6cms, neck circumference 36cms, adequate neck and temporomandibular joint movement, upper lip bite test –grade 1 and no spine abnormality detected. Central nervous system examination revealed no Cranial nerve abnormality, her motor and sensory functions were normal and cerebellar functions were normal. Cardiovascular and respiratory system findings were normal.

All investigations-electrolytes, blood glucose, blood picture, coagulation studies, Thyroid function tests, FSH, LH, Growth hormone, Serum cortisol were within acceptable limits. Visual field charting was normal. Serum Prolactin was elevated (>200ng/ml). By the end of her preanaesthetic evaluation, she was categorized as ASA class III.

Following consultation with the obstetrician, neonatologist and the neurosurgeon the decision was made to proceed with caesarean section under general anesthesia. After obtaining an informed written consent from the patient and her attender, she was shifted to the OT in left lateral position. Two large bore 18 G IV cannulae were secured in both dorsum of the hand and a rapid infusion of ringers lactate was administered through one line. A thorough Anaesthesia cockpit drill was performed. Difficult intubation cart was kept ready. Rescue Medications for seizure control-Midazolam, Phenobarbitone, and Phenytoin and Vasopressors were kept readily available.

Antiaspiration prophylaxis given with 50mg IV Ranitidine and 10mg Metoclopramide. Multiparameter monitors were attached to the patient that consisted of pulse oximetry, NIBP and ECG and $ETCO_2$. The initial BP showed 130/68 mmHg, ECG showed sinus rhythm and heart rate of 90bpm and oxygen saturation in room air was 99%.

Parturient was preoxygenated with 100% Oxygen for 5 minutes. A rapid sequence induction was performed with Inj Thiopentone 250mg and 50mg Rocuronium and airway was secured with 7. 0 no cuffed endotracheal tube. Intubation response was well attenuated with Inj. Lidocaine 1. 5mg/kg given 90 seconds prior to laryngoscopy followed by gentle and rapid intubation within 10 seconds of laryngoscopy. Correct placement of the endotracheal tube confirmed and Anaesthesia maintained

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with only Oxygen and Isoflurane 1% with constant monitoring of MAP; While giving positive pressure ventilation through Bains circuit. Six minutes following skin incision a live male baby was delivered which weighed 4. 25kgs and its APGAR score was 8 and 9 at the end of 1 and 5minutes respectively. Following delivery, 10U of oxytocin infused through ringer lactate and 10U administered intramuscularly. Anesthesia maintained with 66:33 mixture of oxygen and nitrous oxide and Isoflurane 0. 6% with constant monitoring of MAP with controlled ventilation using standard Anaesthesia protocols. After extraction, intraoperative analgesia was given with 100ug of Fentanyl and Diclofenac infusion started through the IV line. Inj Midazolam 0. 02mg/kg body weight was administered. Antiemetic drugs Ondansetron 4mg and Dexamethasone 8mg were also administered IV.

Dexmedetomedine infusion was simultaneously started through another IV line at 0. 6ug/kg/hr while thoroughly monitoring the hemodynamic parameters. As the surgery neared completion Dexmedetomedine infusion was stopped 5 minutes prior to completion of surgery. Patient had good analgesia and adequate depth of anaesthesia throughout the course of surgery marked by minimal changes in hemodynamic parameters. At the end of procedure, neuromuscular blockade was reversed with 2. 5mg Neostigmine and 0. 5mg Glycopyrrolate. Parturient was extubated fully awake in the operating theatre and post-operatively her pulse was 84bpm, BP126/70mmhg and saturation 99% in room air. Her PACU stay was uneventful. Breast feeding was initiated at 4 hours of delivery. Patient was discharged after 1 week.

DISCUSSION: Management of obstetric patients with brain tumours is complex, requiring knowledge of the physiological effects of pregnancy on tumour size and labour on intracranial pressure. Both of these may influence the choice of labour analgesia or anaesthesia for caesarean section. General anesthesia combined with multimodal balanced analgesia is associated with a favorable outcome.[4]

Pituitary adenomas are the most common pituitary disorder affecting pregnancy, and prolactinomas the most common hormone secreting adenomas.[5] The pituitary gland is located at the base of the skull in the sella turcica. It is divided into anterior (adenohypophysis) and posterior (neurohypophysis) lobes. The hypothalamus regulates hormone release from the anterior pituitary through hypothalamic releasing and inhibiting factors that reach the anterior pituitary by a complex portal vascular system. The anterior pituitary secretes at least seven hormones while the posterior pituitary stores and secretes two hormones, antidiuretic hormone and oxytocin.[6]

Functioning pituitary adenomas produce an excess of the anterior pituitary hormones. Adenomas secreting both growth hormone (GH) and prolactin are common. Other less common pituitary tumors are growth hormone secreting lesions resulting in acromegaly; adrenocorticotropic hormone (ACTH) secreting tumors causing Cushing's disease and a very rare thyroid stimulating hormone (TSH) secreting lesion resulting in hyperthyroidism. Prolactinomas may produce the amenorrhea galactorrhea syndrome in females. As the pituitary lesion compresses the pituitary tissue, the sequence in which hormonal function is lost is gonadotrophins; Growth hormone; ACTH and TSH. These tumors are usually benign and slow growing, and are classified as microadenomas or macroadenomas based on size (less than or greater than 10 mm in diameter).[7,8] The hormonal milieu of pregnancy may result in its significant growth. Pituitary tumors may cause local mass effects (hypopituitarism, headache or visual field defects as a result of extrasellar extension and compression of the optic chiasm) or they may invade local structures (leading to ophthalmoplegia, seizures or hemiparesis).[6]

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The rapid resolution of symptoms in the early postpartum period is interesting. The most likely explanation is the rapid change in hormonal milieu that occurs within 24 hours of delivery, when concentrations of both oestrogen and progesterone decrease, which decreases the stimulation of prolactin producing lactotroph cells and oestrogen receptors on some prolactinomas.[6] After investigation of this patient's pituitary tumour, a conservative management policy was adopted. Prolactin levels were only modestly elevated. A much less likely pathological diagnosis in this case could be lymphocytic hypophysitis, which can only be definitively distinguished from a microadenoma by tissue biopsy, and which may also spontaneously regress after pregnancy.

Pregnancy with epilepsy is considered high risk mainly due to teratogenic potential of antiepileptic drugs and increased risk of adverse pregnancy and neonatal outcomes. The understanding of the interactions between anticonvulsant drug therapy, pregnancy and the growing fetus are a must for the anesthesiologist for proper anaesthetic management of a pregnant women posted for cesarean section for successful outcome.[9]

There are no definitive guidelines for the management of parturients with intracranial tumors. The preanaesthetic considerations are related to the endocrine and the tumour status. During the preanaesthetic evaluation, the size and location of the tumour and its effect on intracranial dynamics should be determined by preoperative MRI of brain. The main aim of the anaesthesiologist is smooth induction of anaesthesia by avoiding coughing, straining by maintaining patient in deeper plane of anaesthesia, avoiding hypo or hypertension. Intravenous induction of anaesthesia with either thiopentone or propofol may be used. It will produce a fall in ICP by lowering the cerebral metabolic rate ($CMRO_2$) and the cerebral blood flow (CBF).[10]

MANAGEMENT ISSUES: Marked increase in CSF pressure results from the pain of labour and the consequences of bearing down in the second stage of labour do. Epidural analgesia may eliminate the pain of labour but may lead to an increase in intracranial pressure with the injection of local anesthetic agent into the epidural space. Epidural anesthesia is therefore potentially hazardous for such patients. The risk of accidental dural puncture during the identification of the epidural space, though low in experienced hands, is another concern. Similarly, subarachnoid anesthesia could result in tentorial herniation consequent upon loss of CSF from the dural defect. The anesthetic plan should ensure overall maternal and fetal wellbeing, forestall fluctuations in ICP and maintain hemodynamic stability. At the same time, a sufficient depth of anesthesia and a rapid recovery are essential.[11,12] General anesthesia, adapted to specific management goals, was our choice for the surgical delivery of this patient.

Patients should be premedicated with ranitidine 50 mg I. V. to protect the patient against possible vomiting and aspiration.[3,13]

Thiopentone sodium is still the frequently used IV induction drug of choice in pregnancy for general anaesthesia and we chose it because of its coupling effect of decreased cerebral blood flow followed by decreased metabolic rate and thereby decreases intracranial pressure thus maintaining adequate cerebral perfusion pressure.[10,13,14]

Propofol was not used as the induction agent it is has a direct relaxing effect on the gravid uterus and also critically decreases cerebral perfusion pressure.[3]

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As succinyl choline is found to be associated with raised ICP,[13] we went for rocuronium as the muscle relaxant which produced an equally optimal intubating conditions within 60 seconds at a dose of 1. 2mg/kg without producing any significant elevation in ICP.

Oxygen 100% was administered initially during preoxygenation for 5 minutes and later after intubation, until extraction because it results in higher umbilical venous oxygen saturation and higher APGAR scores,[12,15,16] Patient was maintained in deeper planes of anaesthesia during C-section with 1% isoflurane while constantly monitoring the hemodynamic parameters.

Dexamethasone has been traditionally used to reduce cerebral edema.[3] It is safe to use in an acute setting and it is recommended in order to avoid seizures that may lead to maternal and fetal hypoxia and acidosis.

Fentanyl was used as the analgesic agent in our case in a dose of 2ug/kg immediately after the extraction of the child. As fentanyl easily crosses the placental barrier and takes longer time for metabolism it can produce profound neonatal respiratory depression. Hence it was administered after the child was delivered. The attenuation of airway reflexes at the time of laryngoscopy was brought about by maintaining a deeper planes of anesthesia with isoflurane and by administering Inj. Lidocaine 1. 5mg/kg 90 seconds prior to intubation and duration of laryngoscopy just 10 seconds.

Use of Dexmedetomidine has also very well been recommended in pregnant patients.[3] So we used Dexmedetomidine in the dose of 0. 6 micrograms per kg per minute

Oxytocin has been used in patients with intracranial tumours without any adverse effects. Ergotamine can cause hypertensive responses, which may increase the intracranial cranial pressure and can lead to haemorrhage.[3,5] It should be avoided in pregnant women with brain tumours.

Weighing the risks and benefits for treating seizures with anticonvulsants; It is recommended to use them in this setting to avoid seizures that may lead to maternal and foetal hypoxia and acidosis.[9]

CONCLUSION: Keeping in mind the safety requirements of both mother and the foetus, a close communication between the neurosurgeon, Anaesthesiologist, obstetrician and the patient is crucial. General anaesthesia with Thiopentone, Rocuronium, Fentanyl, Dexmedetomidine and titrated doses of Isoflurane were used in our study and were found to be safe.

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