

Awake Throughout Craniotomy: Initial Experience and the Anaesthetic Challenges

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ABSTRACT

Awake throughout technique for craniotomy demands very careful titration of drugs for sedation. It does not utilize any airway devices. The success depends on experience of anesthesiologist, good team work and meticulous planning. This is the first case of awake throughout craniotomy in our institute.

Keywords: Awake throughout, craniotomy, outcome

INTRODUCTION

The tumor of brain near or within the eloquent brain regions like motor and language cortex requires excision of tumor and at the same time preservation of the functional area. To achieve the second goal the awake craniotomy is being practiced where the aim is to make the patient awake during resection of tumor so that the motor and speech function can be constantly monitored. We present the anaesthetic management of a case of craniotomy for low grade oligodendroma in frontal region with the awake throughout technique.

CASE REPORT

A 34 year old lady of 65 kg presented with history of gradual onset of headache in frontal region associated with dizziness and nausea for three years. The patient also had history of generalized seizure with loss of consciousness six months back. The patients had no other co morbidities. No history suggestive of Obstructive sleep apnea. There were no significant past anesthetic exposure history. The patient had functional capacity of >4 METs. The patient was taking tablet Levetiracetam 500 mg in the

morning and 1000 mg in evening. The patient was co-operative , well oriented to Time , Place and Person without focal neurological deficit. On airway examination , there were no findings to suggest the difficult airway. All the routine laboratory examination were within normal limit. The MRI of brain showed the tumor in frontal region suggestive of oligodendroblastoma. The patient was planned for awake craniotomy.

The patient was assessed by the anaesthesiologist in Pre anaesthetic check up room with extra focus on location and vascularity of tumor, patient cooperation and airway examination. The patient was then explained the plan especially the awareness during the surgery and its importance and consequences . The patient was also told that she would require to move her right hand and leg on command during surgery. The patient was then taken to operation theatre and placed in supine position. The ECG, SpO₂ , invasive blood pressure were monitored. The oxygen was delivered by face mask at 5 lit/min. Iv Ondansetron 4 mg was given for prevention of nausea and vomiting. The Iv loading dose of Dexmedetomidine was given at 1mcg/kg over 10 min with heart rate constantly monitoring.



Figure 1: Patient under sedation for awake throughout craniotomy

Iv bolus dose of Fentanyl 50mcg was also given followed by 50 mcg/hr of infusion . The bilateral scalp block was performed using 40ml of 0.25% Bupivacaine . Iv Paracetamol 1 gm was given as part of multimodal analgesia. The anaesthesiologist sitting was arranged so that he could see and communicate with patient. The sterile draping used did not cover the face of patient. The Dexeditomidine infusion and Propofol infusion was started and titrated to achieve Ramsay sedation scale of 4 .The infusion of Dexmedetomidine ranged from 0.3 to 0.7mcg/kg/hr and Propofol from 50 to 75mcg/kg/min. Beside the above monitoring the patient chest movement and signs of airway obstruction was constantly monitored. When the surgeon was ready for tumor resection all the infusion were stopped except for Fentanyl infusion. After 15 minutes the patient responded to verbal command and stated moving the right feet and hand as per the command. The surgeon proceeded with resection .The resection was stopped when there was decrease in movement of right feet. When the decision was made for stopping of further resection the Dexmedetomidine and Propofol infusion were re-started. The whole process was uneventful except for few episodes for hypotension which was managed by Iv fluids and vasopressors. For

the adequacy of the ventilation the visual signs were used and after three hours of sedation ABG was done, which showed paO_2 of 125 mmHg and pCO_2 of 35mm Hg. The second ABG after next three hour at the end showed pCO_2 of 42 mmhg. The patient was fully conscious and maintain airway on her own and shifted to Post operative ward. The patient had no neurological deficit on discharge.

DISCUSSION

The awake craniotomy is the technique where the patients are awakened during the surgical procedure. The careful patient selection is the key to successful procedure. The patient has to be not only physically fit but also psychologically. The patient co operation during the procedure is very important . Patient refusal is the absolute contraindication. The other relative contraindications are obstructive sleep apnea, cough.¹

There are two anaesthetic techniques ²

1. Awake throughout: The spontaneous ventilation is maintained without any airway device and sedation is titrated .
2. Asleep/awake/asleep: The airway is controlled with supraglottic device and removed during awake period and again used . Here general anaesthesia is utilized except during awake period .

The second technique was already utilized in our institute ³ so we decided to perform awake throughout for first time in our institute.

The local anaesthesia in the form of scalp block ⁴ is usually given for analgesia and hemodynamic stability. The local anaesthetic of choice is that with long duration of action. One must be careful not to exceed recommended maximum dose while preparing the solution. The anaesthetic agents used for the procedure are fentanyl, remifentanyl, propofol. The use of Dexmedetomidine is on rise due to its analgesic property, sedation without causing respiratory depression .⁵

The awake throughout technique demand very careful titration of sedation. Oversedation

causes airway obstruction leading to hypoxia, hypercarbia ultimately leading to raised intracranial pressure. Undersedation may cause anxiety and patient becoming violent. The challenges in awake phase are hypertension, emergence agitation, somnolence, nausea, vomiting.¹

The potential life threatening complications are seizures and airway obstruction. The incidence of seizures vary from 3% to 16% , fortunately most of the seizure can be controlled by irrigation of cortex with ice cold crystalloid solution. The management of airway is very challenging and mainly due to limited access to patient from head side. Different intubation positions like ice pick, inverse, clawhammer, face to face have been described in literatures. Face to face intubation with Airtraq device was found to be faster and better Cormack Lehane grading in one of the study.⁶ In one of the retrospective analysis of failed craniotomy loading dose of Phenytoin was associated with intraoperative communication difficulties.⁷

Some sort of end tidal CO₂ monitoring like sampling channel integrated to nasal cannula would be of great help for early detection in increase in CO₂. The Bispectral index electrode placement in post auricular area is alternative to frontal area in case of frontal craniotomy & for titration of drugs during sedation.

CONCLUSION

The success of awake craniotomy depends

on careful patient selection , meticulous planning, paying attention to minute details and good team work with surgeons also.

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