Anesthesia for Awake Craniotomy: A Retrospective Study of 54 Cases

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ABSTRACT

TITLE: Anesthesia for awake craniotomy: A retrospective study of 54 cases

BACKGROUND: Awake craniotomy allows intraoperative neurophysiological testing during resection of lesions located near the eloquent areas of brain. The anesthetic challenge is to maintain adequate sedation, analgesia, respiratory and hemodynamic stability in an awake and comfortable patient who should be able to co-operate during intraoperative neurophysiological assessment.

OBJECTIVE: To review and analyse the anesthetic management, perioperative complications and outcome at discharge in patients undergoing awake craniotomy at our Institute

METHODS: After obtaining the approval from Institute Ethics Committee, medical records of 54 patients who underwent awake craniotomy over a period of ten years were reviewed, retrospectively. Data regarding anesthetic management, intraoperative complications and postoperative course were recorded.

RESULTS: The mean age of the patients was 36.1±14.3 y (range 17-72 y) with 80% of them being males. Most of the lesions were located in left side (67%). Malappattu grade III/IV injury was present in 6 (11.1%) patients. Propofol+fentanyl (81.5%) and dexmedetomidine (18.5%) were the main agents used for providing conscious sedation. Hypertension (16.7%) was the most common intraoperative complication. The procedure had to be converted to general anesthesia (GA) in one patient owing to refractory brain bulge. The incidence of respiratory and hemodynamic complications were comparable in both groups (p>0.05) but there was less incidence of intraoperative seizures in patients belonging to propofol group (p=0.03). Three patients (6%) developed dysesthesia and 7 (13%) patients had seizures during postoperative period.

CONCLUSIONS: Conscious sedation was the technique of choice for awake craniotomy, at our Institute. Although propofol group presented with less incidence of intraoperative seizure as compared to dexmedetomidine, the respiratory and hemodynamic complications were comparable in between the two groups.

BACKGROUND

Awake craniotomy is a procedure where the patient remains awake during whole or part of the operation.

Advantage: Allows intraoperative neurophysiological testing during resection of lesions near the eloquent areas of cortex.

Anesthetic challenges: Maintenance of adequate sedation, analgesia, respiratory and hemodynamic stability in an awake patient who should be able to co-operate during intraoperative neurophysiological assessment.

Essential aspects: Proper selection of patient, provision of comfortability, and good communication

Despite adequate measures adverse perioperative events may occur

OBJECTIVE

To review and analyze the anesthetic management, perioperative complications, and outcome at discharge in patients undergoing awake craniotomy, at our Institution

METHODS

Institute Ethics Committee approval obtained

Retrospective study

Duration: Ten years (Jan 2001 to Dec 2010)

Medical records of patients who underwent awake craniotomy for intracranial lesions were reviewed

Data on anaesthetic management, perioperative complications and outcome at discharge were collected

Anesthetic Technique

In the operating room:

- Standard monitors (EKG, SpO2, NIBP) connected
- CO2 by nasal cannula with ETCO2 monitoring
- Arterial cannulation with local anaesthetic infiltration
- Regional Scalp Block: Bupivacaine 0.25-0.5%

- Monitored Anesthesia Care (Conscious Sedation)
  - Fentanyl: 0.25-1.5 µg/kg/h
  - Propofol: 25-200 µg/kg/h
  - Dexmedetomidine: 10 µg/kg/h over 10 min (bolus) followed by 0.2-0.7 µg/kg/h (maintenance)

RESULTS

Total number of patients underwent awake craniotomy: 54

Propofol + Fentanyl: 82%; Dexmedetomidine: 18%

Malappattu grade III/IV: 6 (11.1%) patients

Hypertension (16.7%): most common I/O complication

One patient had to be converted to GA: I/O brain bulge

Demographic Data

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>Mean ± SD (Range) / No. (%)</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>61.4 ± 11.2 (45-98)</td>
</tr>
<tr>
<td>ASA Physical Status*</td>
<td>1</td>
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<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Laterality of Lesions Right</td>
<td>18 (33%)</td>
</tr>
<tr>
<td></td>
<td>Left</td>
</tr>
<tr>
<td>Recurrent Tumour</td>
<td>2 (3.7%)</td>
</tr>
<tr>
<td>Duration of Surgery (min) ICU Stay (days)</td>
<td>268 ± 45.7 (165-390)</td>
</tr>
<tr>
<td></td>
<td>Hospital Stay (days)</td>
</tr>
</tbody>
</table>

Complications

- Intracranial Hemorrhage: 1/54
- Epileptic Seizures: 7/54
- Postoperative Seizures: 1/54

CONCLUSIONS

- Conscious sedation is the technique of choice for awake craniotomy, at our Institute.
- Patients receiving propofol sedation presented with less incidence of I/O seizure as compared to dexmedetomidine.
- Respiratory and hemodynamic complications were comparable in between these two groups.
- Appropriate selection of patients, understanding the procedure, and judicious use of sedatives and anesthetics are key to smooth conduct of awake craniotomy.

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