

Background and Objectives: Additional dose of anticonvulsants are administered during supratentorial craniotomy. It has impact on recovery time, haemodynamics and depth of anaesthesia. Our study compared the recovery time in patients who received additional anticonvulsant with those who received the regular dose during craniotomy. **Patient and Methods:** After the Institutional Review Board approval, the study was carried out in 36 patients who underwent supratentorial craniotomy. Patients were divided into two groups; Group 1: Regular dose, Group 2: Additional dose. Patients were anaesthetised using standard anaesthesia protocol. Anticonvulsant was administered during craniotomy, and the haemodynamics and changes in bispectral index were noted during and 1 h after administration of the anticonvulsant. Plasma anticonvulsant levels were measured before and after craniotomy. Extubation time, time to open eyes, obeys commands and orientations were noted. Patients were followed up for 48 h to note the occurrence of seizures. **Results:** Of 36 patients, 19 patients received regular dose; 17 received an additional dose. Age, sex, weight, tumour location and tumour pathology, dose of propofol, fentanyl administered were comparable between the two groups. There was no significant difference in recovery time between the two groups as they were analysed as additional versus regular dose. However, the subgroup analysis showed significant delay in recovery especially, time to obey commands (>15 min) and time to get orientation (>1 h) in patients who received additional dose of phenytoin. Although these differences looked clinically very significant, it was not statistically significant because of smaller sample size. Plasma anticonvulsant levels had significantly dropped in patients who received regular dose ($P=0.004$). There was a positive correlation between intravenous fluid administered and drop in plasma anticonvulsant level. Five patients had post-operative seizures, of which four had pre-operative seizure. There was no correlation with post-operative plasma anticonvulsant levels and occurrence of post-operative seizures. **Conclusion:** Administration of additional dose of phenytoin causes delays the recovery and causes haemodynamic fluctuations. Administration of additional dose of sodium valproate did not affect either the recovery time or the haemodynamics. The presence of pre-operative seizures is one of the significant risk factors for developing post-operative seizure. Due to the small sample size, it is very difficult to comment on the occurrence of post-operative seizures and the plasma anticonvulsant level. This warrants larger randomised control trials to see the correlation statistically.

ISNACC-S-09

Quantitative analysis of changes in cerebral oxygenation during induction of anaesthesia and in different positions in spine surgery using near-infrared spectroscopy

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Background: The primary goal in the haemodynamic management of patients undergoing surgery is to preserve adequate oxygen delivery. Techniques to monitor cerebral oxygen status would be especially useful for patients who are at increased risk for cerebral ischaemia in specific surgical procedures, pathophysiological conditions or positions. Near-infrared spectroscopy (NIRS) is a non-invasive, bedside monitor that provides reliable and real-time data of cerebral oxygenation (rSO_2) by integrating arterial, venous and capillary blood within the field of view. We conducted a prospective observational study to evaluate the changes in rSO_2 at anaesthesia induction and in different positions in patients undergoing spine surgery using NIRS. **Methods and Materials:** Thirty-two patients undergoing spine surgery in prone position were studied using NIRS. Cerebral tissue oxygenation was measured in various positions at different fixed time intervals before and after induction of anaesthesia. Haemodynamic parameters were also noted and appropriate statistical methods used to find a correlation between rSO_2 measured by NIRS and haemodynamic parameters at various intervals and positions. **Results:** Significant difference in NIRS values was observed on either side (left - 69.19, right - 67.81). We observed a 7% increase in NIRS values after pre-oxygenation. There was a significant decrease in NIRS values at 5 min after induction on placing the patient in reverse trendelenburg and prone positions as compared to supine position. On evaluating NIRS values over a period after prone positioning, we found a significant decrease at 60 min as compared to baseline (4.8% on left and 4.3% on right). Change in NIRS also had a significant correlation with change in heart rate, oxygen saturation and mean arterial pressure. **Conclusion:** Maintaining rSO_2 during surgery and anaesthesia is of paramount importance. It is clear from our study that rSO_2 significantly reduces when the patient is placed in prone position. Change in NIRS needs to be observed in long duration surgeries before it is directly correlated with duration of surgery in certain positions.

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Effect of stellate ganglion block in cerebral vasospasm as assessed by digital subtraction angiography

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Background: Cerebral vasospasm is defined as a delayed but reversible narrowing of the cerebral blood vessels. Stellate ganglion block (SGB) causes sympathetic denervation, which may lead to dilatation of intracerebral vessels and an improvement in cerebral blood flow. Our study assessed the efficacy of ultrasound guided SGB in relieving symptomatic cerebral vasospasm following aneurysmal clipping using digital subtraction angiography (DSA) technology. **Materials and Methods:** Twenty patients who underwent clipping for cerebral aneurysm and developed cerebral vasospasm later were included in the study. DSA was performed. Vasospasm was classified with respect to diameter at the mid A1 and mid M1 segment of anterior cerebral artery (ACA) and middle cerebral artery (MCA) respectively. Location of vasospasm, parenchymal filling, and venous sinus filling time were calculated. Ultrasound guided SGB was given using 10 ml of 0.5% injection bupivacaine on the same side of vasospasm or the side contralateral to the deficit. The neurological condition and DSA parameters were reassessed after 30 min. **Results:** Five patients had neurological improvement; among these, four patients had vasospasm involving a single vessel. The mean vessel diameter measured at the mid A1 segment of ACA ($P = 0.002$) and mid M1 segment of MCA ($P = 0.003$) increased significantly. Twelve patients had an increase in vessel diameter. Vasospasm grade improved in three patients. The mean parenchymal filling time and mean venous sinus filling time did not decrease significantly after SGB ($P = 0.163/0.104$ respectively). **Conclusion:** Our study shows that SGB results in improvement in vessel diameter of large cerebral blood vessels. It had no impact on the cerebral microvasculature as evidenced by lack of significant changes in parenchymal filling time and venous sinus filling time. Thus, SGB has a limited role in management of patients with cerebral vasospasm.

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Anaesthetic considerations for intraoperative neurophysiological monitoring in neurosurgical cases

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Introduction: Intraoperative neurophysiological monitoring (IONM) is the standard of care for a wide range of surgeries where neurological insult is anticipated. The choice of anaesthesia depends on the signals being monitored, patient's comorbidities and the intraoperative course of physiological parameters. We report here a retrospective case series to highlight the

anaesthetic considerations in various neurosurgeries. **Methods:** We reviewed all neurosurgical cases ($n = 43$) which required IONM in the last 3 months (since the inception of IONM services in our hospital). This included cerebellopontine angle tumours ($n = 15$), compressive spinal cord myelopathies ($n = 10$), spinal cord tumours ($n = 4$), tumours of caudaequina ($n = 3$), brain tumours in the vicinity of speech area ($n = 4$), brain tumours in the vicinity of motor area ($n = 3$), sellar-parasellar tumours ($n = 2$), trigeminal neuralgia ($n = 1$) and spinal nerve root tumour ($n = 1$). Various neurophysiological techniques used in these cases for neuromonitoring included transcranial electrical motor evoked potentials (MEPs), somatosensory evoked potentials (SSEPs), free-run and triggered electromyography (EMG), direct cranial and peripheral nerve stimulation, motor mapping, language mapping, bulb cavernous reflex testing, raw and processed electroencephalography (EEG). In cases requiring MEPs and SSEPs, we used total intravenous anaesthesia and avoided relaxants. Soft bite block helped avoid tongue bites. In cases where EMG alone was monitored, only muscle relaxants had to be avoided and inhalational agents could be used. Awake craniotomy under local anaesthesia with an 'asleep-awake-asleep' technique was used for language mapping. Systemic blood pressure and core body temperature also had to be maintained for optimal neurophysiologic signals. EEG and bispectral index monitoring were used to assess the depth of anaesthesia. **Results:** By customising anaesthesia according to neurophysiological requirements, we achieved good baseline monitor ability in 42/43 cases (one patient had severe neurological deficit that baseline signals could not be recorded). Monitoring was successful in all 42 cases except one (monitoring had to be discontinued in a case, as inhalational agent was kept above 0.5 minimum alveolar concentration). **Conclusion:** Good signal acquisition for a reliable neuromonitoring is teamwork between neurosurgeons, surgical neurophysiologists and anaesthesiologists. Inhaled anaesthetics are to be used frugally/not at all, in cases requiring MEP monitoring.

ISNACC-S-12

Comparison of awake endotracheal intubation using intubating laryngeal mask airway and fibreoptic bronchoscope in patients with unstable cervical spine

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Background: Anaesthetists often encounter patients at their initial resuscitation phase after acute spinal cord injury. Therefore, they are ideally placed to influence