Table 1: Overall trends of change in parameters across time points

Parameter	Preincision	Postincision	Precraniotomy	Beginn craniotomy	End craniotomy	Postcraniotomy	Postdurectomy	Postdecompression	P
CI	4.3±1.3	4.3±1.2	4.1±1.3	3.9±1.6	3.6±1.5	3.6±1.1	3.8±1.3	3.7±1.1	0.008
SVI	48.2±10.7	47.4±10.6	46±12.7	42.8±16.4	41.3±15.5	42.9±12.7	44.8±14.8	42.7±12.9	0.291
SVV	9.3±3.6	8.7±3.8	8.3±2.7	9.1±5	10.9±4.4	10.3±4.7	6.4±2.2	10.1±5.3	0.026
SVRI	1610±584	1867±755	1818±851	2202±1317	2165±1198	1767±575	1537±470	1583±664	0.052
PR	89.1±18.8	91.9±18.9	90.3±18.6	92.3±18.7	88.9±19.5	87.8±19.6	85.6±17.9	89±16.7	0.068
MAP	90.9±14	100.1±16.2	91.7±13.9	97.9±12.6	91.5±17.8	84.2±13.8	79.6±13.6	79.5±12.4	<0.001

CI: Cardiac index, SVI: Stroke volume index, PR: Pulse rate, MAP: Mean arterial pressure, SVRI: Systemic vascular resistance index, SVV: Stroke volume variation

craniotomy and increased after durotomy significantly. Stroke volume variation (SVV) increased during craniotomy and decreased after durotomy significantly. MAP increased at beginning of craniotomy and decreased significantly after durotomy. SVRI and SVI decreased, PR increased during craniotomy but was not statistically significant. **Discussion:** Decrease in CI, increase in SVV and SVRI, not associated with change in PR or MAP occurred in the pericraniotomy period due to blood loss during craniotomy. The increase in CI and fall in SVRI and MAP after durotomy may be the result of loss of sympathetic tone. Advanced haemodynamic monitoring might be useful and provide better understanding of pressure and flow changes in patients undergoing surgery for head injury.

ISNACC-S-31

Comparison of changes in central venous oxygen saturation and ST segment changes in a V lead electrocardiographic with changes in haemoglobin in neurosurgical patients undergoing craniotomy and tumour excision: A prospective observational study

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Background: The aim of the study was to observe the trends in central venous oxygen saturation (ScvO₂) and ST segment changes with change in haemoglobin (Hb) in patients undergoing acute blood loss during surgery and assess their role as blood transfusion trigger. **Methods:** Seventy-seven consecutive patients undergoing craniotomy were recruited for this study at a tertiary care institution after obtaining written, informed consent. After establishing standard monitoring,

anaesthesia was induced with standard anaesthetic protocol. Central venous cannulation was performed either in the subclavian or internal jugular vein with electrocardiogram guidance to confirm the position of the catheter tip at the superior vena cava-right atrial junction. ScvO₂ was checked at baseline, before and after blood transfusion and at the end of the procedure. ST changes were also recorded at the above times. Comparison of the mean and standard deviation for the haemodynamic parameters was performed between the transfused and not transfused patient groups. Pearson correlation test was done to assess the correlation between the covariates. Receiver operating characteristic (ROC) curve was constructed for the ScvO₂ variable, which was used as a transfusion trigger and the cut-off value at 100% sensitivity and 75% specificity was constructed. Linear regression analysis was done between the change in Hb and the change in ScvO₂ and change in Hb and change in the ST segment. **Results:** There was a statistically significant positive correlation between the change in ScvO₂ and change in Hb during acute blood loss with a regression coefficient of 0.8 and also between change in ST segment and Hb with a regression coefficient of -0.132. The ROC curve showed a ScvO₂ cut off of 64.5% with a 100% sensitivity and 75% specificity with area under curve of 0.896 for blood transfusion requirement. **Conclusions:** We conclude that ScvO₂ and ST segment changes may be considered as physiological transfusion triggers in patients requiring blood transfusion in the intraoperative period.

ISNACC-S-32

Retrospective analysis of airway management, intraoperative haemodynamics and post-operative complications in patients with atlantoaxial dislocation

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Background: Atlantoaxial dislocation (AAD) is highly unstable and usually fatal injury resulting from osseoligamentous disruption between the C1 and C2 vertebrae, it is at high risk of life-threatening neurological injury so cervical spine management is essential, manual in-line stabilisation is used to decrease cervical spine injury. The major difficulty encountered is that of airway management. Intraoperative management should focus on maintaining adequate perfusion pressure and oxygenation of spinal cord. This study is to provide an update on airway management, intraoperative haemodynamics and post-operative complications in patients of AAD. **Methodology:** After Ethics Committee approval, we retrospectively analysed 105 patients operated for AAD at Neurosurgery Department of K.E.M. Hospital, Mumbai from March 2012 to March 2015. Difficult intubations were evaluated on basis of all 3 = MPC-III or IV, sternomental distance = <12.5 cm, mouth opening = <3 fingers. AirTraq, McGrath, Macintosh, McCoy, intubating laryngeal mask airway (ILMA) were compared, intraoperative haemodynamics and post-operative complications were analysed. **Results:** After analysis of data, 38 (36.2%) patients were difficult and 67 (63.8%) were not difficult intubations. 7 (6.67%) patients were intubated with AirTraq, 2 (1.90%) McGrath, 69 (65.71%) Macintosh, 13 (12.38%) McCoy, 14 (13.33%) ILMA, respectively. Successful intubation in first attempt among total was = AirTraq 6 (85.7%), McGrath 2 (100%), Macintosh 35 (50.7%), McCoy 4 (30.8%), ILMA 7 (50%). Moreover, among difficult intubation were = AirTraq 2 (66.7%), McGrath 2 (100%), Macintosh 5 (22.7%), McCoy 0 (0%), ILMA 2 (40%). Intubation requiring more than two attempts = AirTraq 1 (33.3%), McGrath 0 (0%), Macintosh 13 (59.1%), McCoy 5 (83.3%), ILMA 1 (20%). Major blood loss (>1500 ml) was in 24 (22.86%) patients. Five patients had bradycardia and hypotension intraoperatively, 3 of them had major blood loss. Four were recurrent AAD, 3 with rheumatoid arthritis, 2 with Down's syndrome. Post-operatively, 4 patients were neurologically same and 2 were deteriorated. Post-operative mortality recorded in 5 patients, of which 3 had major blood loss and 2 were pre-operatively bad (power = 0). **Discussion:** Indirect laryngoscopy - McGrath and AirTraq were better than other intubation techniques. Major blood loss had higher incidence of post-operative ventilator support and mortality. No overall correlation between post-operative ventilatory support and neurological deterioration with intubation technique. Being retrospective, missing data are major limitation Awake fiberoptic bronchoscope was not used for intubation.

ISNACC-S-33

Effects of 20% mannitol and 3% hypertonic saline on intracranial pressure and systemic haemodynamics

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Background: Mannitol and different osmolar strengths of hypertonic saline (HTS) have been studied in patients with diverse brain pathologies for intraoperative brain relaxation. However, none of the study was carried out simultaneous measurement of intracranial pressure (ICP) and systemic haemodynamics with equiosmolar solution. **Methodology:** Forty adult patients scheduled to undergo elective craniotomy for supratentorial tumours were enrolled for a prospective, randomised, double-blinded study. After standard anaesthesia, cardiac indices were measured non-invasively using Vigileo monitor. The Codman catheter was inserted into the subdural space via first burr-hole. Patients were randomised to receive equiosmolar hypertonic solutions of either 20% mannitol (5 ml/kg) or 3% HTS (5.35 ml/kg) over a period of 15 min. The time of placement of ICP catheter was marked as T₀, and baseline ICP and systemic haemodynamic variables were noted; followed by recording every 5 min till 45 min. **Results:** Both mannitol and HTS showed significant but comparable reduction in ICP. Transient increase in sodium and chloride was seen in HTS group while decrease in sodium and chloride and increased potassium and blood lactate levels were noticed in mannitol group. Urine output was significantly higher in mannitol group. The perioperative complications, overall hospital stay and Glasgow outcome score at

Figure 1: Comparative trends of mean arterial pressure, intracranial pressure and cerebral perfusion pressure between the two groups

MAP: Mean arterial pressure, ICP: Intracranial pressure, CPP: Cerebral perfusion pressure, CPP=MAP - ICP; HS: Hypertonic saline group; M: Mannitol group. *Significant statistical difference ($P < 0.05$) in ICP values at 15 and 20 min; Fall in MAP in initial 15 min and rise in CPP after 15 min in both the groups.