Background: Resection of brain tumours has been associated with increased blood loss and blood transfusion. Achieving proper haemostasis forms one of the most important intraoperative goals in such surgeries. Tranexamic acid has been used to reduce blood loss in various settings, but its efficacy and use in neurosurgery is very limited. The purpose of this randomised, double-blinded, placebo-controlled, parallel trial was to evaluate the efficacy of Tranexamic acid on blood loss and quality of surgical field in meningioma resection surgeries. **Materials and Methods:** 30 patients, aged 18–65 years undergoing elective meningioma resection surgeries were included in the study. They received either Tranexamic acid or placebo at a loading dose of 25 mg/kg and infusion of 1 mg/kg/hr during surgery. The intraoperative blood loss was measured. The surgical field was assessed by the surgeon using 5-point Likert scale. **Results:** The patients who received Tranexamic acid had significantly less blood loss compared to the placebo group (616.42 ± 393.42 vs 1150.02 ± 416.1 , $P = 0.02$), which accounted for 46.43% reduction in blood loss. It also reduces the intraoperative blood transfusion requirement (0 vs 6, $P = 0.0016$). The quality of the surgical field was significantly better in the Tranexamic acid group with a median score 4 compared to 2 in placebo group ($P < 0.001$). The blood collected in closed suction drain 24 hours post surgery was less in the Tranexamic acid group compared to placebo group (84.7 ± 50.4 vs 127.6 ± 62.2 , $P = 0.047$). **Conclusion:** Tranexamic acid reduces perioperative blood loss and transfusion requirement with improved surgical field in patients undergoing meningioma resection surgeries.

Post-operative cerebral vasospasm prophylaxis using hypertensive therapy alone in cerebral aneurysm clipping: Our experience at KIMS

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Background: To discuss the institutional experience in the management of post operative vasospasm in cerebral aneurysms using hypertensive therapy. **Materials and Methods:** It is a retrospective descriptive study done in patients with cerebral aneurysms who were managed by surgery at KIMS hospital between Jan 2009 to Oct 2014. Totally 200 patients are included in this study. **Results:** As per the age distribution there were 39 patients with age < 40 yrs, 52 aged 40–49 yrs, 58 aged 50–59 yrs, 39 aged 60–69 yrs and 12 aged > 70 yrs. As per WFNS grading criteria 106 patients were Gr I, 52 were Gr II, 20 were

Gr III, 17 were Gr IV and 5 were Gr V. 178 patient had ruptured aneurysm and 22 patient were with un-ruptured aneurysm. Of the 200 patients 61 patient developed post op vasospasm requiring treatment with Papaverine through intra-operatively placed reservoir. Of this 61 patients 10 patients had vasospasm during 1–2 days, 33 during 3–4 days, 13 during 5–10 days, 2 during 11–15 days 1 during 15–20 days and 2 patients developed vasospasm after 20 days post ictus respectively. **Conclusions:** Using only hypertensive therapy as prophylaxis for post op vasospasm 61 patients of the total 200 developed vasospasm, and 48 patients had vasospasm during 3rd to 15th day post ictus. To conclude the incidence of cerebral aneurysm is more common in females after 50 years. Most are ruptured status with WFNS Gr I. Prophylactic administration of Hypertensive therapy alone can decrease the incidence of post op vasospasm 30.5% in our study when compared to conventional use of triple H therapy where the incidence in various trials is inconclusive.

Attenuating emergence response: Fentanyl or dexmedetomidine, which is better?

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Background: Fentanyl is often used to attenuate the emergence haemodynamic response following general anaesthesia which when untreated could cause post-craniotomy intracranial haematoma. We compared dexmedetomidine with fentanyl and placebo, for attenuating haemodynamic response during emergence and extubation. **Materials and Methods:** One hundred fifty ASA grade I and II normotensive patients, aged 18–55 years undergoing elective surgeries under general anaesthesia were randomized into 3 groups. Ten minutes prior to extubation, patients received intravenous bolus infusion of saline 0.9%, fentanyl 1 µg/kg and dexmedetomidine 1 µg/kg respectively over 10 minutes period. Heart rate (HR), blood pressures, extubation quality (5-point scale), sedation and recovery scores were recorded at regular intervals. Rescue drugs used were noted. **Results:** At extubation, HR increased by $49 \pm 19\%$ with saline compared to $27 \pm 14\%$ with fentanyl and $15 \pm 15\%$ with dexmedetomidine ($P < 0.001$). Systolic blood pressure increased by $43 \pm 13\%$ with saline compared to $23 \pm 13\%$ with fentanyl and $16 \pm 14\%$ with dexmedetomidine ($P < 0.001$). Hypertensive response (>30% increase from baseline) was seen in 86%, 18% and 6% of patients ($P < 0.001$) for a duration of 15 ± 14 minutes, 4 ± 2 minutes and 6 ± 5 minutes with saline, fentanyl and dexmedetomidine

respectively. Extubation quality (scale-1) was superior with dexmedetomidine (54%) than fentanyl (16%) and saline (0%). Rescue drugs were used more often in saline group (34%) than fentanyl group (2%) and dexmedetomidine group (0%). Sedation and recovery scores at 30 min post-extubation were similar among the groups. **Conclusion:** Compared to saline, dexmedetomidine was superior to fentanyl in attenuating haemodynamic responses during emergence and quality of extubation, with similar sedation and recovery profile.

Study of pattern of perioperative ECG and echocardiographic changes in the patients with aneurysmal subarachnoid haemorrhage

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Background: The objectives of the study were: *Primary:* Perioperative pattern of Electrocardiography (ECG) and Echocardiographic (Echo) changes till seven days following surgical clipping. *Secondary:* i) Incidence of ECG and Echo Changes following aneurysm rupture. ii) Association of ECG and Echo Changes with Clinical Grades, time elapse from Ictus to hospital admission, site of bleed and location of aneurysm. iii) Association of ECG and echo changes with intraoperative ionotropic requirement. **Materials and Methods:** This prospective, observational study was conducted in the patients undergoing clipping with subarachnoid hemorrhage (SAH) secondary to aneurysm rupture. Patients with known cardiac disease and unfit for surgery, were excluded from the study. Baseline parameters, such as, Blood Pressure, Heart Rate, ECG, Echo; Hunt and Hess, WFNS and Fisher's Scores were recorded. ECG and Echo changes were recorded preoperatively and till seven days following surgery. Serum electrolytes were kept within the normal range. **Results:** 100 patients were enrolled. 75 patients developed ECG Changes and 17 patients developed Echo changes preoperatively, including global hypokinesias and RWMA. Various ECG observed were QTc prolongation, conduction defects, ST and T wave abnormalities, tachyarrhythmias and bradyarrhythmias. Both echocardiographic and ECG changes, such as, QTc prolongation and bradycardia showed significant recovery on postoperative day-1 and 2 ($P < 0.05$). Other ECG changes did not show significant recovery during study period. We did not find association between ECG and echo changes. ECG changes were not associated with increased intraoperative ionotropic requirement but patients

with Echo changes were found to have significant high ionotropic requirement. None of the patients had perioperative cardiogenic shock. **Conclusion:** Early therapeutic intervention can hasten the recovery of these changes by taking care of intracranial pathology. ECG and Echo changes were not associated with clinical grades, time elapse between ictus and admission, location of aneurysm or bleed.

Objective monitoring of intraoperative nociception in neurosurgical patients. A preliminary study and analysis

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Background: Pain during neurosurgery is associated with various haemodynamic changes and adverse effects. Identification of pain and its effective management is important. Careful titration of analgesics is also required to prevent interference with the neurological assessment postoperatively. A new monitor Analgesia Nociceptive Index monitor (ANI); Metrodoloris, France) may provide objective information about the degree of pain noninvasively. The basic principle involves the influence of respiration on parasympathetic component of heart rate variability. **Materials and Methods:** The primary aim of the study was the validation of ANI against standard haemodynamic variables. The secondary aim of our study was to compare the analgesic requirements in patients undergoing spine surgery with those undergoing craniotomy. The adequacy of analgesics intra-operatively was monitored with ANI monitor. Therefore in our study, intra-operative nociception was monitored using ANI and analgesics were administered as and when ANI values fell below 60. Patients aged 18 to 60 years, undergoing craniotomy and patients undergoing lumbar laminectomy and discectomy were recruited. Intraoperative monitoring included standard anaesthesia monitoring, ENTROPY (RE/SE) and ANI. **Results:** 21 patients undergoing craniotomy for various lesions and 11 lumbar PIVD patients undergoing laminectomy were included. HR, MAP increased and ANI decreased with each noxious stimuli. HR and MAP are commonly used to monitor pain intra-operatively. ANI monitor may help us in identification of the cause of change in HR and MAP. **Conclusion:** ANI monitor identifies pain with as much sensitivity as hemodynamic variables. It is definitely superior to SE and RE as monitor of intensity of pain. Change in ANI values parallel the changes in haemodynamics during painful stimulation.