

ORAL PRESENTATIONS

01

A comparative study of the microbial and clinical outcome of antimicrobial surface treated central venous catheters exchanged over the guide wire versus newly inserted catheters

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Objectives: (1) To compare the risk of line colonization with pathogens and/or catheter associated bloodstream infection when such surface treated central venous catheters (CVC's) are inserted by guide wire exchange versus newly inserted CVC's. (2) To compare the intensive care unit (ICU) stay. (3) Mortality rates between both groups. **Materials and Methods:** This is a prospective randomized controlled study where a cohort of 20 consecutive patients were studied with guide wire exchange and site matched control cohort of 20 patients with newly inserted catheters were studied in an ICU. Patients above the age of 18 years, hemodynamically stable with informed consent were included. Exclusion was of patients with shock (vasopressor dependence) requiring continued infusion of vasopressors which could not be maintained during wire exchange of the line and patients with a new CVC inserted within 72 h of an exchange in the presence of suspected CVC infection. **Results:** Patients having guide wire exchanged catheters and newly inserted ones were similar for mean age (58.7 vs. 62.2 years), gender ([60.7%] female vs. [60.5%] male in both groups) and illness severity on admission (mean acute physiology and chronic health evaluation III: 71.3 vs. 72.2). However, guide wire exchanged patients had longer median ICU length of stay (12.2 vs. 4.4 days; $P < 0.001$). There was no significant difference with regard to the number of CVC tips with bacterial or fungal pathogen colonization among guide wire exchange CVC's versus. Newly inserted CVC's (5 [2.5%] vs. 6 [7.4%]; $P = 0.90$). Catheter-associated blood stream infection's occurred in 2 (1.4%) with wire exchange compared with 3 (1.8%) newly inserted ones ($P = 0.75$). There was no significant difference in hospital mortality (35 [24.1%] vs. 48 [29.4%]; $P = 0.29$). **Conclusions:** Guide wire exchange and newly inserted CVC's had similar rates of tip colonization at removal, catheter associated blood stream infections and mortality. If the CVC removed by wire exchange is colonized, a new CVC must then be inserted at another site. In selected ICU patients at higher central vein puncture risk receiving antimicrobial surface treated CVC's wire exchange may be an acceptable initial approach to line insertion.

02

Complications of tube thoracostomy in trauma

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Objective: The aim is to evaluate the complication rate associated with intercostal chest drain insertion in trauma patients at a UK major trauma center and implement a quality improvement program to limit iatrogenic harm and improve patient care. **Materials and Methods:** North Bristol NHS Trust went "live" as the major trauma center for the Severn region in April 2012. During the period between August and September 2012, four patients were admitted to the intensive care unit (ICU) at Frenchay Hospital following major trauma were noted to have had complications as a result of intercostal chest drain insertion. Following individual case reviews at critical care and trauma clinical governance meetings a "significant event audit" was undertaken to examine complications associated with the insertion of all intercostal

chest drains in trauma patients. Details of all intercostal chest drain insertions in trauma patients undertaken in the Emergency Department or ICU between April 2012 and September 2012 were retrospectively collected utilizing the medical coding database. A further search was undertaken utilizing the Trauma Audit Research Network database. Patient notes and all radiology images and reports were reviewed to ascertain the following outcome measures: (a) Indication for insertion and documentation, (b) pre-insertion radiology, (c) complications associated with insertion and subsequent management. **Results:** Between April 2012 and September 2012, 9/47 (19%) drains in 27 patients were placed in the lung parenchyma. Similar published case series have an intraparenchymal insertion rate of 14%. In terms of patients; 9/27 (33%) drains were intraparenchymal. A program of education involving didactic lectures and clinical skill demonstrations were organized to disseminate the findings and highlight the potential for complications with intercostal chest drain insertion, particularly when they have been inserted prior to radiological confirmation. Following the intervention a retrospective re-audit was performed for the 6 month period October 2012 to April 2013. During this period, 6/33 (18%) chest drains in 22 patients were found to have been placed in the lung parenchyma. In terms of patients; 6/22 (27%) drains were intraparenchymal. Combining the data for the 12 months period April 2012 to April 2013, 59 trauma patients had a total of 80 drains inserted with 15 patients having multiple drains totaling 21. A total of 15 drains were placed in the lung parenchyma. **Conclusion:** Intraparenchymal placement of intercostal chest drains in trauma patients fell from 33% to 27% following the implementation of an educational program. An intraparenchymal insertion rate of 18.75% is comparable to other published series.

03

Richmond agitation sedation scale as a tool to predict development of delusional memory in surgical intensive care unit patients

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Objective: The goal is to assess the incidence of delusional memory and unpleasant recall in surgical intensive care patients and to test Richmond Agitation Sedation Scale (RASS) as a tool to predict the development of delusional memory in patients. **Design:** An observational study. Within 12 h of the patient being extubated, an interview with the patient was conducted by the principal investigator using the structured interview intensive care unit (ICU memory tool). This structured interview is a tool to document factual recall, unpleasant recall and delusional memory in patients who have had a stint in the ICU. For all patients the ICU records was reviewed and the number of times the RASS score deviates beyond +1, 0, -1, -2 was documented. **Patients:** Surgical patients who were intubated for more than 24 h in the ICU were included in the study. Patients with traumatic brain injury, age beyond 18-75 years, patients with past history of dementia/Alzheimer's disease, schizophrenia or other delusional disorders were excluded from the study. **Results:** The overall incidence of delusional memories was 8.9%, the incidence of hallucination was 7.9%, the incidence of nightmares during the ICU stay was 15.8%. Mann Whitney U-test was used to assess the correlation between the number of instances of RASS above +1, number of instances of RASS below -2 and development of delusional memory. There was no correlation between instances of RASS above +1 and delusional memory ($P = 0.458$) or instances below -2 and delusional memory ($P = 0.733$). **Conclusion:** Richmond Agitation Sedation Scale cannot be used to predict the development of delusional memories.

04

Can manual muscle testing influence decision making in mobilizing patients in intensive care unit?

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Background: Early mobilization of patients in intensive care units (ICU) is required to prevent ICU acquired muscle weakness. The existing clinical mobilization algorithm (CMA) categorizes patients into three categories, viz., (a) Unconscious patients, (b) physiologically stable patients and (c) deconditioned patients. Manual muscle testing (MMT) prior to mobilization of patients in ICU has not been considered criteria; in the existing CMA. **Objective:** To determine the influence of MMT in decision making for mobilizing patients according to CMA. **Methodology:** An on-going observational study, in which patients were recruited from level 3 medical ICU, from October 2013. Patients were categorized according to the existing CMA. Patients in category A were excluded from the study. Among those included, MMT of the major muscle groups according to MRC grading and pelvic bridging according to functional grading was performed. Handgrip was assessed using a hand dynamometer (Jamar) in Kilogram-force (Kgf). Changes in patient categorization and decision regarding mobilization after including MMT were assessed. **Results:** A total of 12 patients were recruited, 4 females and 8 males, aged between 22 and 70 years. Out of 12, 4 were in category C and 8 in Category B according to existing CMA. After performing the MMT, 3 patients in category B, were reclassified as category A, as had an MMT score of <2 for major muscles and hand dynamometer score <10 kgf and pelvic bridging grade <3. **Conclusions:** MMT plays a vital role in mobilizing patients and should be incorporated in decision making in ICU patients.

05

Bedside sonographic measurement of optic nerve sheath diameter as a predictor of raised intracranial pressure: A pilot study

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Aim and Objectives: To evaluate the efficacy of optic nerve sheath diameter (ONSD) by ultrasound as a non-invasive method for detecting raised intracranial pressure (ICP) in intensive care unit, to compare with computed tomography/magnetic resonance imaging findings of raised ICP and to prognosticate ONSD value with treatment. **Methods:** We conducted a prospective, observational study on 101 adults by including 60 patients in Group A admitted with fever, headache, vomiting and altered sensorium and 41 healthy individuals in Group B as control. We examined them in supine position using 10 MHz linear array probe on closed eyelid. ONSD was measured 3 mm behind the globe in each eye. A mean binocular ONSD greater than 4.6 mm in females and 4.8 mm in males was considered as abnormal. Midline shift, edema, or effacement on imaging suggestive of elevated ICP was used to evaluate ONSD accuracy. **Results:** Mean ONSD in the control group was 4.6 mm in females and 4.8 mm in males. In 60 patients of Group A, mean ONSD for 17 female was 5.103 ± 0.6221 mm ($P = 0.002$) and 5.081 ± 0.5799 mm ($P = 0.032$) for 43 males. Radiological sign of raised ICP was confirmed in 35 patients with high ONSD value. Out of 25 patients without radiological signs of raised ICP 10 patients showed high ONSD ($F = 4.735$ mm and $M = 4.907$ mm). Sensitivity of ONSD was 84.6% in females and 75% in males while specificity was 100% in both genders. ONSD was well-prognosticated with treatment modalities. **Conclusion:** Bedside ocular ultrasonography for measuring ONSD can be used an

early test for diagnosing raised ICP as it's a non-invasive, cost effective bedside test which can be repeated for reevaluation.

06

Role of ultrasonographic assessment of diaphragmatic dysfunction in successful weaning

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Background: Difficulties in discontinuing ventilator support are encountered in 20-25% of all mechanically ventilated patients. Approximately 40% of total ventilation time is spent in the weaning process alone. Mechanical ventilation itself can induce diaphragmatic dysfunction (DDS). Despite the existence of many weaning protocols, often making a correct decision is difficult because the DDS is not included. **Aim:** The goal is to determine the influence of DDS assessed by M-mode ultrasonography on weaning outcomes from mechanical ventilation. **Methodology:** This prospective and double-blinded multi-centered study conducted at all of our university teaching intensive care unit from January 2012 to August 2013. All who required mechanical ventilation over 48 h were included. After 48 h everyday criteria for a spontaneous breathing trial was assessed and ultrasonographic (USG) assessment for DDS and were blinded to each other. Patients were extubated when they met criteria. A third analyzer analyzed both the results and the outcome. **Results:** A total of 80 patients met the inclusion criteria out of which 57 (71%) were male and mean age was 41 years. In all patients, the overall incidence of weaning failure was 20% (16 patients). The prevalence of USG DDS was 18.75% (16 patients). Rapid shallow breathing index was significantly higher in the DDS group. The sensitivity, specificity, positive predictive value and negative predictive value of USG DDS in predicting weaning failure was 81.25%, 96.88%, 86.67% and 95.38% respectively. **Conclusion:** Using M-mode ultrasonography DDS was found in many patients in intensive care unit without history of any previous diaphragmatic disease. Patients with such DDS showed a high incidence of weaning failures. Hence, we suggest ultrasonography of DDS should be included in all weaning criteria.

07

Arrive: A retrospective registry of Indian patients with venous thromboembolism

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Objectives: To provide real world information on patient characteristics, management strategies, clinical outcomes and temporal trends in venous thromboembolism (VTE). **Materials and Methods:** Multicenter retrospective registry in India involving 549 medical records of patients with a confirmed diagnosis of VTE (deep vein thrombosis [DVT] confirmed by Doppler ultrasonography; pulmonary embolism [PE] by chest computed tomography scan, pulmonary angiography and/or V/Q scan) from 2006 to 2010 at three tertiary care hospitals. **Results:** Acute DVT without PE, acute DVT with PE and PE alone were reported in 64% (352/549), 23% (124/549) and 13% (73/549) patients, respectively. Mean age was 47 (±16) years and 70% were males. Prior history of DVT (34%), trauma (16%) and immobilization >3 days (14%) were the most common risk factors for VTE. Hypertension (25%), diabetes mellitus (19%) and neurological disease (other than stroke) (8%) were the most common co-morbidities. Venography was done in barely 4% patients to confirm DVT. Most (94%) were treated with anticoagulants-heparin alone (82%) or fondaparinux (2%) for initial anticoagulation; low molecular weight heparin alone (5%) or warfarin/acenocoumarol (76%) for long-term anticoagulation. Anticoagulant

treatment was needed to be stopped because of bleeding in just 2% (9/515) patients. Mortality was 7% among patients diagnosed with VTE during the hospital stay versus 1% in those hospitalized with diagnosed VTE. The annual incidence of DVT (\pm PE) increased from 2006 to 2010. **Conclusion:** Acute DVT alone was responsible for a substantial burden of VTE in Indian patients. Bleeding was not the limiting factor for anticoagulant treatment in most of the patients. Higher mortality may warrant more aggressive treatment in patients diagnosed with VTE during the hospital stay.

08

Outcomes associated with acute exacerbations of chronic obstructive pulmonary disease requiring hospitalization

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Objective: The present study was carried out to ascertain failure rates following acute exacerbation of chronic obstructive pulmonary disease (AECOPD) and factors associated with frequent readmissions. **Materials and Methods:** We conducted a prospective study among 186 patients with chronic obstructive pulmonary disease (COPD) with one or more admissions for acute exacerbations in a tertiary care hospital. Frequency of previous admissions for AECOPD in the past year and clinical characteristics, including spirometry were ascertained in the stable state both before discharge and at the 6-month post discharge. Failure rates following treatment were ascertained during the follow-up period. All the patients were followed-up for a period of 2 years after discharge to evaluate the factors affecting the repeated readmissions for AECOPD. **Results:** Of 186 COPD patients admitted for AECOPD, 54% had one readmission and another 45% had two or more readmissions over a period of 2-years. There was a high prevalence of current or ex-heavy smokers, associated co-morbidity, underweight patients, low vaccination prevalence and use of domiciliary oxygen therapy among COPD patients. Nearly 12% mortality was observed in the present study. Immediate failure rates after first exacerbation was observed to be 34.8%. Multivariate analysis showed that duration >20 years (OR = 0.37; 95% CI: 0.10-0.86), use of Tiotropium (OR = 2.29; 95% CI: 1.12-4.69) and use of Co-amoxiclav during first admission (OR = 2.41; 95% CI: 1.21-4.79) were significantly associated with higher immediate failure rates. The multivariate analysis for repeated admissions revealed that disease duration >10 years (OR = 0.50; 95% CI: 0.27-0.93), low usage of inhaled corticosteroid + long-acting beta agonist (ICS + LABA) (OR = 2.21; 95% CI: 1.08-4.54) and MRC dyspnea grade >3 (OR = 2.51; 95% CI: 1.08-5.82) were independently associated with frequent readmissions for AECOPD. **Conclusion:** The outcomes of patients admitted for an acute exacerbation of COPD were poor. The major factors influencing frequency of repeated COPD exacerbations were disease duration, low usage of inhaled ICS +LABA and MRC dyspnea grade >3.

09

Dexmedetomidine versus propofol in dilatation and curettage: An open label randomized controlled trial

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Aims and Objective: The primary objective was to compare hemodynamic, respiratory and recovery profile of dexmedetomidine and Propofol. Secondary objective was to compare the degree of comfort experienced by patients and the usefulness of the drug to surgeons. **Study Design:** Open-label randomized controlled trial. **Materials and Methods:** Subjects between 18 and 60 years of age with ASA Grade I-II requiring dilatation and curettage were enrolled in two groups (25 each). Both groups received fentanyl 1 μ g/kg IV at the beginning of

the procedure. Group P received IV Propofol in a dose of 1.5 mg/kg until Ramsay sedation scale (RSS) score reached 3-4. Group D received dexmedetomidine at loading dose of 1 μ g/kg over 10 min followed by 0.5 μ g/kg/h infusion until RSS reached 3-4. Heart rates (HR), non-invasive blood pressure (BP) and SpO₂ were compared during and after the procedure. In the recovery room time to reach modified aldrete score (MAS) 9-10 was also recorded and compared. **Results:** In Group D, patients had lower HR at 2, 5, 10 and 15 min following the initiation of sedation ($P < 0.05$). There was statistically significant difference in blood pressure and oxygen saturation. Hypotension was present in 52% in Group P and 4% in Group D ($P < 0.05$). MAS of 9-10 was achieved in 4.38 min in subjects in Group D in contrast to 16.28 min in Group M ($P < 0.05$). Dexmedetomidine showed higher patient and surgeon satisfaction scores ($P < 0.05$). **Conclusion:** Dexmedetomidine can be a superior alternative to propofol for minor surgeries as dilatation and curettage.

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Assessment of medicine intensive care unit of an APEX Teaching Hospital of India against the guidelines prescribed by Indian society of critical care medicine

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Introduction: Organization of intensive care unit (ICU) includes both quantity and quality of staffing and the leadership taken by the ICU medical team regarding medical decisions. **Objective:** This study was conducted to assess the compliance of structural and organizational parameters of Medicine Intensive Care Unit (MICU) against the national guideline for ICU. **Methodology:** Study was carried out in MICU at All India Institute of Medical Sciences (AIIMS), New Delhi. Structural and organizational aspects were studied against ICU planning and designing in India Guidelines 2010 (Guidelines prescribed by Indian Society of Critical Care Medicine). Parameters were assigned equal weightage and scoring was done by assigning non-compliance, partial compliance and compliance a score of 0, 5 and 10 respectively. Data was collected through direct observations and by studying relevant hospital records. Unstructured interview were held with key informants i.e. doctors, nursing staff, infection control unit, engineering staff and other hospital staff posted for MICU. **Observations:** MICU at AIIMS is an eight bedded open model ICU with no full time dedicated designated Director. When compared against the guidelines prescribed by ISCCM compliance of 90.91% in organization, 73.81% in staffing, 28.38% in service inpatient areas, 53.19% in equipment, 44.87% in environmental requirements, 50% in disaster preparedness and 12.50% in meeting the needs of families and visitors. **Conclusion:** Overall compliance of only 50.52% was observed against the guidelines prescribed by ESICM which is quite low and leaves with a lot of scope for improvement.

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Does golden hour exist for administering appropriate anti-malarial drugs

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Aim and Objective: To study if each hour delays in administering appropriate anti-malarial is associated with an increase in mortality. **Materials and Methods:** A retrospective analysis of patients admitted with malaria in our hospital from June 2007 to June 2013. Research coordinator audited the files. The data collected included demographic data, date and time of admission, provisional diagnosis, blood investigations. Admission diagnosis and time of administration of 1st anti-malarial in the form of Artesunate was noted. Any ongoing

treatment from the referral hospital was also captured. Comparison was made to see the admission time and time of anti-malarial administration and outcome. **Results:** A total of 501 malaria patients were admitted during the study period. The M:F ratio was 2:1. The average age was 27.2 years. Totally 320 patients were admitted to the wards with no evidence of organ failure and 181 were admitted to intensive care with at least one or more organ failure. 391 had positive peripheral smear and 192 had positive rapid malarial antigen test. 112 patients had a combination of two. Average time of anti-malaria's were administered time was 57 min, with 325 patients receiving it within 0-1 h, 90 patients received it between 1 and 2 h, 55 patients within 2-3 h and 31 patients between 3 and 4 h. A total of 21 patients died due to malaria. The mortality percentage was 4%. Of the non-survivors 7 patients received anti-malaria's after 3 h with an average time of 92 min in all the non-survivors. **Conclusion:** In a retrospective analysis of malaria patient's delay in administering Artesunate was found to be associated with an increase in mortality. However, the effect was not substantial to associate a causation.

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Vivax malaria, not so benign: A case series of acute respiratory distress syndrome complicating vivax malaria

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Objectives: Traditionally complications of malaria such as acute respiratory distress syndrome (ARDS) and acute kidney injury have been reported with falciparum malaria; vivax malaria runs a relatively benign course. However the clinical profile of vivax malaria has been changing. We studied a series of patients with vivax malaria complicated with ARDS with an aim to find what factors, if any predispose to the development of this complication. **Materials and Methods:** Medical records of patients admitted with vivax malaria from the past 3 years were surveyed. Case records of patients diagnosed with vivax malaria complicated with ARDS were extracted. ARDS was diagnosed on the basis of arterial blood gas analysis. Details of duration of the illness, presenting complaints, associated symptoms, past history of malaria, immigration status, comorbidities, systemic examination findings, laboratory values complete blood count, semiquantitative count for parasitemia count, renal function test and liver function test, urine analysis, treatment and duration of ventilator support if any. **Results and Observations:** In our case series, eight patients diagnosed with vivax malaria had a complication of ARDS. Six patients had a cough and or/breathlessness at admission. Four of patients with ARDS presented after more than 4 days of illness. Six patients had high parasitemia. Of the eight patients studied, 7 patients had thrombocytopenia. **Conclusions:** ARDS is a complication of vivax malaria, must be associated in most patients with malaria and respiratory symptoms. Longer duration of illness and higher parasitemia appears to be predictive of this complication. Therefore, the presence of these factors would necessitate frequent monitoring for early diagnosis of ARDS.

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Survival after in-hospital cardiac arrest

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Objectives: We examined the rates of survival to hospital discharge of patients with in-hospital cardiac arrests as our primary outcome. **Materials and Methods:** This study was carried out at a single center in North India from January 2010 to August 2013. The hospital has around the clock rapid action AHA-ACLS provider certified team with adequate post-resuscitation care facilities to deal with cardiac arrest patients. **Results:** The total number of code blue calls over the period

of 4 years was 760. Out of these, 15.26% ($n = 116$) were diagnosed as false code blue while the rest 84.74% ($n = 644$) were true cardiac arrests. Among 644 patients with an in-hospital cardiac arrest, the overall case survival (to discharge) rate was 26.86% ($n = 173$). The overall cardiac arrest incidence rate was 4.8/1000 hospital admissions. The initial cardiac-arrest rhythm was asystole or pulseless electrical activity (non-shockable rhythm) in 498 (77.32%) patients and ventricular fibrillation or pulseless ventricular tachycardia (shockable rhythm) in 146 (22.67%). There was no difference in the survival rates in the two sub-groups when compared separately. Rates of acute resuscitation survival (immediate ROSC) was 64.28%. All the patients were shifted to the intensive care unit for post resuscitation care. Out of these, 104 (16.14%) expired within the first 24 h of post cardiac arrest care while 141 (21.89%) expired later in the course of hospital stay. **Conclusion:** We conclude that the survival rates after in hospital cardiac arrest were comparable to the two large recent multi-centric trials.

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Delirium, its risk factors and antipsychotic use in intensive care unit

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Objectives: Delirium is a disturbance in attention, awareness and cognition which develops over a short period of time and tends to fluctuate in severity during the course of the day. Delirium occurs in 15-53% of older individuals postoperatively and in 50-72% of those in intensive care unit (ICU). It remains an under-diagnosed entity that is associated with increased mortality, morbidity, healthcare cost and duration of stay. We aimed to study the incidence of delirium in ICU patients and to describe utilization of antipsychotics in ICU. **Materials and Methods:** In an observational study, 486 patients (≥ 18 years) admitted in ICU (at least 1 day) were assessed using confusion assessment method for the ICU (CAM-ICU) and Richmond Agitation Sedation Scale (RASS). Admission details, use of mechanical ventilation, invasive devices, antipsychotics and other medication were noted. SPSS version 12.0 was used for statistical assessment. **Results:** 68.9% (335) patients were admitted due to medical causes and sepsis was the main diagnosis (17.9%, 87). In total 163 (33.5%) patients were sedated RASS ≤ -3 and only 323 (66.5%) were assessed with CAM-ICU. 9.6% (31) had delirium, 15% (73) were administered antipsychotics; haloperidol (43, 58.9%) and olanzapine (29, 39.7%) were most commonly used. Delirium was highly significantly associated with increased ICU length of stay (LOS) (5 vs. 3 days, $P < 0.001$) and hospital LOS (10 vs. 6 days, $P < 0.001$) but not in-hospital mortality (10 vs. 9, $P = 0.44$). Use of antipsychotics itself and its use in the absence of history of psychiatric disorder were significantly associated ($P < 0.001$) with all the above. Invasive devices, central venous and arterial catheter and invasive mechanical ventilation was significantly associated ($P < 0.001$) with delirium. **Conclusion:** Haloperidol and olanzapine were the most commonly used antipsychotics. When antipsychotics were used in the absence of history of mental disorder it was associated with higher ICU LOS and mortality. Antipsychotics must be used only for psychiatric symptomatology judiciously. Delirium with its risks factors must be monitored.

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Predictors of mortality in geriatric patients in an Indian intensive care unit

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Background: Ageing being a global phenomenon, increasing number

of elderly patients are being admitted to intensive care units (ICU). Hence there is a need for continued research on outcomes of ICU treatment in the elderly. **Objectives:** The aim of our study was to examine the outcomes of geriatric patients and analyze the factors predicting mortality in elderly patients >65 years of age in an Indian ICU. **Materials and Methods:** A retrospective observational study was conducted in 2317 patients admitted in a 24-bedded ICU of a tertiary care hospital over 2 years study period. A clinical data base was collected which included age, sex, specialty under which admitted, patient outcome, average length of ICU stay, use of mechanical ventilation, inotropes, hemodialysis and tracheostomies. Patients were divided into two groups: <65 years (Younger age group) and >65 years (Geriatric age group). **Results:** The observed overall ICU mortality rate in the study population was 19.6% and there was no statistical difference in the young and geriatric age group mortality ($P > 0.05$). Mechanical ventilation ($P = 0.003$, OR = 0.573, 95% CI = 0.390-0.843) and use of inotropes ($P = 0.018$, OR = 0.661, 95% CI = 0.456-0.958) were found as predictors of mortality in the elderly population. On multivariate analysis, inotropic support was found to be an independent factor predicting mortality in geriatric age group (β coefficient = 1.221, $P = 0.000$). **Conclusion:** ICU mortality rates increased in the geriatric population requiring mechanical ventilation and inotropes during ICU stay. Only inotropic support could be proposed as an independent risk factor for mortality in the geriatric population. Hemodialysis and tracheostomy do not predict ICU mortality for the geriatric population.

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Role of magnesium sulphate in the management of acute human poisoning by organophosphorus insecticides

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Background and Objectives: Magnesium sulfate may be beneficial in organophosphorus poisoning (OPP) because it reduces central nervous system stimulation and acetylcholine release from presynaptic nerve terminals. We aimed to find its effect on the atropine requirement; length of mechanical ventilation, intensive care unit (ICU) and hospital stay; and the occurrence of cardiac arrest, re-intubation, ventilator associated pneumonia (VAP) and death in OPP. **Methods:** We conducted a prospective randomized controlled trial in 20 consecutive patients aged range from 18 to 65 years, admitted in our ICU for mechanical ventilation with a diagnosis of OPP. Patients with renal failure, hypotension (systolic blood pressure <90 mmHg), heart blocks and concomitant ingestion of non-organophosphorus compounds were excluded. A total of 10 patients received magnesium sulfate infusion at 0.5 g/h, after ICU admission until extubation, along with protocol based treatment and another ten patients received protocol based treatment only. Patients were monitored for heart rate, blood pressure, urine output continuously; and serum magnesium and calcium levels every day. **Results:** The amount of atropine administered per day (mean \pm standard deviation) was less in magnesium sulfate group (195 ± 167 mg) compared with the control group (290 ± 178 mg). The length (median [IQR] days) of mechanical ventilation ($9.5 [6-16]$ vs. $11.5 [5-12]$), ICU stay ($10.5 [8-19]$ vs. $12 [7-15]$) and hospital stay ($17.5 [12-28]$ vs. $22.5 [11-34]$) were less in patients receiving magnesium sulfate; but, these values were not statistically significant ($P > 0.05$). There were no episodes of hypermagnesemia or hypocalcemia during magnesium infusion. There was no significant difference in the occurrence of cardiac arrest (20% vs. 10%), re-intubation (20% vs. 10%), VAP (40% vs. 60%) and mortality (0% vs. 22%) in magnesium sulfate group and control respectively. **Conclusion:** Magnesium sulfate infusion at 0.5 g/h was well tolerated in patients with OPP. Magnesium sulfate did not reduce the dose of atropine, length of mechanical ventilation, ICU stay or hospital stay and mortality in patients with OPP.

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Takotsubo cardiomyopathy/syndrome of transient left ventricular apical wall motion abnormality occur in critical ill patient

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Background: Diagnosis of Left Ventricular Apical Ballooning Syndrome can be challenging in patients admitted in intensive care unit, because symptoms could be attributed to underlying disease. **Objective:** The aim of our study is to combine clinical features, echocardiography (ECG) abnormalities, abnormal cardiac enzymes and bed side ECG for diagnosis of stress Cardiomyopathy. **Methods:** Retrospective observational study. Seven patients who were admitted in Critical Care Unit had abnormal clinical features and abnormal ECG, cardiac enzymes and apical wall motion abnormality on the bed side ECG were included. Follow-up ECG was obtained in most cases ($n = 4$).

Results:

Sex	Female=5, Male=2
Average age	53.4 years
Identifiable precipitating event	Emotional event $n=3$ Surgery $n=2$ Sepsis $n=2$
Clinical features	Respiratory distress (decreased in saturation) $n=3$ Hemodynamic instability $n=4$
ECG abnormality	ST elevation $n=2$ T inversion $n=3$ Tachycardia $n=2$
Vasopressor requirement	$n=3$
Bed side ECG	Done in all
Follow-up echo	Done in 4

ECG: Echocardiography

Conclusion: Sudden hemodynamic instability and/or increased requirement of oxygen with abnormalities in ECG and cardiac enzymes may be suggesting symptoms of Takotsubo Cardiomyopathy in ICU and should be included in diagnostic algorithm.

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Safety of blind bronchial sampling in diagnosis of ventilator associated pneumonia

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Background: Blind bronchial sampling (BBS) is a cheap, simple and cost-effective way to diagnose ventilator associated pneumonia (VAP) with high accuracy and good reproducibility. There is however little data on the safety of this procedure. This study was planned to address this concern and to better define the possible complications, adverse effects and remedial measures to enhance safety during use of this modality. **Materials and Methods:** This observational study was conducted over a 9 month period from May 2012 to January 2013. Various parameters selected to establish the safety of the procedure were prospectively recorded in 42 patients who underwent BBS on clinical suspicion of VAP. These included vital parameters, changes in ventilator requirements, changes in inotrope requirements and serious and life-threatening complications, if any. Parameters were recorded pre procedure, during the procedure and up to 6 h post procedure. About 10% change in hemodynamic parameters was regarded as significant. **Results:** None of the 42 patients had a life-threatening complication necessitating abandoning of the procedure. 12 (28.6%) of

the patients had desaturation during the procedure, none however to <80%. This reverted to pre procedure levels within 2 min post procedure in 10 of these patients. In 2 of the patients, the desaturation persisted beyond 2 min necessitating increase in ventilator settings. This too reverted to baseline within 6 h post procedure. Significant tachycardia and hypertension was seen transiently in 10 (23.8%) and 7 (16.6%) patients respectively during the procedure. 2 (4.7%) of the patients had significant transient hypotension. None of these hemodynamic changes lasted beyond half an hour, none required changes in inotropic requirements. No other adverse event was noted. **Conclusion:** BBS is a safe procedure for diagnosing VAP in critically ill pediatric ICU patients.

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A randomised placebo controlled trial of indian and western classical music on sedation requirement in critically ill patients

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Critically ill patients are exposed to high degree of stress and require sedation. Our objective is to compare the effect of Indian and Western classical music with placebo on reducing stress, monitoring various clinical and biochemical markers. **Materials and Methods:** Critically ill patients requiring invasive ventilatory support and sedation were included. Patients below 18 years, cerebrovascular accidents, structural cerebral lesions, or <24 h ventilator support were excluded. At baseline injection Propofol 20 mg bolus followed by infusion at 20 mg/h given for 1 h with rescue dose of 20 mg given when required. Ramsay sedation score was done pre and post music therapy growth hormone (GH), interleukin 6 (IL6), tumor necrosis factor alpha (TNF- α) levels before and after 2 and 8 h of music therapy. Qualitative variables between the 3 groups were analyzed by chi square test and quantitative variables by Kruskal Wallis ANOVA and Wilcoxon signed rank test using SPSS version 18. **Results:** MAP was 88.43 ± 11.75 prior and 90 ± 14.18 post therapy. **Ramsay Sedation Score:** No significant difference between pre and post therapy for the group as a whole as well as individual sub groups ($P = 0.07$). Average additional sedation dosages = 1.09/PT not significantly different among groups. $P = 0.522$ significant increase in GH value post therapy seen in western music group at 2 h ($P = 0.0008$), persisted for next 8 h ($P = 0.0004$). IL 6 value was significantly lower in Indian Music group at 8 h ($P = 0.021$). TNF α value was significantly reduced in western music group at 2 h ($P = 0.04$). **Conclusion:** Application of Indian and western classical music significantly decreased inflammatory biomarkers.

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Ventilator associated pneumonia in traumatic brain injury

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Objective: The aim is to detect the incidence, microbiologic pattern, antibiogram and outcome in cases of ventilator associated pneumonia (VAP) in traumatic brain injury (TBI). **Materials and Methods:** All patients with head injury over a period of 1 year from September 2012 who required ventilation for more than 48 h were retrieved from the intensive care unit (ICU) database. VAP was diagnosed using radiological, clinical and microbiological criteria. Worsening of an existing pulmonary patch or development of a new patch was considered radiological evidence of pneumonia. A semiquantitative analysis of endotracheal aspirate with more than 10^4 CFU/ml was considered positive and the antibiogram for each causative agent was recorded. **Results:** Totally 238 cases of TBI were ventilated over this period, with a total of 713 ventilator days. 39 patients developed VAP, giving incidence of 55/1000 ventilatory days. Nearly 74% of cases had

a polymicrobial etiology with a total of 86 isolates. Klebsiella was the commonest organism and was present in 64% ($n = 25$) patients. Five patients had methicillin resistant *Staphylococcus aureus* and seven grew acinetobacter. Two isolates were sensitive only to colistin and three were resistant to the first line antibiotics and carbapenems, but sensitive to amikacin along with colistin. All the other isolates were sensitive to the first line antibiotics. **Conclusions:** The incidence of VAP is high in ventilated TBI, possibly because of varying degrees of aspiration. The low incidence of multiresistant organisms is due to these patients being admitted in a separate ICU with strict infection control and antibiotic use policies and the fact that these patients were previously healthy. Therefore if patients with acute TBI can be kept away from other ICU patients the choice of empirical antibiotics should be different from other ICUs.

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Passive leg raising: An indicator to fluid responsiveness in sepsis

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Objective: To assess whether passive leg raising can help in predicting fluid responsiveness in sepsis patients with acute circulatory failure. **Methodology:** This study was prospectively conducted in the emergency room and intensive care unit of a multispecialty teaching university in Salem. All those who were more than 18 years and admitted with hypotension were included and those with arrhythmia, parturient, amputation of the lower limbs, pelvic fracture, clinical or radiological evidence of mediastinal mass and pneumothorax/hydrothorax were excluded. Measure of stroke volume (SV) was obtained in the supine position and 2 min following passive leg raise at 45° (baseline) using 2D ECHO. Same parameter was repeated after volume expansion (VE) (30 ml/kg of crystalloids). The change in SV after passive leg raising (PLR) and VE were compared with the indices at the baseline to classify patients as either volume responders or non-responders based on their changes in Δ SV over 15%. **Result:** A total of 116 patients were evaluated out of whom 73 were fluid responders. In 64 cases among fluid responders, SV increased by more than 15%. A SV increase induced by PLR of $\geq 15\%$ predicted volume responsiveness with a sensitivity of 87.67%; specificity of 100%; positive predictive value of 100% and a negative predictive value of 82.69%. **Conclusion:** Passive leg raising improves the SV in sepsis patients with hypovolemia and circulatory failure which is an indirect evidence that the patient need more fluids. It is a quick, simple, non-invasive method to assess the adequacy of fluid resuscitation.

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A 12-month review of the medical emergency team system in an Australian private hospital: A retrospective observational study

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Objective: To investigate the causes for and the outcomes from, medical emergency team (MET) calls in a private hospital setting. **Design:** This was a retrospective descriptive observational study of hospital in-patients over a period of 12 months. Data were collected from MET call sheets and medical records. **Setting:** A 175 bed private teaching hospital in Australia. **Participants:** 432 MET calls in 24094 patients. **Main Outcome Measures:** Length of stay in hospital and mortality in post-MET call patients transferred to intensive care unit (ICU) and remaining on the ward. **Results:** There were 17.9 MET calls/1000 admissions. Of 432 MET calls, 136 were admitted to ICU/HDU (31.48%), an unplanned admission rate of 8.8%. The average length of stay in hospital was 12.9 days in MET call patients versus 5.7 days in others. The most common

reason for a MET call was systolic hypotension (39.8%). The mortality of patients who were transferred to ICU post-MET call was 6.6% versus 9.8% for ward patients when not for resuscitation (NFR) patients were excluded ($P = 0.38$), which increased to 12.5% when NFR patients were included ($P = 0.09$). **Conclusions:** The MET call rate was similar to other published studies and needs monitoring to ensure an effective "dose" is reached. There was a significant prolongation of average hospital stay in patients who received a MET call. The most common reason for a MET call was hypotension, in contrast to other studies. There was a trend toward improved mortality in post-MET call patients transferred to ICU, which requires further validation in future studies.

Every little smile can touch somebody's heart. No one is born happy, But all of us are born with the ability to create happiness...

Cheers!!!!

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Increased end-expiratory lung volume with high flow nasal cannula: Comparison 3 nasal cannula device

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Objectives: High flow nasal cannula (HFNC) delivers high flow, warmed and humidified air and oxygen via nasal cannula. Recently, a new nasal cannula device was designed and can produce the jet flows directed towards the nasal prongs. Electrical impedance tomography (EIT) estimates changes in lung volume by measuring changes of lung impedance. The purpose of our study was to compare the new device (OmniOx-HFT500, MEKICS, Seoul, Korea) and other 2 conventional (Optiflow, Fisher and Paykel Healthcare, Auckland, New Zealand and Vapotherm, Stevensville, Maryland, USA) nasal cannula device on end expiratory lung volume and nasal pressure. **Materials and Methods:** Prospective study with 15 healthy volunteers was performed from September 01, 2013 to November 01, 2013. After 2 min breathing ambient air, HFNC was applied for 12 min. The air flow was increased from 30 L/min to 40 L/min every 3 min. For each device, global and regional end-expiratory lung impedance variations ($\Delta EELI$) were measured by EIT. Pharyngeal pressure, air flow rate and $\Delta EELI$ were recorded as flow increased. **Results:** The body mass index of healthy volunteers was 23.7 ± 3.0 kg/m² and male were 7. There was not different in pharyngeal pressure ($P = 0.137$ and $P = 0.15$) and global $\Delta EELI$ ($P = 0.152$ and $P = 0.232$) at 30 L/min and 35 L/min. At 40 L/min, there was a significant difference in pharyngeal pressure (OmniOx: 3.7 ± 0.8 vs. Optiflow: 3.5 ± 0.6 vs. Vapotherm: 2.9 ± 0.7 , $P = 0.013$) global $\Delta EELI$ was similar (OmniOx: 1.4 ± 1.4 vs. Optiflow: 1.4 ± 1.0 vs. Vapotherm: 2.0 ± 2.4 , $P = 0.467$). **Conclusion:** New nasal device and conventional nasal devices similarly increased the end expiratory lung volume and created positive oropharyngeal airway pressure.

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Assessment of left ventricular function in critically ill patients by mitral annular plane systolic excursion

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Objectives: Left ventricular (LV) dysfunction is common in critically ill patients. Echocardiographic assessment of systolic function by ejection fraction (EF) may be technically difficult due to poor windows and often inaccurate. Mitral annular plane systolic excursion (MAPSE) may be a more precise and easily measured alternative that could reflect both systolic and diastolic dysfunction. We aimed to study the efficacy of MAPSE as a tool to assess LV function in critically ill-patients. **Materials and Methods:** We conducted this prospective observational trial on 86 consecutive adult patients admitted to our multidisciplinary intensive

care unit. Echocardiographic assessment was performed on day 1. EF was measured by the Teicholz method. MAPSE was measured from the medial and lateral annulus and averaged. Diastolic function was assessed by E/E' ratios by tissue Doppler imaging from the septum and lateral wall and trans-mitral velocities measured by pulse wave Doppler. **Results:** A complete echocardiographic study was possible in 82 (95.3%) patients. Systolic dysfunction, defined as EF less than 50%, was observed in 21 (25.6%) and severe diastolic dysfunction, defined as E/E' more than 13, was present in 15 (18.3%) patients. MAPSE correlated positively with EF ($r = 0.7$, $P < 0.0001$) and negatively with E/E' ratio ($r = 0.6$, $P = 0.0013$). MAPSE of less than 10.1 mm has a sensitivity of 82.7% and specificity of 79.8% in detecting severe LV dysfunction; a MAPSE of less than 9.7 mm predicted systolic dysfunction with specificity of 86.8% and a sensitivity of 81.2%. **Conclusion:** MAPSE may be a useful, easy to use tool to measure left ventricular function in critically ill-patients. Besides correlating well with systolic function as measured by EF, it detects severe diastolic dysfunction and may be a useful alternative to more complex measures such as tissue Doppler imaging.

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Therapeutic plasma exchange practices in the intensive care unit

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Objective: The objective is to evaluate the practice of therapeutic plasma exchange (TPE) in a tertiary intensive care unit (ICU) and identify common indications, feasibility, tolerance and outcomes. **Materials and Methods:** A retrospective analysis of all patients ($n = 56$) who underwent TPE between May 2011 and August 2013 was done. Data were extracted from a database maintained by the Transfusion Medicine Department. Indications for TPE were classified into 4 categories as per the American Society for Apheresis 2010 guidelines. Data on each patient including age, sex, diagnosis, category of indication, number of TPE sessions, volume of plasma removed, type and volume of replacement solution infused and outcomes were collected and analyzed. **Results:** Out of 56 patients studied, 33 were males and 23 were females. TPE was performed for category one indications in 50%, category two indications in 20%, category three indications in 7% and category 4 indications in 23% of patients. Total number of sessions was 163 with the mean number of sessions per patient being 2.89. Mean plasma volume removed per patient was 7934 ml and mean replacement volume per patient was 3090 ml. Fresh frozen plasma, isotonic crystalloids, cryo poor plasma and packed red cells constituted 62.9%, 22%, 9.9% and 5.3% of plasma volume replacement respectively. TPE was terminated in 3 patients with transfusion associated acute lung injury, hypotension and cardiac arrest being the reasons for termination. Clinical improvement was seen in 46 patients. Overall mortality rate in our study patients was 8.9%. **Conclusion:** TPE is feasible, well-tolerated and safe. Common indications for TPE in our study were sickle cell and myasthenic crisis. Favorable disease resolution was seen in most patients who underwent TPE.

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Prognostic factors in patients hospitalized with diabetic ketoacidosis

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Aim and Objectives: (1) To evaluate the incidence of diabetic ketoacidosis in diabetic population. (2) To evaluate the clinical and biochemical prognostic markers in diabetic ketoacidosis. (3) To correlate the various prognostic markers with mortality in diabetic ketoacidosis. **Materials**

and Methods: A prospective multicenteric observational study done at tertiary care center. A total of 451 patients hospitalized with diabetic ketoacidosis over a period of 1½ years were evaluated clinically and by laboratory tests. They were managed in the standard way with insulin, intravenous fluids and appropriate supportive care. **Main Outcome Measures:** Serial assays of serum electrolytes, glucose and blood pH and clinical outcome of either discharge home or death. Data were analyzed by SPSS version 17 and were presented in the values of mean, median and percentages. $P < 0.05$ was considered to be significant. **Results:** The significant predictors of the final outcome obtained above (sex, past history of type 1 diabetes mellitus [DM] and type 2 DM, systolic blood pressure, di-n-butyl phthalate, Total lung capacity, acute physiology and chronic health evaluation II [APACHE II] score, BUN, S. creatinine, S. Mg^{++} , S. PO_4^{-3} , S. Osmolality, NT-ProBNP, serum glutamic-oxaloacetic transaminase, serum glutamate pyruvate transaminase, S. albumin) were further regressed together and subjected with multivariate logistic regression (MLR) analysis. The MLR analysis found that sex, APACHE II score and S. PO_4^{-3} , are significant and independent predictors of final outcome. The MLR analysis further revealed that the male sex had 7.93 fold higher favorable outcome when compared with female sex (OR = 7.93, 95% CI = 3.99-13.51) while a decrease in mean APACHE II score (14.83) and S. PO_4^{-3} (4.38) at presentation may lead 2.86 (OR = 2.86, 95% CI = 1.72-7.03) and 2.71 (OR = 2.71, 95% CI = 1.51-6.99) fold better favorable outcome respectively as compared to higher levels (APACHE II score: 25.00; S. PO_4^{-3} : 6.04). However, other variables did not reach statistical significance ($P > 0.05$). **Conclusion:** Sex, baseline biochemical parameters like APACHE II Score, phosphate level and C peptide level were important predictor of mortality from DKA.

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A comparative evaluation of glide scope and macintosh laryngoscope for endotracheal intubation

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Objectives: To evaluate and compare glidescope video laryngoscope (GVL) with macintosh laryngoscope (ML) for ease of endotracheal intubation (ETI) in adult patients undergoing elective surgery under general anesthesia (GA). **Methods:** Two hundred adult patients posted for elective surgery under GA were randomly assigned to two groups of 100 each. After initial assessment of airway difficulty with Airway difficulty score (ADS), GA was induced and in both groups a separate laryngoscopist noted the Cormack and Lehane grade (CL grade) and percentage of glottic opening (POGO) score with a macintosh blade size 3. Group I patients were intubated with GVL and Group II with ML by a different laryngoscopist who recorded CL grade and POGO score. Time to intubate (TTI), number of attempts, intubation difficulty score (IDS), hemodynamic parameters before and after intubation and any adverse events were noted. **Results:** Baseline demographics, hemodynamics, ADS was comparable in two groups ($P > 0.05$). TTI was 24.9 ± 5.6 and 20.7 ± 3.6 s in Group I in Group II ($P < 0.001$). Mean POGO score during initial and final laryngoscopy was 66.7 ± 29.9 and 94.4 ± 10.5 in Group I ($P < 0.05$) and 75.8 ± 27.0 and 74.2 ± 29.5 in Group II respectively. The difference in CL Grades during final laryngoscopy between the two groups was statistically highly significant ($P < 0.001$). The mean IDS in Group I and II were 0.4 ± 0.7 and 1.2 ± 1.3 respectively ($P < 0.05$). The pressor response to intubation was significantly higher in Group II for up to 2 min after intubation ($P < 0.05$). The incidence of adverse events was similar in two groups ($P > 0.05$). **Conclusions:** GVL offers a better laryngeal view and improved IDS when compared with ML for routine ETI in an unselected population with clinically insignificant increase in TTI. The hemodynamic response to ETI was significantly less with GVL.

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Transthoracic echocardiography used in conjunction with passive leg raising for assessment of fluid

responsiveness in severe sepsis or septic shock patients

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Objective: During passive leg raising (PLR), we need a real-time device to demonstrate the hemodynamic changes. This study investigates the correlation of transpulmonary thermodilution technique (TPTD) and transthoracic echocardiography (TTE) in term of change in stroke volume (ΔSV) after PLR and the ability of TTE to predict fluid responsiveness (FR). **Methods:** A prospective study was carried out in our medical intensive care unit. Eligible patients were age ≥ 18 years, on mechanical ventilation with hemodynamic instability who were considered for volume expansion (VE). SV assessment using the subaortic velocity time measurement was obtained by TTE simultaneously with other hemodynamic parameters derived from TPTD (EV1000, Edward Life Science) at baseline, within 2 min of PLR and following VE (250 ml of fluid in 10 min). Fluid responder was defined by the increase of $\Delta SV \geq 15\%$ after VE by TPTD. **Results:** Preliminary report on 14 severe sepsis or septic shock patients with satisfactory cardiac windows were analyzed, 3 patients (22%) had baseline cardiac index < 2.2 L/min/m². The % ΔSV after PLR measured by TTE was positively correlated with the % ΔSV after VE measured by TPTD ($r = 0.71$, $P = 0.0048$). Bland-Altman plot, compared two methods, showed 95% limits of agreement from -9.1 to $+7.7\%$ ΔSV and the mean difference (bias) of measurement is -0.7% ΔSV . The % ΔSV after PLR measured by TTE $\geq 8.36\%$ may predict FR with sensitivity of 100%, specificity of 62.5% and AUC of 0.729 (95% CI: 0.434-0.924, $P = 0.125$). **Conclusion:** We may use % ΔSV measured by TTE within 2 min of PLR to predict a FR which is non-invasive and less time-consuming than other invasive techniques.

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Patterns of central venous oxygen saturation, lactate and venoarterial carbon dioxide difference in patients with shock and their association with outcome

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Introduction and Objectives: Tissue hypoperfusion is reflected by microcirculatory parameters such as lactate, central venous oxygen saturation (ScvO₂) and venoarterial carbon dioxide (vaCO₂) difference. We studied these parameters in patients with shock, observed time trends and correlated with mortality. **Methods:** Echocardiography and simultaneous arterial and venous blood gases were done and sequential organ failure assessment (SOFA) scores calculated on enrolment (0-h) and at 24-, 48- and 72-h. Patients were followed up till hospital discharge or death. **Results:** The study cohort ($n = 104$; 54 males) aged 48 (standard deviation ± 15.5) years, with SOFA score of 10.6 ± 3.4 included patients with septic ($n = 79$), cardiogenic ($n = 13$), hypovolemic ($n = 8$) and obstructive ($n = 4$) shock. 90 (86.5%) patients were ventilated; ventilator free days being 12.5 ± 12.4 . The duration of hospitalization was 16 ± 12 days and hospital mortality 47.1%. Lactate significantly decreased over time with the rate of fall more pronounced in survivors than non-survivors ($P < 0.0001$). When cardiac output (CO) and vaCO₂ interactions was assessed over time, for every 1/min increase in CO, vaCO₂ decreased by 0.45 mmHg ($P < 0.001$). In septic shock, on logistic regression analyses, 0-h SOFA and vaCO₂ ≤ 6 were strongly associated ($P = 0.008$, $P = 0.015$ respectively) with mortality. The association between vaCO₂ ≤ 6 and mortality in septic patients was evident only in those with ScvO₂ > 70 and not in ScvO₂ ≤ 70 . There was no association between ScvO₂ and mortality ($P = 0.93$). **Conclusions:** In septic shock, vaCO₂ ≤ 6 is independently associated with mortality, particularly in those with normalized ScvO₂. These findings are consistent with cytopathic dysoxia.

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Urinary neutrophil gelatinase-associated lipocalin as an early marker of acute kidney injury in children with shock in paediatric intensive care unit

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Background: Acute kidney injury (AKI) is a frequent and serious problem, associated with high mortality and morbidity in the critically ill children. The current diagnostic tools at an early stage of AKI are limited, leading to delay in diagnosis and initiation of renal protective measures in early stages. Several biomarkers such as cystatin C, Kidney injury molecule-1, neutrophil gelatinase-associated lipocalin (NGAL), cytokines (Interleukin [IL]-6, IL-8, IL-18), liver fatty acid-binding protein, NHE3 have been studied. Among these NGAL has been emerging as a promising biomarker. Hence, this study was designed. **Aim:** The primary aim is to analyze urinary NGAL as an early marker of AKI in children presenting with shock and secondary aim is to correlate titers of urinary NGAL with a hospital stay, need for renal replacement and mortality. **Methods:** Prospective. **Period:** 12 months. **Results:** A total of 81 patients were included in the study. Among the study children, 31% (25 out of 81) developed AKI. Urinary NGAL with the cut-off of >120, was found to have a sensitivity of 80% and specificity of 71.4%. The area under curve-receiver operating characteristic curve was 0.8175, proves that urinary NGAL is an early marker of AKI. AKI was associated with high mortality of 84% when compared with children with shock but no AKI (14.29%). Independently urinary NGAL was a predictor of mortality ($P = 0.0014$). Duration of pediatric intensive care unit stay was significantly increased with children with AKI ($P = 0.0382$). We also found urinary NGAL values were significantly high in children with septic shock (irrespective of AKI) (141.50) and comparatively low in dengue shock (16.00), this was statistically significant. **Conclusion:** Urinary NGAL is a good early marker of AKI in critically ill children presenting with shock with normal creatinine levels. Urinary NGAL rises early (<24 h) in children with AKI and correlates well with mortality, need for renal replacement therapy.

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Intensive care unit nurse workload assessment using therapeutic intervention scoring system-28 in a tertiary-care intensive care unit

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Objectives: To evaluate the impact of patient numbers assigned per nurse per shift and need for invasive mechanical ventilation (IMV) on intensive care unit (ICU) nurse workload using simplified therapeutic intervention scoring system (TISS-28). **Materials and Methods:** In this prospective, observational study, TISS-28 scores were calculated for duty nurses of medical-surgical ICU from 9th to 15th October, 2013. Patient demographic data, admission dates and diagnosis, nurse to patient ratio and need for IMV were recorded. TISS-28 data was recorded by ICU duty nurses. Scores were calculated as per standard method and analyzed statistically (*t*-test and Chi-square test). **Results:** A total of 45 patients (Mean \pm standard deviation [SD] 47.44 \pm 21.98 years age, 62.2% males) in the ICU were cared for over 7 days. Of the 21 (over 3 daily shifts) individual nursing assignments, 103 involved care of a single patient and 108 care of two patients. Mean \pm SD overall TISS-28 score was 43.17 \pm 14.97. TISS-28 score with single patient assignment (36 \pm 12) was significantly less than score (49.88 \pm 15.77) for two patient assignment ($P < 0.001$). Direct patient care time (calculated from TISS-28) was 456.19 \pm 159.51 min (526.04 \pm 169.79 min) for two and 382.94 \pm 107.49 min for one patient assignment; $P < 0.001$). Of 31/108 (28.8%) nurse shifts assigned two patients and 84/103 (81.5%) assigned single

patient ($P < 0.001$) involved care of patient(s) on IMV. TISS-28 scores for double patient assignment with IMV, double assignment without IMV, single assignment with IMV and single assignment without IMV were 56.77 \pm 15.43, 47.11 \pm 15.13, 38.84 \pm 8.39 and 24.11 \pm 8.41 respectively, all being significantly different ($P < 0.001$). The overall mortality during the study period was 7/45 (15.6%). **Conclusion:** Nursing workloads in ICU are high; being significantly more with decreased nurse-to-patient ratio and whenever assigned patient is on IMV.

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A study on clinical profile of geriatric patients with dyselectrolytemia in an intensive care unit setting

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Introduction: Dyselectrolytemia is among the most common biochemical abnormality among elderly admitted to the intensive care unit (ICU) and has a direct relation with patient outcomes. **Objectives:** To study the clinical profile of geriatric elderly admitted to ICU with dyselectrolytemia. **Materials and Methods:** It is a retrospective study on clinical profile of 312 patients admitted to the ICU of a tertiary care center with dyselectrolytemia. The data was retrieved from the MRD and was captured to a preformatted data sheet. The diseases that the geriatric patients were admitted with and their associated electrolyte imbalances were assessed. The data was analyzed using frequency, mean and percentages. **Results:** Hyponatremia was the most common metabolic abnormality encountered. It was observed in 54.8% of the patients presenting with stroke, 63.8% of the patients with chronic obstructive pulmonary disease (COPD), 71.4% of the patients presenting with Bronchial Asthma, 61.9% of the cases with Myocardial infarction and 50% of the patients presenting with Pneumonia. Hypernatremia was observed in 2.7% of the patients admitted for stroke, 1.4% of the patients with COPD and 7.7% of the patients with pneumonia. Hypokalemia was observed in 18.1% of the patients with stroke, 24.6% of the patients with COPD, 35.7% of the patients with bronchial asthma and 28.6% of the patients with myocardial infarction. Hyperkalemia was observed in 2.8% of the patients with CVA, 7.2% of the patients with COPD, 7.1% of the patients with bronchial asthma and 9.5% of the patients with myocardial infarction. **Conclusion:** Hyponatremia followed by hypokalemia were the common electrolyte imbalances amongst geriatric elderly admitted at our center. Early diagnosis and intervention can help improve the outcome in geriatric patients with dyselectrolytemias.

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C-spine decision rule validation for India

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Background: Trauma is a common presenting complaint to the Emergency Department in India and raises concerns for cervical spine injury. Most trauma patients do not require imaging of the cervical spine, but receive it regardless. Currently NEXUS criteria is been followed, Center for Civic and Social Responsibility (CCSR) rule is simple and easier to access. **Aim:** To validate the use of clinical decision rules for cervical spine imaging for patients in India. **Methodology:** This is a prospective, analytical, multi-centered and comparative study done in following hospitals Vinayaka Mission Hospital and 7 other tertiary care centers in India from January 2012 to September 2013. All the patients diagnosed of having blunt trauma and undergoing cervical spine imaging were included in this study. Those with penetrating injury and injury greater than 48 h prior to presentation were excluded. All patients who were included in the study were clinically assessed

based on NEXUS criteria and Canadian c-spine rule criteria. All patients subsequently had cervical spine imaging done. Findings of the cervical spine imaging and clinical evaluation were correlated and compared. **Results:** The study sample analyzed consisted of 1008 cases, of which 88.5% were male and 11.5% were female and 96.7% were due to road traffic accidents and 3.3% were due to fall injury. On comparing NEXUS versus CCSR the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) as follows NEXUS: Sensitivity-88.07%, Specificity-53.51%, PPV-50.41%, NPV-89.31% and CCSR: Sensitivity-99.72% Specificity-90.09%, PPV- 84.38%, NPV-99.83%. **Conclusion:** CCSR is superior to NEXUS criteria in decision making for cervical spine imaging.

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Is mobilization lacking in post-surgical patients during intensive care unit stay?

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Background: Post-operative pulmonary complications following surgery remain an important cause of morbidity, contributing to significant increase in patient discomfort, length of hospital stay and overall hospital costs. Development and implementation of protocols based on best-available evidence are advocated to address the variation in management, facilitate clinical decision making and optimize the use of evidence by practitioners. While there is sufficient evidence for physiotherapy interventions used in intensive care unit (ICUs), there is an urgent need to determine the optimal service delivery model. This could provide the standardize care to facilitate patient outcome and decrease costs. **Objective:** To identify how physiotherapy is delivered to patient following surgery and how much variation exists from the existing algorithm. **Methods:** This is an ongoing observational study in which assessment form was filled by physiotherapist for each post-surgical patient during their ICU stay. Assessment form has focused on the role of specific physiotherapy techniques used in the postoperative period. This includes the comparative effectiveness of different treatment modalities like conventional chest physiotherapy including deep breathing exercises, incentive spirometry, limb exercise and ambulation. This collected data was compared with existing algorithm used for surgical patients. **Results:** A total of 15 patients have been recruited among 9 male and 6 female, age ranges between 20 and 70 years. Results shows that post-surgery 99% patients received chest physiotherapy, 86% patients received limb exercise and only 33% patients mobilized during ICU stay. **Conclusion:** It appears that early mobilization is lacking in the surgical ICU while the provision of intensive chest care is high. Early mobilization needs to be aggressively implemented in the surgical ICU as this may have a tremendous impact on patient care and hospitalization.

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Therapeutic hypothermia: A cool concept with hot results

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Objective: The objective is to observe practices of inducing therapeutic hypothermia (TH) in comatose patients following return of spontaneous circulation (ROSC) after in-hospital cardiac arrest and determine its safety and efficacy. **Materials and Methods:** A prospective observational study was carried out in a tertiary care open type multidisciplinary intensive care unit. Standard neuroprotective measures were initiated for all patients who had ROSC after resuscitation from in-hospital cardiac arrest and TH instituted (using surface cooling methods) based on the bedside consultants decision. Basic demographic data, incidence of coagulopathy and nosocomial infections within the first 14 days and

neurological recovery of those who survived at hospital discharge were recorded. Descriptive statistical methods were applied using Microsoft Excel, Redmond, Washington: Microsoft, 2007. **Results:** TH was initiated in 27 of 36 patients (17M/10F age: 58.5 ± 15.56) who sustained in-hospital cardiac arrest. Combination of an initial non-shockable rhythm along with severe sepsis and significant coagulopathy was the most common reason for not initiating on TH. Target temperature was achieved within a median time of 525 min after ROSC and within 307 min of initiation of TH. The protocol was interrupted early in only five patients. The median time taken to rewarm to 36°C was 6 h. Nearly 81.5% of patients offered hypothermia survived of which 50% of those with non shockable rhythm and 37% of those with a shockable rhythm had good neurological recovery. Six patients had acquired nosocomial infections while only one patient had clinically significant coagulopathy. **Conclusion:** TH can be safely and effectively achieved and maintained by surface cooling techniques. Despite the delay in achieving the target temperature our results not only showed comparable survival benefit with good neurological recovery for shockable rhythms but also comparable and superior results for non shockable rhythms, not demonstrated in any previous trials. The incidence of clinically significant adverse effect was low.

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Comparison of high frequency oscillatory ventilation and conventional low tidal volume ventilation in H1N1 influenza pneumonia related severe acute respiratory distress syndrome

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Background: High frequency oscillatory ventilation (HFOV) is a promising rescue therapy for refractory hypoxia in severe acute respiratory distress syndrome (ARDS). HFOV had been used during H1N1 pandemic for refractory hypoxia in many intensive care unit (ICUs) in the world with variable success rates. However, recent publications have raised questions about the efficacy and safety about this modality when compared to conventional lung protective ventilation (CLPV). **Objective:** Comparison of HFOV with CLPV strategy in patients with H1N1 influenza pneumonia related severe ARDS. **Methodology:** This is a single centered retrospective comparative study conducted in our 55 bedded ICU which is a regional tertiary care referral center for severe H1N1 influenza pneumonia cases. We retrieved data of all patients with H1N1 influenza pneumonia related severe ARDS treated in our ICU during October 2009 to April 2013. Our ICU had only tone HFOV machine during the pandemic (Sensormedics 3001B, now Carefusion 3001B). Patients were divided into two groups: HFOV group (received HFOV at first eligibility) and CLPV group (did not receive HFOV at first eligibility due to non-availability of HFOV). Eligibility criteria for rescue therapy by HFOV (first HFOV eligibility) were: (1) P/F ratio ≤ 100 (2) positive end expiratory pressure (PEEP) needed above 12 cm to maintain $PO_2 \geq 55$ mmHg (3) plateau pressure ≥ 30 cm on volume controlled ventilation (6 ml/kg; ARDSnet protocol). There was no selection or omission bias for HFOV application and HFOV was applied to first eligible patient. If another patient met the eligibility criteria for rescue therapy by HFOV and the HFOV machine was not available, that patient continued with CLPV and enrolled in CLPV group HFOV protocol: Mean airway pressure and FiO_2 adjustment to keep $PO_2 \geq 55$ mmHg. Amplitude and frequency adjustments as per pH and PCO_2 targets. CLPV protocol - tidal volume 6 ml/kg to 4 ml/kg of predicted body weight attempting plateau pressure < 30 cm, PEEP and FiO_2 adjustment to maintain $PO_2 \geq 55$ mmHg. Respiratory rate was adjusted to keep pH > 7.15 . Patient demographic data, laboratory parameters, hemodynamic variables, oxygenation and ventilator settings were recorded while on conventional low tidal volume ventilation at first HFOV eligibility in all patients. **Results:** During the study period of 43

months, patients with proven H1N1 influenza pneumonia with severe ARDS were screened for first time HFOV eligibility criteria. Totally 45 patients who met the rescue therapy criteria were further grouped into HFOV group (25 patients) and CLPV group (20 patients) depending upon modality of ventilation received after satisfying first time HFOV eligibility criteria. 1 out of 25 patients in HFOV group and 1 out of 20 patients in CLPV group received extracorporeal membrane oxygenation for their refractory hypoxia and were excluded from this analysis. Thus in HFOV group 24 patients were retained for analysis and in CLPV group 19 patients were retained. Both the groups were comparable for differences with Fisher's *t*-test for qualitative variables and ANOVA for quantitative variables [Table 1], except for higher mortality in CLPV group (16/19 [84.4%] vs. 12/12 [50%], *P* = 0.026). On logistic regression analysis to find independent variables differentiating the two groups, mortality was higher in CLPV group (*P* = 0.02, odds ratio [C.I.] = 71.60 [1.85-2766.59]) compared to HFOV group. **Conclusion:** HFOV when applied as a rescue therapy for refractory hypoxia due to severe ARDS caused by H1N1 influenza pneumonia, is associated with a better outcome when compared to conventional low tidal volume ventilation lung protective ventilation strategy.

Table 1: Comparison of HFOV group and CLPV group

	CLPV (n = 19)	HFOV (n = 24)	P value
Age (years) #	41.15 (16.90)	32.83 (11.71)	0.06
"Flu" symptom onset to refractory hypoxia (days) #	8.42 (4.36)	7.17 (2.97)	0.27
SOFA score #	4.95 (1.35)	4.62 (1.17)	0.41
pH #	7.24 (0.13)	7.29 (0.15)	0.32
PCO ₂ mmHg #	59.89 (18.10)	59.92 (20.28)	0.99
P/F ratio #	70.63 (26.99)	76.79 (31.06)	0.50
OI #	38.88 (15.47)	35.70 (17.81)	0.54
Pplat cm H ₂ O #	29.57 (3.51)	30.46 (1.18)	0.26
VAP* (%)	13 (68.4)	18 (75)	0.74
Barotrauma* (%)	3 (15.8)	10 (41.7)	0.10
Prone* (%)	9 (47.4)	10 (41.7)	0.76
Steroid* (%)	13 (68.4)	16 (66.7)	1.00
Mortality* (%)	16 (84.2)	12 (50)	0.026

#ANNOVA for quantitative variables; *Fisher's test for qualitative variables. HFOV: High frequency oscillatory ventilation, CLPV: Conventional lung protective ventilation, SOFA: Sequential organ failure assessment, OI: Oxygenation index, VAP: Ventilator associated pneumonia, ANOVA: Analysis of variance

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Mortality associated with hair dye (Super Vasmol) poisoning: Experience from an intensive care unit in rural India

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Objectives: To describe the characteristics and the outcomes of patients with hair dye poisoning in a rural district hospital. **Materials and Methods:** Retrospective chart review of patients admitted in an intensive care unit because of hair dye poisoning from May 2010 to May 2013. **Results:** The study included 102 patients, with an average age of 23 years. Of them, 78% (80) were female; 42% (43) belonged to scheduled casts; 63% (65) were married; 32% (33) took more than 50 mL of hair dye; 16% (17) arrived after 5 h of ingestion; 75% (77) had increased salivation and 40% (39) had cervical edema. In 19 cases an emergency tracheostomy was performed and 16 patients required endotracheal

intubation. The median of days on mechanical ventilation was two. 47% (48) presented with dark urine, 7 of them developed an acute renal failure within 3 days of the ingestion and dialysis was performed in 3 of them. 17% (18) had a transient elevation of transaminases with peak levels at the 2nd and 3rd day. No patient died due to liver failure. Six cases (5.9%) died: two due to cardiogenic shock (myocarditis); two due to hypoxia followed by brain death; and two due to renal and respiratory failure. **Conclusion:** In our rural setting, where patients were managed with early securing of the airway and aggressive fluid management, the mortality of hair dye poisoning was low.

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Retrospective analysis of young AMI in a tertiary care cardiac center with respect to risk factors and arteries involved

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Objective: Incidence of acute myocardial infarction (AMI) in young is significantly increased in last few years. There have been very few studies to find out the risk factors involved in young AMI in Indian settings. We also tried to find out whether coronary arteries are commonly involved in young. **Materials and Methods:** It is a retrospective analysis of case records of young AMI who had undergone coronary angiogram in our tertiary care cardiac center from October 2012 to November 2013. Young AMI were defined as patients with age less than or equal to 45 and admitted with complaints of chest pain. **Results:** Totally 134 patients of young AMI were admitted between October 2012 and November 2013. Out of 134 patients only 6 (4%) were female. Among risk factors hypertension was the most common risk factor which was found in 42 (31.3%) patients. Hyperlipidemia was found in 37 (27.6%) patients. Smoking was found in 32 (23.8%) patients. Diabetes mellitus was found in 2 (21.6%) patients. Previous Treadmill test was positive in 5(3.7%) patients. Among young AMI, left anterior descending (LAD) artery was the most common culprit vessel which was found in 74 (55.2%) patients. Right coronary artery and left circumflex was involved in 31 (23%) and 13 (9%) respectively. Double vessel disease was found in 22 (16.4%) patients. Triple vessel disease was found in 12 (8.9%). **Conclusion:** We found that risk factors in young are almost similar to overall prevalence with higher incidence of hypertension and smoking in this study group. There is higher prevalence of LAD in young AMI. Alarmingly incidence of DVD and TVD were also significantly high.

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Therapeutic hypothermia (TH) induction during resuscitation: A case control trial

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Objectives: To evaluate the feasibility, safety and efficacy of induction of hypothermia during cardiac arrest resuscitation before the return of spontaneous circulation (ROSC) (intra-arrest cooling [IAC]) in hospital cardiac arrest (IHCA) patients. **Materials and Methods:** IAC initiated by infusion of iced saline in all eligible adult IHCA patients from January to June 2013, continued further following ROSC with surface cooling for 24 h. Neurological status was assessed by Pittsburgh CPC score following re-warming on 2nd day, 7th day and at the time of discharge. All patients were monitored for hypothermia related complications such as arrhythmias, coagulopathy and electrolyte disturbances. After initial 25 cases in the study group, we have initiated conventional post ROSC hypothermia in the control group. IRB and institutional ethical clearance was taken. **Results:** Among 34 patients in study (IAC) group, 9

were excluded. (5 were fully awake after ROSC, 4 died without ROSC). Initial cardiac rhythm was VT in 2 (8%) and asystole in 23 (92%). Seven (28%) patients had good neurological recovery. Mean time to achieve target temperature (TTT) was 208 (SD 38) min. In control group (23) patients, initial rhythm was VT in 1 (4.3%) and asystole in 22 (95%). Two patients (8%) had good neurological recovery. Mean TTT was 219 (SD 85) min. No statistically significant difference was noted in ROSC, TTT, neurological recovery and survival between the groups. There were no reported serious complications due to hypothermia in both groups. **Conclusion:** Initiation of hypothermia during resuscitation is safe and feasible. IAC group showed better neurological recovery in comparison with conventional hypothermia group in IHCA patients; however it was statistically insignificant due to small sample size.

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Tracheostomy in infants with complex congenital heart defects after cardiac surgery-our experience

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Introduction: Infants with complex congenital cardiac defects are more likely to be associated with co morbidities. Involving multiple organs; the commonest being respiratory defects. In view of this, these infants are at high risk of requiring prolonged ventilatory support and need for tracheostomy. We present our outcome of Infants with complex congenital heart defects who underwent tracheostomy post cardiac surgery. **Materials and Methods:** This was a single unit retrospective study of 950 infants with congenital heart defects who underwent cardiac surgery from January 2008 to August 2013. Infants who required tracheostomy were analyzed on basis of various parameters. **Result:** A total of 13 infants (1.3%) with complex congenital heart defects required tracheostomy. Out of these 9/13 patients were male (69%) and 3/13 (23%) females. The subjects were 1d-8 mo old (mean 4.5 mo) and had a weight of 2.7-6.5 Kg (Mean-4 Kg). 23% (3/13) of the patients had congenital syndrome in the form of Downs Syndrome. 3/13 patients (23%) had transposition with intact ventricular septum and transposition with VSD (dTGA IVS, dTGA, VSD), 3/13 patients (23%) had complete atrioventricular canal defect, 3/13 patient (23%) had total anomalous pulmonary venous drainage (TAPVD) out of which one had mixed type TAPVD, remaining 2/13 patients (15%) had VSD and tetralogy of fallot with anomalous left coronary artery from pulmonary artery. In addition 2/13 patients (15%) had associated cong defects in the form of Bronchomalacia, 1/13 patient (7.6%) had posterior urethral valve with renal failure, scoliosis and left bronchial stenosis and left lung hypoplasia in 1/13 patient (7.5%). Pre-existing sepsis was present in 8/13 patients (61%), GI perforation and NEC in 2/13 patients (15%), acute kidney injury was present in 5/13 patients (38%) and acute respiratory distress syndrome in 1/13 (7.5%). All these patients had a high comprehensive Aristotle score of >10 (high risk) of which 8/13 patients (61%) had a score of 10-15 and 5/13 (38%) had a score of >15. The final outcome, duration of ventilation and the length of intensive care unit and hospital stay was higher in patients with Aristotle score of >15. **Conclusion:** Infants with complex congenital heart defects are at high risk for prolonged ventilatory support. Tracheostomy is a very good option in such infants and if done skillfully is unlikely to have any long-term complications.

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Clinical profile of obstetric admissions and the efficacy of scoring systems in predicting mortality in a tertiary private health care system

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Aims and Objectives: To study the characteristics of obstetric patients requiring intensive care unit (ICU) admission, their demographic profile, outcomes and the role of current scoring systems in estimating mortality. **Materials and Methods:** A prospective observational study was conducted between October 2011 and September 2013, approved by the institutional ethics committee of CARE hospital. **Inclusion Criteria:** All patients admitted to the ICU during pregnancy or up to 42 days postpartum. **Exclusion Criteria:** Non-obstetric female patients admitted to the ICU for either gynecological, medical or surgical causes. Demographic and ICU related data was collected. Acute physiology and chronic health evaluation II (APACHE II), sequential organ failure assessment, simplified acute physiology score (SAPS II) and MPM scores were used. Data were analyzed by SPSS version 16. The Student's *t*-test, Mann-Whitney U-test, Fishers exact tests were used. **Results and Conclusions:** The mean age was 26.5 years. Mean length of ICU stay was 5.11 days and hospital stay was 7.4 days. Mean number of days for ventilation was 2.27 and for renal replacement therapy (RRT) was 1.87 days. Among those who died all required ventilation and RRT. Nearly 51% of survivors required some intervention i.e. 42.85% required ventilation and 20.4% RRT. Primigravidae were most vulnerable for obstetric complication. HELLP Syndrome constituted the major (23%) cause and HELLP Syndrome was the leading cause of death. SAPS score fared best in predicting mortality and APACHE II score, the poorest.

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Patients discharged against medical advice: What happens to them?

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Introduction: Discharge against medical advice (AMA) is not an uncommon request from family members of patients in Indian Critical Care Units (CCU). These patients are lost to follow-up and their outcomes remain unknown. The exclusion of these patients from analysis of research studies and quality audits such as calculation of standardized mortality ratio confounds results and reports.. In this study, we seek to explore the proportion of CCU patients discharged AMA and their 28 day outcome. **Materials and Methods:** We conducted a prospective study of all patients admitted to our CCU in a tertiary care hospital in Chennai, from July to October 2013. All patients who were discharged AMA during this period were included in the study. Demographics, acute physiology and chronic health evaluation II (APACHE II) data and 28 day outcome of these patients were collected and compared to patients who did not request discharge AMA (control group). Follow-up of the patients discharged AMA was done by phone call to the family by a dedicated research coordinator. **Results:** A total of 241 patients were admitted to the CCU during the study period. 16.2% ($n = 39$) of these patients required discharge AMA. The mean APACHE score of the AMA group was higher than the control group (29.79 vs. 22.55 respectively; $P < 0.001$). During the 1 month follow-up of patients discharged AMA, 12 (30.8%) were alive, 15 (38.5%) were dead and the outcome could not be obtained for 12 patients (30.8%). **Conclusion:** A significant proportion of patients in the CCU leave AMA for varied reasons despite high severity of illness. Contrary to expectations almost one-third of these patients (30.8%) are alive at 28 day follow-up. Understanding the outcomes of these patients will help refine CCU quality audit reports and research study results.

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Family presence during invasive procedures in the critical care: An integrative review

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Background: While some clinicians remain undecided on family

presence during invasive procedures, others, including nurses, support the practice. **Objective:** To perform an integrative review of the literature to answer the question: "What is the perception of nurses regarding family presence during invasive procedures in the critical care setting?" **Methods:** This review used an integrative method to explore the available evidence on this issue, which has not been fully investigated. The study used CINAHL and Medline databases to search for studies, focusing on articles published in English after and including, 1993. **Results:** The result produced ten articles suitable for this review (six studies were quantitative, two were of mixed-method designs and two were qualitative). Findings from the studies addressed five themes. Two commonly discussed themes were positive attitudes toward family presence from health care providers, particularly nurses and negative attitudes indicating that families might interfere with care and increase the stress on the critical care team. Three less commonly discussed themes in the collected data were the lack of official policies in hospitals, families claiming the right to be present and maintaining connectedness in the patient-family relationship. **Conclusions:** This integrative review of the literature indicates that evidence is growing on this topic and that some health care professionals, particularly nurses, accept family inclusion in a positive way. The notion of preventing family members' presence results from thinking that invasive procedure efforts are too traumatic for the family or that family presence interferes with the performance of clinicians. It is important for critical care nurses to be reflective and to review their perceptions of this issue and the implications for their practice.

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Stroke volume variation guided fluid therapy in severe septic shock — when to stop?

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Introduction: Surviving sepsis campaign guidelines^[1] recommend application of dynamic parameter like stroke volume variation (SVV) for fluid resuscitation. **Objective:** In the current cohort analysis, we intend to study the outcome predictors in severe septic shock patients in whom SVV had been used for fluid resuscitation. **Methods:** This was a retrospective study conducted in a 55 bedded tertiary level mixed intensive care unit (ICU). Inclusion criteria were: (1) Septic shock patients who had received a minimum of 30 ml/kg volume expansion (VE) before vasopressor therapy (2) norepinephrine ≥ 0.1 mcg/kg/min (3) CVP ≥ 12 mmHg (4) mechanical ventilation under deep sedation. Exclusion criteria were arrhythmias and spontaneous mode of ventilation. During the 24 h study period, SVV was continuously monitored with Third Generation FloTrac-Vigileo system (version 3.02). Intravenous fluids were given in bolus form to keep SVV $< 12\%$ throughout the study period. Vasopressors and ionotrope infusions were titrated to keep mean arterial pressure (MAP) ≥ 65 mmHg. We used analysis of variance (ANOVA) test. Statistical analysis was done using SPSS statistics 20.0. Statistical significance is derived at $P < 0.05$. **Results:** Consecutive 45 patients with severe septic shock in whom SVV guided fluid therapy was instituted were studied. Average dose of Norepinephrine was 0.19 ± 0.01 mcg/kg/min at baseline. In addition, 22 patients were on Dopamine, 8 patients were on Dobutamine or Epinephrine for ionotropy and 10 patients were on vasopressin as third vasopressor agent. Average amount of SVV guided fluids infused was 4.84 ± 0.91 L in 24 h 33.33% (15/45) patients survived till hospital discharge (Survivors) and 66.66% (30/45) patients died in the ICU/hospital (non survivors). Table 1 shows the baseline comparison of survivors and non survivors. Table 2 shows predictors of mortality by regression analysis at 24 h of study period. Worsening of PO_2/FiO_2 ratio ($P = 0.01$) and SVV persistently above 12% ($P = 0.01$) were independently and significantly related with the mortality. **Conclusion:** Worsening of oxygenation and persistent higher SVV ($\geq 12\%$) at 24 h of SVV guided fluid resuscitation are independent predictors of mortality in severe septic shock.

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Table 1: Comparison of baseline parameters

	Survivors	Non-survivors	P value
Age (years)	59.67 (15.23)	60.13 (15.03)	0.92
Sex (female) (%)	5 (33.33)	7 (23.33)	0.49
Mean arterial pressure (mm Hg)	70.13 \pm 8.01	70.63 \pm 7.51	0.84
CVP (mm Hg)	12.93 \pm 3.08	13.83 \pm 3.08	0.36
Lactates (mmol/L)	3.07 \pm 3.77	4.13 \pm 3.48	0.35
Urine output ml/h	33.33 \pm 29.50	35.33 \pm 40.51	0.87
SVV at baseline	20.80 \pm 5.26	17.87 \pm 3.80	0.07
P/F baseline	261.33 \pm 100.94	211.31 \pm 131.80	0.21
ScvO ₂ (mm Hg)	67.57 \pm 4.94	65.72 \pm 3.53	0.57
LV systolic function (%)	50.33 \pm 10.08	48.83 \pm 8.57	0.61

CVP: Central venous pressure; SVV: Stroke volume variation; ScvO₂: Central venous oxygen saturation, LV: Left ventricular

Table 2: Predictors of mortality on logistic regression analysis

Variable at 24 h	B value	Standard error	P value	OR (CI)
CVP (mm Hg)	-0.13	0.25	0.60	0.88 (0.95-1.06)
Urine output (ml/hr)	0.09	0.01	0.55	1.01 (0.98-1.04)
Lactate (mmol/L)	-0.70	0.47	0.13	0.49 (0.20-1.23)
Fluid volume received (L)	0.27	0.40	0.50	1.31 (0.60-2.88)
P/F ratio	0.01	0.01	0.01	1.01 (1.01-1.02)
SVV ($< 12\%$)	2.65	1.06	0.01	14.20 (1.78-113.23)

CVP: Central venous pressure; SVV: Stroke volume variation; CI: Confidence interval; OR: Odds ratio

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Cost of intensive care in India: A 6 year tertiary care experience

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Objective: This prospective ongoing analysis is being done to monitor and analyze the determinants of costs of providing intensive care in a tertiary care center in a metropolitan city. Effect of the changing costs on quality of care is being assessed. **Materials and Methods:** The data was collected from 1 March 2006 onwards and is ongoing. Details of all patients including the investigations, interventions and costs were recorded during intensive care unit (ICU) stay and at discharge from the unit. Hospital stay was not included. Running costs of the ICU was recorded on a quarterly basis. Fixed expenditures and capital investment were periodically updated. Data was analyzed annually and compared with the previous year data. **Results:** In the past 6 years the cost of intensive care has risen by 112% overall. Routinely used equipment like ventilators and infusion pumps showed a very high rise in tariff. Similarly oxygen therapy and hematology tests showed the highest rise. The outflow seemed the highest for fixed costs. Professional remuneration for procedures showed a modest rise. The cost of reagents and dialysis stayed nearly on par with the inflation pattern and could not justify the higher costs to patients. **Conclusions:** Intensive care costs are

rising in India. The average daily bill exceeds the per capita income by several times. Fixed costs seem inevitable. However, professionals don't seem to be benefitted by the rise in costs of providing intensive care.

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Full outline of unresponsiveness score versus Glasgow Coma scale in critically ill patients with altered sensorium: A comparison of inter-observer variability and outcomes

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Background: Glasgow Coma scale (GCS), the most widely used tool for evaluation of level of consciousness has various limitations. The full outline of unresponsiveness (FOUR) score is a possible alternative. This study was designed to examine the inter-rater reliability and outcome predictability of GCS and FOUR score in a mixed intensive care unit (ICU) of a tertiary care teaching institution. **Methods:** The GCS and FOUR scores of 111 adult patients with altered sensorium admitted to the ICU were assessed by the Senior Resident (SR), Junior Resident (JR) and Staff Nurse (SN) of ICU as early as possible after admission. The outcomes measured included survival and modified Rankin Scale (mRS) and Glasgow Outcome scale (GOS) at discharge. **Results:** The inter-observer agreement was measured using the kappa (k) statistic. The k values for GCS ranged from 0.472 to 0.555 with the higher k score of 0.555 recorded between SR and JR. The GCS component score agreement was 65.8% for eye opening, 58.6% for motor response and 98.2% for verbal response. The k values for FOUR score ranged from 0.352 to 0.448 with the higher k score of 0.448 recorded between SR and JR. The component score agreement was 57.7% for eye movement, 60.4% for motor response, 76.6% for brainstem reflexes and 81.1% for respiration. A logistic regression analysis showed no significant association of either score with the duration of ICU stay or of mechanical ventilation. Survival in ICU was correlated with both GCS and FOUR scores on logistic regression. GOS and mRS were not correlated with either GCS or FOUR score on ordinal regression. **Discussion:** The inter-observer agreement with FOUR score was not superior to GCS in this study possibly due to the lack of familiarity. Both the scores were strongly correlated with survival.

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Prognostic indicator of dengue fever

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Dengue infection is one of the common tropical infections in India with severity ranging from mild discomfort to fatal disease. Treatment is mostly supportive. Dengue disease is classified by WHO in three patterns depending on severity in dengue fever, dengue hemorrhagic fever and dengue shock syndrome. We want to assess different patient characteristics and hematocrit on presentation as indicators for the prognosis of severity and duration of illness. We present retrospective cohort analysis of around 500 patients who were admitted with diagnosis of dengue in a tertiary care hospital in year 2012 and 2013.

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Ulinastatin therapy in severe sepsis patients; a retrospective study

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Introduction: Sepsis is a major killer in hospitalized patients none of the new therapies have proven survival benefits. After the era of Xigris no other therapy is available. Ulinastatin (U-Tryp) is being used in several Asian countries, coated promising results in sepsis. Ulinastatin inhibit

coagulation and fibrinolysis and has the anti-inflammatory effect. **Objective:** The study is to analyze the outcomes in terms of mortality and monitor reduction in organ dysfunction. **Methods:** This is a retrospective cohort study compare potential efficacy of ulinastatin in severe sepsis patients, who received ulinastatin versus those didn't. Patients enrolled were admitted since November 2012 to August 2013, who were fulfill the criteria. Inclusion criteria were 18 years with severe sepsis. Patients were allocated in two groups Group A and Group B. Each consists of 50 patients. Group A patients; who received U-trip therapy for 5 days along with antibiotic and supportive care. Group B patients; who received antibiotic and supportive care. Acute physiology and chronic health evaluation (APACHE) II and sequential organ failure assessment (SOFA) scores will be done on admission to intensive care unit (ICU) 3rd, 5th day and on discharge or death. Exclusion criteria were; terminally ill, acute myocardial infarction, CVA, hypersensitivity to U-trip, chronic treatment with immunosuppressive drugs. We analyze clinical parameters in both groups and outcomes in terms of mortality, ICU length of stay, ventilator days, requirement of vasopressors accordingly. **Results:** Mortality in group B (46%) was more than group A (34%), 12% survival benefit in ulinastatin group but P was not significant ($P = 0.22$). We did not find any significant difference in group A and B patients in ICU length of stay, ventilator days and requirement of vasopressors. In group A, there was a significant reduction in APACHE II score at day 3 (16.50%, $P = 0.006$) and day 5 (14.50%, $P = 0.04$) compare to day one. We also find a reduction in SOFA score 9.0% on day 3 ($P = 0.21$) and 12.0% at day 5 ($P = 0.14$). There was no reduction in APACHE and SOFA score were seen in group B. **Conclusion:** Ulinastatin therapy seems to be beneficial in severe sepsis patients.

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Comparative evaluation of central venous pressure and sonographic inferior vena cava variability in assessing fluid responsiveness in septic shock

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Objective: Fluid infusion, most critical step in resuscitation of septic shock, needs preferably continuous invasive hemodynamic monitoring. The study was planned to evaluate the efficacy of ultrasonographically measured inferior vena cava collapsibility index (IVC CI) in comparison to central venous pressure (CVP) in predicting fluid responsiveness in septic shock. **Materials and Methods:** A total of 36 patients of septic shock requiring ventilatory support (invasive/noninvasive) were included. Patients with congestive heart failure, raised intra-abdominal pressure, poor echo window were excluded from the study. They were randomly divided into two groups based on the mode of fluid resuscitation-Group I (CVP) and Group II (IVC CI). Primary endpoints were mean arterial pressure (MAP) of ≥ 65 mmHg and CVP >12 mmHg or IVC CI $<20\%$ in Group I and II respectively. Patients were followed until achievement of end points or maximum of 6 h. Outcome variables (pulse rate, MAP, urine output, pH, base deficit and ScvO₂) were serially measured until end of study. At 2 and 4 weeks survival was used as secondary end point. **Results:** Primary endpoint was reached in 31 patients (15 in Group I and 16 in Group II). Fluid infusion, by either method, had CVP increased and IVC CI decreased having negative correlation between them (Pearson correlation coefficient -0.626). There was no significant difference in amount of fluid infused and time to reach end point in two groups. Comparison in outcome variables at baseline and endpoint showed no significant difference including mortality. **Conclusion:** CVP and IVC CI are negatively correlated and both methods can be used for resuscitation, with IVC CI being non inferior to CVP.

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Zero tolerance for mortality in organophosphorus poisoning in intensive care unit

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Objectives: The aim of the following study is to determine the clinical outcome in organophosphorus poisoning with treatment guidelines. **Materials and Methods:** The study was carried out from December 2012 to December 2013 among patients of all ages admitted with a history of ingestion of organophosphorus compounds in Jeevan Rekha Critical Care and Trauma Hospital. Demographic profile, presentation, complications and the health outcome were statistically analyzed. **Results:** Organophosphates are the most common mode of poisoning especially in rural population. Out of 19 cases studied, 16 (84%) were suicidal, 3 (15.7%) accidental and 1 homicidal (5.2%). 11 were males (57.89%) and 8 were females (42.10%) of mean age 31.5 ± 17 years. 17 (89%) presented with vomiting excessive salivation, sweating, meiosis, blurred vision, giddiness, 2 (10.5%) Unconscious ness of which 1 had post cardiac arrest health information exchange before admission. Both these patients had quadriplegia and respiratory failure, early photodynamic therapy was done to ensure the need of prolonged ventilation. Mechanical ventilation required in 6 cases including post cardiac arrest intermediate syndrome, aspiration pneumonitis and shock with. The mean duration of intensive care unit (ICU) stay was 10 ± 4 days all 19 cases were treated with high dose pralidoxime 8 g daily in infusion for 5 days irrespective of time elapsed after poison ingestion, intermittent atropine targeted to dryness of secretion was given up to dryness of secretions. Nutrition, total calories, hand hygiene and infection control were maintained throughout the ICU stay. **Conclusion:** Zero tolerance is the non-acceptance of morality in organophosphorus poisoning cases in ICU. All patients recovered with the clear cut guidelines, use of high dose PAM, early tracheostomy, intermittent use of atropine targeted to dryness of secretions followed by good supportive care and mechanical ventilation and monitoring.

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Thrombocytopenia in dengue: Platelet transfusion threshold dilemma

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Objectives: The aim is to determine the indications for platelet transfusion in dengue patients. **Materials and Methods:** A total of 37 patients were admitted to our intensive care unit (ICU) during the months from August to November in the year 2013 had sufficient baseline data for analysis. We included patients in this prospective study according to WHO diagnostic criteria, which are dengue IgM or non-structural protein 1 antigen positive with any one of the following: Bleeding; platelet count $<100,000/\text{mm}^3$; hemoconcentration (Hct $>45\%$); hypoalbuminemia and polyserositis. Platelet transfusion was held up with following criteria:

Very low risk of bleeding $>50,000/\text{mm}^3$

Low risk- $30-50,000/\text{mm}^3$

Moderate risk- $20-30,000/\text{mm}^3$

High risk $<20,000/\text{mm}^3$

However no platelet transfusion was done even below $20,000/\text{mm}^3$ count if there was no e/o of bleeding. **Results and Discussion:** Among 37 cases 29 were males, mean age of presentation was 25.3 years. Most common indication for ICU admission was thrombocytopenia with polyserositis and raised hematocrit, others being deranged liver function test (LFT), impending acute respiratory distress syndrome, bleeding, acute renal failure. Eight patients had bleeding manifestations, advanced pancreatic cancer (APC) of six were $>50,000/\text{mm}^3$, out of remaining two patients only one needed platelet transfusion. Nearly 88% of the patients had deranged LFT and 23% required fresh-frozen plasma transfusion. We found that contradictory to conventional practice for platelet transfusion at $<20-30,000/\text{mm}^3$, thrombocytopenia can be well-tolerated up to a level of $5000/\text{mm}^3$ or less unless patient has some bleeding manifestations. APC may not be well-correlated with bleeding risk because there are other mechanisms involved in causation of bleeding in dengue. Patients showed bleeding tendencies even with APC $>50,000/\text{mm}^3$, those with APC $<20,000/\text{mm}^3$ did not show any e/o bleeding. **Conclusion:** APC does not correlate with bleeding in dengue, therefore low platelet count is not absolute indication for platelet transfusion.