ORAL PRESENTATIONS

01

Which nutrition screening tool for Geriatric critically ill?

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Background: Malnutrition is a known cause of increased morbidity and mortality in critically ill patients. Geriatric patients may be at a specially increased risk of malnutrition. Despite this, screening for nutritional status is not yet standardized upon admission in many critical care units. There are many screening tools available, allowing to identify patients at risk, only a few designed for the geriatric patient population. Having previously established malnutrition as a cause of poor long term outcome in our critically ill geriatric patients, we compared two such screening tools with an aim of identifying a robust screening test for our patients. **Methods**: For this prospective, descriptive, non-randomized study, 111 consecutive patients admitted to the intensive care unit, aged > 65 years underwent the malnutrition universal screening tool (MUST) and the geriatric nutrition risk index (GNRI) screening tests. A predefined definition of malnutrition risk was used as the reference test. Predefined standard definitions of malnutrition risks were taken as the gold standard to evaluate the sensitivity, specificity and predictive values of the tools. The k statistic was calculated to measure the agreement between the tools. The Shrout classification was used to interpret its values as follows- 0-0.1, virtually none; 0.11-0.4, slight, ; 0.41-0.6, fair; 0.61-0.8, moderate; 0.81-1.0 substantial (agreement). **Results**: The mean age of the patients screened was 74.7 ± 8.4 years (65–97 years). The standard definition, MUST and GNRI identified 52.2 %, 65.4 % and 64.9% to be malnourished respectively. The sensitivity and specificity of the tests were 96.5 % CI (87.9-99.5%) and 72.3% CI (57.5-84.5%) for MUST and 89.5% CI (75.2-96.7%) and 55.0% CI (75.2-96.9%) for GNRI respectively. Screening was not possible by GNRI tool in a higher percentage of the population than with the MUST tool (31% vs 4% respectively). The agreement between the tools was moderate for Standard- MUST κ= 0.65 and MUST-GNRI κ= 0.60 and fair for Standard-GNRI κ= 0.43. **Conclusion**: The risk of malnutrition is high among our patients as identified by all the screening tools. Standard definition may underdiagnose the risk. Although both the GNRI and MUST showed a high sensitivity, their revealed that the MUST might be more practical to use due to a higher specificity and greater applicability (lesser missing values).

02

A prospective observational study comparing "The effect of endotracheal tube with subglottic suction port (ETT SS) vs standard endotracheal tube (ETT C) on incidence of ventilator associated pneumonia (VAP)" in Patients admitted to Intensive Care Unit

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Introduction: One of the postulated causes of ventilator associated pneumonia (VAP) is micro-aspiration of subglottic secretions, which pool in the laryngopharynx above the cuff of endotracheal tube. Standard endotracheal tubes (ETT C) do not have an option to remove these secretions. But, newer endotracheal tubes with a dedicated suction port just above the cuff (ETT SS), has facility to remove subglottic secretions.While some previously studies did not show a definitive benefit, some did show benefits, with ETT SS use in VAP reduction. In our study we hypothesized the use of ETT SS will decrease the incidence of VAP. **Methods**: This study was exclusively done on patients admitted to 13 bed Surgical ICU (SICU) & 6 bed AICU in Christian Medical College and Hospital, Vellore, Tami Nadu, India. **Study Design**: Adult patients admitted to ICU with duration of ventilation>48 hrs. were included in this study and the type of ET tube used for intubation was noted. Surveillance for VAP and other Ventilator Associated Events (VAE) this study was in accordance with the CDC's latest "Surveillance for ventilator-associated events in the National Healthcare Safety Network **(**NHSN)" guidelines released in Jan 2014.In addition demographics, APACHE II, ICU & hospital stay, ventilator days, and mortality were noted in both groups.**Statistical Methods**: The overall incidence of VAE and VAP per 1000 ventilator days was calculated using the formula given by CDC's NSHN in the VAP surveillance algorithm. The incidence of VAP in two groups was compared using two sample proportion test. **Results**: In total 88 patients were enrolled, 43 in ETT SS group and 45 in ETT C group. The incidence of VAP in our ICU was 4.24 per 1000 ventilator days. The incidence of VAP was lower in ETT SS (0 %) compared with ETT C group (4.44%) though, not statistically significant. The overall incidence of VAE- Ventilator associated events(VAC+IVAC+POSSIBLE VAP+PROBABLE VAP) was 16.94 per 1000 ventilator days. The incidence of VAE between the two groups were similar as there were 5 (11.6 %) in ETT SS group vs. 3 (6.6 %) in ETT C group

Incidence	Type of ET tube used		P
	ETT SS	**ETT C**	
VAP	0/43	2/45	
VAE	5/43＝11.6%	3/45＝6.6%	0.41794 (proportion test was used)

ETT SS: Effect of endotracheal tube with subglottic suction port; ETT C: Endotracheal tube; VAP: Ventilator associated pneumonia; VAE: Ventilator associated events

Discussion: With data already available is in favor of ETT SS, we set out to see if this finding is applicable to our Indian set up. Since, the results are obtained by interim analysis and VAP/VAE surveillance continues, we reserve the recommendation for mandatory use of ETT SS pending the study's completion. **Conclusion**: The incidence of VAP in ICU showed a reduced trend with the use of ETT SS in comparison with ETT C.

03

Sustained low-efficiency dialysis (SLED) for patients of septic shock requiring renal replacement therapy

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Introduction: Since the introduction of CRRT into clinical practice in the early 1980s, its use in critically ill patients with AKI has increased steadily. According to the KDIGO guidelines it's the method of choice for dialysis in patients with AKI and

shock. SLED has been proposed as an alternative to other forms of RRT and is used in many centers worldwide for logistical reasons. However, the role of SLED in septic shock is yet to be evaluated. **Methods**: We present a single centre experience of SLED in patients of septic shock over 1 year from October 2013. The patients of septic shock who developed AKI were given sessions of SLED as appropriate. The efficacy and hemodynamic tolerability defined by 20% reduction in MAP during the procedure is being evaluated. **Result**: Total of fifty three [age 45.8 ± 18.4 years, gender (M/F: 37/16)] patients admitted with septic shock were subjected to 254 sessions of SLED in ICU. The mean duration of SLED was 5.1 ± 2.1 hours. The number of sessions terminated because of hemodynamic intolerability was 12. 26 (10%). The average dose of SLED (Kt/V) delivered was 1.1 ± .21. Our patients had 28 day mortality of 60% which is similar to predicted mortality based on their admission APACHE II scores [median 27.4 9 (min-max)]. Seventy percent of SLED sessions did not require heparin. **Conclusion**: SLED is an effective method of RRT in patients of septic shock who develop AKI. It a feasible alternative to CRRT as it offers the advantage of convenient timing, mobility and lesser anticoagulation.

04

Epidemiology of out of hospital cardiac arrest in urban South India

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Background: The key factor for a favorable outcome following cardiopulmonary resuscitation (CPR) is the implementation of the "chain of survival" and the prompt activation of emergency medical services. Data on this aspect, which describes the epidemiology of out of hospital cardiac arrest, is largely lacking from resource-limited settings (South Asia in general and India in particular). **Aim**: To describe the epidemiology of patients sustaining out of hospital cardiac arrest and to identify possible areas for improvement. **Methods**: Retrospective chart review of patients presenting to a community hospital with out of hospital cardiac arrest between January 2006 and December 2012. Data on Patients and cardiac arrest characteristics, activation of emergency medical services, by-stander CPR and outcome were reported in Utstein's template. **Results**: Out of 1112 patients presenting with cardiac arrest, CPR was performed on 1000 patients (Figure 1 and 2). Spontaneous circulation was achieved in 151 (15.1%). Cardiac arrest etiology was cardiac and non-cardiac in 359 (35.9%) and 641 (64.1%) patients, respectively. Emergency medical services were utilized in 7 patients (0.7%). Despite being witnessed in all the patients, bystander CPR was performed in only 4 patients (0.4%). Cardiac arrest rhythm was shockable in 18 patients (1.8%). Survival to hospitalization and discharge was seen in 151 (15.1%) and 20 patients (2%), respectively. **Conclusion**: Emergency medical services and the concept of "chain of survival" have been scantly utilized in cardiopulmonary resuscitation for out of hospital cardiac arrest and this may have resulted in unfavorable outcome. The knowledge of basic life support and the importance of activation of emergency medical services whilst dealing with a cardiac arrest victim need to be emphasized to the general public. **Limitations**: 1. Single Centre and retrospective data.2. Inability to calculate the incidence of out of hospital cardiac arrest due to non-availability of data on the population that gets managed by the hospital.
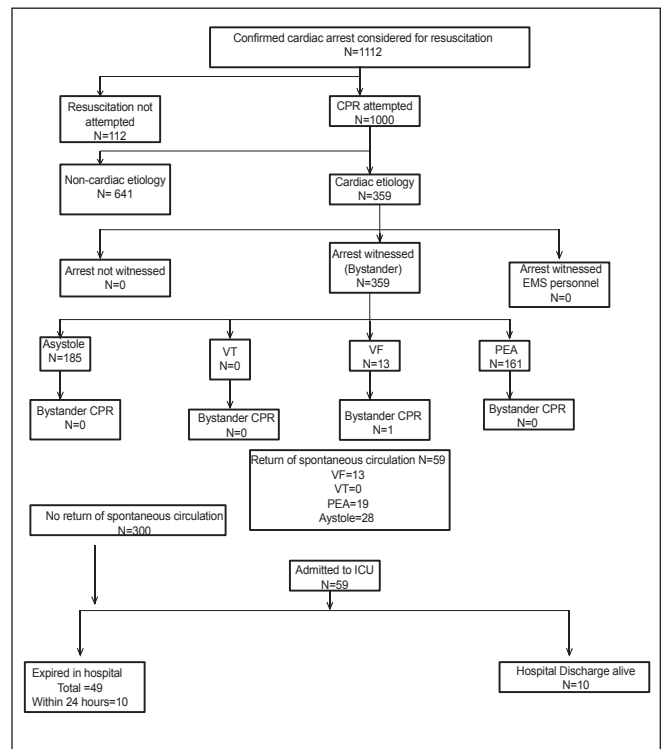

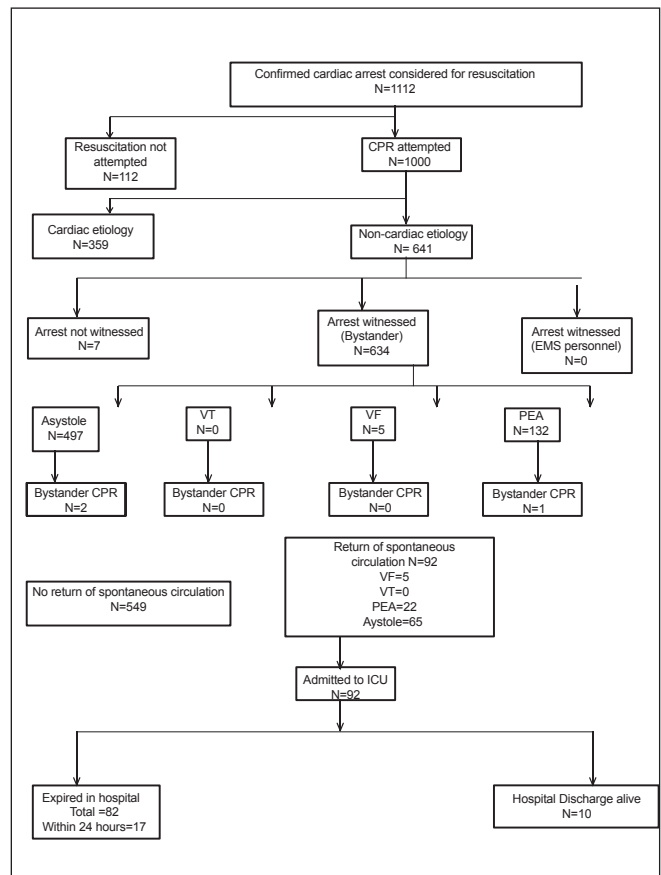**Figure 1: Utstein style reporting of data on Out-of-Hospital Cardiac Arrest: Cardiac etiology**

Figure 2: Utstein style reporting of data on Out-of-Hospital Cardiac Arrest: Non-cardiac etiology

05

Effectiveness of modified early warning score (MEWS) in the outcome of in-hospital adult cardiac arrests in a tertiary hospital

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Introduction: Cardiac arrest in a hospital often follows a period of severe illness and if the pre-arrest scenario is recognised early, cardiac arrest may be averted or identified in time. This should be reflected by an improvement in the outcome. The modified early warning score (MEWS) is a useful tool for identifying hospitalised patients in need of a higher level of care and those at risk of in-hospital death. Use of the MEWS as a triage tool to identify patients needing hospital admission and those at increased risk of in-hospital death has been evaluated only to a limited extent. This study was aimed at evaluating the effectiveness of Modified Early Warning Score (MEWS) in the outcome of In- hospital adult cardiac arrest in a tertiary hospital. **Methods**: This was a prospective study conducted in patients who sustained cardiac arrest in a tertiary hospital from September 2009 to May 2013. We included adult patients (Age >18 years) who had In- hospital cardiac arrest. We excluded cardiac arrests in operation theatre and patients brought dead to the hospital. Tools used to collect data were Modified Utstein style Format for standard reporting of In-hospital cardiopulmonary resuscitation and Modified early warning score chart. The initial phase was the pre MEWS data collection and second phase was the post MEWS data collection. Awareness to fill the MEWS chart was given to all the staff nurses and doctors in the hospital prior to the introduction of the MEWS chart. **Results**: There were 1135 patients in the Pre EWS period and 820 patients in the Post EWS period. The survival to hospital discharge was more (Pre EWS- 59, Post EWS- 138) after the introduction of MEWS and it was statistically significant (P = 0.001). There was a significant difference in the Return of Spontaneous circulation duration (ROSC) between Pre and Post MEWS (P = 0.001). There were significantly more patients in Cerebral performance category (CPC) 1-2 in the post MEWS compared to pre MEWS (CI 14.63- 31.03 and P = 0.0001). **Discussion and Conclusion**: In the present study the survival to hospital discharge improved significantly from 5% to 16.82 % pre and post MEWS and it is similar to the results of Nauman Naeem et al where introduction of MEWS resulted in a better survival to hospital discharge and it was statistically significant - (5.2% Vs 16.8 %).In our study there was no significant difference in the CPC but there was a change in the ADL in the post MEWS period which shows that when the patients were resuscitated earlier, the outcome both in terms of survival and neurological status in the long term. This study suggest that MEWS could be widely used in the hospitals to detect the deterioration of in- patients by the ward nurse and the patients could be resuscitated effectively and quite earlier so that the neurological status is regained in a better manner. This is the first study that evaluated the effectiveness of MEWS in CPC and ADL. MEWS significantly improves the ROSC, survival to hospital discharge and Neurological outcome of the patient

06

The prognostic value of admission arterial blood lactate level in mixed ICU population

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Background: There are studies emphasizing the importance of arterial blood lactate level on outcome, specifically mortality in patients with circulatory shock, cardiac arrest, trauma, sepsis, septic shock, ards, pulmonary embolism and cardiovascular outcome, but its prognostic significance in mixed icu population is not well defined. **Objective**: To examine whether value of arterial blood lactate level on admission to a general intensive care unit with mixed populations of septic and non septic patients can indicate prognosis.The primary outcome measured is 28 day mortality. **Design**: Prospective Observational study. **Setting**: General adult intensive care unit in a tertiary care teaching hospital. Interventions: Arterial blood samples were obtained on admission to the intensive care unit.Patients: 224 consecutive patients admitted to the intensive care unit. Patients are split into two groupsnamely septic and non-septic from final diagnosis. **Measurements and Results**: For statistical calculation, we used Stata/SE 11 software. Out of Total 120 septic patients 25 patients lost to follow up and Out of 104 non-septic patients 19 lost to follow up, so excluded from the study for 28 days mortality. In all patients whose initial arterial blood lactate levels were >1.9, the unadjusted and adjusted odds ratios are 3.64 (2.00 – 6.62) and 3.30 (1.66-6.57) with 95% CI and p value of 0.001. In septic patients the area under ROC curve is 0.7794 and the same for non-septic patients is 0.8657. The area under ROC curve for all patients (total 180) is 0.7447. **Discussion**: In a study by Wong DT(Crit care med, 1995), Apache II ROC curve is 0.860 for prediction of hospital mortality.More recently PROWESS study(Richards G, J intensive care med, 2011) the patients with community acquired pneumonia in placebo arm, the ROC for Apache score of ≥ 25 was 0.64 for 28 day mortality. Our study ROC Curve for mixed ICU population is 0.7447 for prediction of mortality at 28 day. It is a very easy accessible and relatively cheap measure. Its ability favorably compares to apache II. So we think admissionarterial blood lactate level can be used to predict outcome in patients admitted to the intensive care unit. This variable may be utilized to identify patients who have a high risk for mortality and thus who should be admitted to the intensive care unit. The limitation of the study is that it is a single centered study.

07

Readmission to ICU-is it a big concern? An analysis

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Introduction: Readmission to Intensive Care Units (ICU) is an important quality indicator of ICU care. We conducted a prospective study in a level 3 Care ICU in Kolkata of a tertiary care hospital to analyse whether there are overall outcome differences when comparing readmission group with the entire group. **Methodology**: Our Prospective study included (2140) patients admitted in a level 3 Care ICU over a period of one year. Number of readmission (85) during the same period was also documented. Readmission was defined as all patients who were transferred back to ICU prior to hospital death/discharge during the above period. ICU outcome was calculated using predictive APACHE IV Model. Payment methods were documented as either self paying or corporate/insurance paying. A comparison analysis between the entire group with the readmission group was done using unpaired student t test and p value c0.05 was considered statistically significant. **Results**: In the Entire Group (2140), mean A4 was 50.34±31.54SD (Median 42), PMR 15.49, Observed deaths 327, ALOS 4.05days±4.55SD (Median 3), SMR 0.99 (CI .88-1.1), mean Age 60.55years±15.68SD (Median 63), 490 ventilations, 72.71% of patients were self paying while 27.29% of patients were corporate/insurance paying. In the Readmission Group (85) mean A4 was 77.16±33.72SD (Median 73), PMR 38.89, Observed deaths 42, ALOS 5.23days±4.18SD (Median 4), SMR 1.27 (CI .95-1.67), mean Age 64.79years±14.40SD (Median 67), 43 ventilations, 75.3% of patients were self paying while 24.7%

of patients were corporate/insurance paying. During comparison between the two groups there were statistically significant differences, with readmission group having significantly higher A4 (P<0.0001), PMR (P<0.0001), ALOS (P=0.002), age (P=0.005), SMR (1.27vs. 0.99) compared to the entire group. Percentage of patients requiring ventilation (50.59% vs. 22.90%) and mortality rate (49.11% vs. 15.28%) was also significantly higher in the Readmission group. Readmission was significantly higher in self paying group. Root Cause Analysis (RCA) showed most readmissions were due to deteriorating conditions (desaturation, hypotension, sepsis, arrhythmias) however it was also associated with cases where transfer policy from ICU was not followed by stakeholders and financial issues was a cause of early transfer. **Conclusion**: Readmission to ICU was associated with worse outcome in our study group. Lack of adherence to transfer policy by concerned stakeholders was a concern as well as increasing cost of healthcare. **Limitations**: Care administered after transfer from ICU prior to readmission was not included which can have a significant impact. Statistical analysis would have been more appropriate with a larger sample size of readmission group.

o8

Predicted mortality rate (PMR) as a tool to analyse ICU performance

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Introduction: Predictive Scoring system Models have been developed to measure severity of disease and prognosis of patients in intensive care unit (ICU). We tried to analyze performance of a level 3 ICU of a tertiary care hospital in Kolkata using the Predicted Mortality Rate (PMR) calculated from APACHE IV Model. **Methodology**: 1094 patients admitted in a Level 3 Care ICU over a period of one year were included. ICU outcome was calculated using APACHE IV Predictive Scoring Model. Patients were then divided into 3 subgroups based on Predicted Mortality Rate (PMR) as per calculated by APACHE IV Model into- Group1 subgroup (PMR<20%), Group 2 subgroup (PMR 20%-50%), Group 3 subgroup (PMR>50%). Mean age, observed number of deaths, number of ventilation, DAMA (Discharge against Medical Advice), ALOS (Average Length of stay), SMR (Standardized Mortality Ratio) based on observed deaths and predicted deaths with 95% Confidence Interval were calculated with the entire group and subgroups. Analysis was carried out by unpaired student t test and p value<0.05 was considered significant. **Results**: In the Entire group of 1094 patients analyzed, Mean age was 61.31 years± 17.02SD (Median 64), PMR was 18.79, number of ventilations 310(28.34%), DAMA 71(6.49%), ALOS 5.14 days±5.44SD (Median 3), observed deaths 208 and SMR 1.01 (CI 0.88-1.16). In Group 1 subgroup (PMR<20%) of 778 patients analyzed, Mean age was 60.37 years± 17.47SD (Median 63), PMR was 6.17, number of ventilations 83(10.67%), DAMA 45(10.67%), ALOS 4.66 days±4.85SD (Median 3), observed deaths 52 and SMR 1.08 (CI 0.81-1.42). In Group 2 subgroup (PMR 20%-50%) of 181 patients analyzed, Mean age was 62.84 years± 16SD (Median 66), PMR was 32.09, number of ventilations 107(59.12%), DAMA 18(9.94%), ALOS 7.05 days±6.92SD (Median 5), observed deaths 52 and SMR 0.90 (CI 0.67-1.17). In Group 3 subgroup (PMR >50%) of 135 patients analyzed, Mean age was 64.58 years± 15.17SD (Median 65), PMR was 73.70, number of ventilations 120(88.89%), DAMA 8(5.93%), ALOS 5.36 days±6.62SD (Median 2), observed deaths 104 and SMR 1.05 (CI 0.85-1.27). Statistically significant differences were observed for Age (Group 3 subgroup p=0.033) and ALOS (Group 2 subgroup P<.00001) while comparing with the entire group. Analysis showed significantly higher SMR in Group 1 subgroup (1.08) in comparison to the entire group (1.01). Incidences of DAMA were also higher Group1 subgroup (10.67%). Conclusion- SMR calculated and DAMA was significantly worse in patients with lower baseline risk (Group 1 subgroup PMR<20%). Root Cause Analysis showed unequal distribution of manpower, care biasness to more severely ill and deviation from standard treatment protocol as causes for the worse performance. **Limitation**: Varying sample size among the different subgroups is a limitation to analysis.

o9

Impact of syndrome evaluaton system (SES) on outcomes of neonatal sepsis-a randomized - controlled trial

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Introduction: Sepsis is the leading cause of mortality in newborn. Sepsis related mortality is largely preventable with rational antimicrobial therapy and aggressive supportive care. Although blood culture is considered as the gold standard for diagnosis, low sensitivity (15-20%) and time delay (48 to 72 hours) often limits its role in early targeted therapy. Hence there is need for non-culture based rapid diagnostic test for neonatal sepsis management. **Methods**: This randomized controlled trial compared the efficacy of a rapid molecular diagnostic method Syndrome Evaluation System (multiplex Nucleic Acid Amplification followed by sequence specific hybridization) for diagnosis and management of neonatal sepsis with routine blood culture. Subjects and interventions: Inborn babies with sepsis (clinical features plus 2 screening test positive) were randomized into two groups i.e. culture group (control) and SES group (case) during January to August 2013. Antibiotics therapy was based on BACTEC culture in the control group and SES in the case group. All other supportive measures were similar in both the groups. Primary outcome included identification of causative organism and death/discharge of the baby from the hospital. Duration of NICU / hospital stay, readmission within a month, number of antibiotics used and other interventions needed in both groups were the secondary outcome. **Results**: Three hundred and sixty eight babies were included and randomized into either group. BACTEC could identify organism in 18%, whereas SES had positive result in 72%. SES had 100% concordance with blood culture by BACTEC. Detection of bacteria and fungi were four and ten fold higher respectively with SES when compared to BACTEC culture. SES results were available within 24 hrs while Culture took on an average of 72 hrs. SES had detected polymicrobial infections in 42% of SES positive cases. Switching from empirical therapy based on SES resulted in significantly less mortality 6 versus 33 deaths (3% versus 18%). SES group also had lower incidence of readmission 3 versus 22. SES had significantly (p < 0.001) reduced number of antibiotics used (2.6 vs 5.8), number of ICU days (7 days vs 11 days), number of ventilator hours, number and dosage of inotropes and dosage of various blood products **Conclusion**: This new molecular based diagnostic system (SES) helps in rapid and accurate diagnosis of bacterial and fungal sepsis and reduces mortality and morbidity in affected newborns. **Keywords**: Newborn, Sepsis, Syndrome evaluation system (SES), Nucleic acid amplification and Hybridization

10

Feeding the critically ill: Is prone position a hindrance?

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Aim: To assess the feasibility and tolerance of enteral nutrition in critically ill patients receiving invasive mechanical ventilation in the prone position for severe Acute Respiratory Distress Syndrome (ARDS) **Methods**: Prospective observational study was conducted in multidisciplinary critical care unit (CCU) of a tertiary care hospital from Jan 2013 till July 2014. All patients who received invasive mechanical ventilation in prone position during study period were included.

Patients' demographics, severity of illness (Acute Physiology and Chronic Health Evaluation (APACHE) score II), baseline markers of nutritional status (subjective global assessment (SGA), and body mass index (BMI)), details of nutrition delivery during proning and supination and outcomes were recorded. Statistical analyses using Chi-Square test, Fisher's exact test, Mann-Whitney U test, Shapiro Wilk's test were applied with SPSS version 11.0 **Results**: Twenty four patients met inclusion criteria of which three patients were excluded from analysis since they did not receive any enteral nutrition in prone position due to severe hemodynamic instability. The mean age of our patients was 45.8 ± 13.96, with male: female ratio of 7:3. On admission, SGA revealed moderate malnourishment in 54% of patients and the mean APACHE II score was 30.45 ± 11.2. The average duration of prone positioning per patient was 51.33 ± 33.6 hours. All patients received gastric feeds. The mean calories and protein prescribed in supine position were 25.8 ± 3.7 and 1.1 ± 0.3 while the mean calories and protein prescribed in prone position were 24.1 ± 2.4 and 1.0 ± 0.2 respectively. Patients in supine position received 77.9 ± 18.4% of their caloric goals while those in prone position received 74.3 ± 18.7%. The mean percentage of protein goals delivered in supine and prone position was 77.1 ± 17.1 and 69.8 ± 17.2 respectively. The proportion of patients who received at least 75 % of the caloric and protein goals was similar in supine and prone position. There was no difference in the mean gastric residual volume between supine and prone positioning. **Conclusion**: In critically ill patients receiving invasive mechanical ventilation in the prone position, enteral nutrition is possible and well tolerated even with gastric feeding. Nutritional delivery in prone position is comparable to that of supine position.

11

Estimation of phospholipase A2 levels in Indian snake bite victims as a marker of envenomation – boon or bane

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Background: Snake envenomation is considered as a major medical and public health problems in the poor rural communities living in the tropics. Even though the specific antivenoms are not available in India, identification of snake species allows the physician to plan for appropriate management, judicious use of antivenoms, anticipate complications and prognosticate. Unfortunately, in many situations the offending snake is not seen and if it is, its portrayed by the patient is often misleading. Many a times, dead and crushed snake is brought to the hospital, which is wrongly identified. Immunoassays for detecting venom antigens in blood of the victims are described but not practiced due to cross-reactivity between venoms. The Phospholipase A2 (PLA2) is one of the key components in snake venom. To some extent, it's presence in the serum of the suspected patient indicates envenomation but not the type of snake. **Aim**: To estimate the status of PLA2 levels in the snake bite victims as a bio-marker of envenomation and to find out the usefulness of it to distinguish venomous from non venomous snake bite. **Methods**: A prospective study was designed and carried out in a tertiary care teaching hospital with 35 consecutive snake bite victims who were free from other co-morbities and brought the offending snake to the emergency department. All the patients included in this study had base line haematological and metabolic work up including coagulation profile. Pre antivenom serum sample were analyzed for PLA2 activity by simple microplate assay using substrate 4-nitro-3-octanoyloxybenzoic acid as per standard protocol. The studies were approved by the institutional ethics review committee. The data were analyzed statistically. **Results**: Of the 35 offending snakes, herpetologist identified them as Russell's viper (11), Indian cobra (4), Indian krait (8) and Non venomous (12). The median PLA2 level was 53.3 µmol/ml/min for Russell's viper envenomation, 14.2µmol/ml/min for cobra, 16.9µmol/ml/min for krait, and 5.1µmol/ml/ min for non-venomous patients. These values were correlated significantly with clinical features and with the duration. **Conclusions**:Serum PLA2 levels were significantly elevated in those with systemic envenomation and helped to distinguish envenomated from non-poisonous bites. Future prospective studies with large-cohort are suggested to confirm or refute these observations.

12

Out of hospital cardiac arrest: A community hospital experience from Urban South India

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Background: Out of hospital cardiac arrest (OHCA) is associated with significant morbidity and mortality. Data is insufficient regarding their clinical experience from resource-limited centers. **Aim**: To describe the experience in the management and outcome of patients with OHCA. **Methods**: Retrospective data regarding arrest rhythm and outcome was studied in patients presenting with OHCA between January 2006 and December 2012. Therapeutic hypothermia (core temperature 32-34°C) was initiated in the emergency department by surface cooling and intravenous bolus of cold normal saline (500-1000mls) and applied for 24 hours. Based on the neurological status on day 3, patients were classified into two groups: unresponsive (GCS ≤ 8, motor response worse than flexion) and responsive (GCS > 8, motor response better than extension). Survival, morbidity and mortality (secondary to withdrawal of life sustaining treatment and due to underlying illness) were examined in both the groups. **Results**: Out of the 1112 patients presenting with cardiac arrest, CPR was performed on 1000 patients with return of spontaneous circulation (ROSC) in 151 patients (15.1%). ROSC was achieved in all patients with ventricluar fibrillation [(VF) N=18, 1.8 %]. Out of the 151 patients admitted to ICU, 148 received therapeutic hypothermia in a median time of 120 minutes (IQR: 90-180). Survival following hospitalization for > 24 hours was seen in 124 patients. On day 3 post cardiac arrest, 99 patients remained unresponsive (GCS < 8, motor response worse than flexion) and none had favorable outcome. 97 of these patients died (53 following withdrawal of life sustaining treatment and 44 due to underlying illness) and 2 patients were discharged in persistent vegetative state [Cerebral performance category (CPC) 4]. On day 3, post- cardiac arrest, out of the 25 patients who showed signs of neurological awakening (GCS > 8, motor response better than extension), survival to hospital discharge with favorable neurological outcome (CPC 1, 2) was seen in 18 patients. The remaining 7 patients regained consciousness but died due to severe nosocomial infection. **Conclusion**: Mortality following OHCA was extremely high. The incidence of shockable rhythm was very low but had better survival. Very few patients were discharged in persistent vegetative state. Therapeutic hypothermia could be achieved quickly with cost-effective and low technology solutions. **Limitations**: 1. Single Centre, retrospective data. 2. Mortality following withdrawal of life sustaining treatment raises the possible impact of self-fulfilling prophecy.

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"Critical care without walls"- impact of a "paediatric emergency team" on PICU admissions from the wards and overall mortality

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Introduction: Cardiopulmonary arrest in children isa gradual process, preceded by critical period of physiologic instability, during which lifesaving interventions can decrease the mortality and improve outcome in sick patients admitted to hospitals. The recognition that patients have warning signs and symptoms prior to cardiopulmonary arrest, has led to the introduction of rapid response teams - Medical Emergency Teams/Rapid Response Teams. In a first such study from India, we are reporting the successful implementation of a Paediatric Emergency team (PET) concept and its effectiveness in an Indian setting in reducing overall mortality.We hypothesised that, early recognition of the warning signs and symptoms of patients admitted to the wards and appropriate intervention reduces their rate of transfer to the PICU and their overall mortality-extending the "Golden hour " concept to ward patients as well!. **Methods**:This study is a retrospective audit, before and after implementation of the Paediatric emergency team (PET) concept in paediatric wards. The pre-intervention period was between October 2011 and March 2013(phase-1) and post-implementation period was between April 2013 and October 2014(phase-2). The following variables were compared before and after implementation of the PET concept- the number of patients having cardiopulmonary arrest in the ward, the number of patients transferred to the PICU from the wards, , the number needing intubation on D1 of transfer , and the overall mortality of patients transferred in. To examine the impact of PET, p values, Odd ratios (OR) and95% confidence interval were calculated for the variables before and after the implementation period. **Results**: We found a significant reduction in the number of patients needing intubation and mechanical ventilation within 24 hours after their transfer to PICU, after starting PET (from 17.9% before starting PET to 5.8% after starting PET) (p value 0.012864, OR 0.2831, 95% CI 0.1120 to 0.7156.) Mortality in patients needing intubation and mechanical ventilation within 24 hours after their admission to the PICU in our study decreased from 6.2 % to 0% (p value 0.046258, OR 0.1481, CI:0.0185 to 1.1881), after the implementation of PET. All the patients needing intubation within 24 hours of shifting to the PICU survived(mortality-0%) after the implementation of PET, whereas 9/26(34.6%) needing intubation died, before starting PET from 6.2 % to 0% (p value 0.046258, OR 0.1481, CI:0.0185 to 1.1881).7 out of 9 patients died within 24 hours of transfer in and the other 2 died within 48 hours. **Discussion**: Although more such studies may be needed, it may be said that implementation of a Paediatric Emergency Team concept(Paediatric RRT) will reduce the incidence of respiratory and cardiopulmonary arrests or sudden crashes outside of the critical care areas, thereby reducing overall mortality. We hence recommend implementation of the Paediatric Emergency Team (PET) concept in all tertiary care hospitals, in an attempt to reduce in-hospital cardiopulmonary arrests and overall mortality in Paediatric patients.

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## Ultrasonographic measurement of diaphragm thickness is a predictor of successful extubation.

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Introduction: The diaphragm is the major respiratory muscle and hence plays a crucial role in extubation.Conventional criteria like breathing frequency, minute ventilation and negative inspiratory force are not reliable.Evidence supports the use of Rapid shallow breathing index(RSBI) as a guide for assessing successful extubation after spontaneous breathing trial, but has limited application after a trial of pressure support ventilation.The purpose of this study is to test the hypothesis that the ultrasonographic measurement of the diaphragm thickness(tdi) is a good predictor of successful extubation. **Methods**: This is a prospective observational study done on 102 patients in medical intensive care unit(MICU) who were eligible for extubation as decided by the attending physician.Baseline demographics, clinical data were collected.Just prior to extubation, tdi of right hemidiaphragm were measured using linear probe(sonosite MAXX) at the zone of

apposition(ZOA) between 8th to 10th intercostal space in midaxillary line.Measurements were done at end-inspiration(maximal thickening) and end-expiration(minimal thickening) as seen in M-mode.Δtdi%was calculated as (tdi end-inspiration−tdi end-expiration/tdi end-expiration)×100. The Δtdi% for each patient represented the mean of three to five breaths.Other variables like RSBI, Mechanical ventilation days(MVdays), Pao2/Fio2 ratio, Tidal volume(TV), echodensity using imageJ grayscale analyis were also recorded for all patients. Extubation failure was considered if re-intubated within 48hours of extubation.Statistical analysis was done using STATA 12 v software. Descriptive data were expressed as mean±SD for continous variables .X^2 tests were used for categorical variables.Logistic regression was done for all significant variables.For predictive performance of Δtdi%, RSBI, MV days, TV, ROC curves was used.Composite measures like Δtdi% with RSBI, Δtdi% with TV were also evaluated.
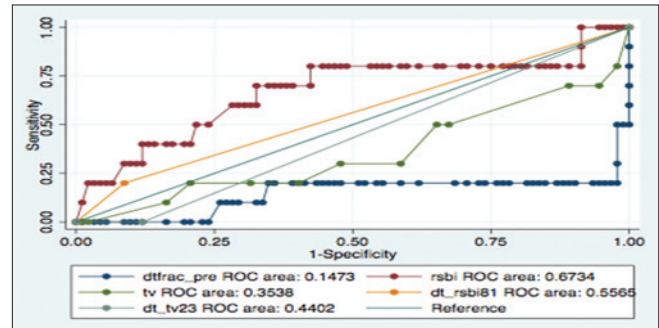
RESULTS: Out of 102 patients enrolled, male was 53.9% with an average age of 54.4years.Hemodynamic parameters were not significant between the two groups.Of the 92 patients who remain extubated after 48hours, 90 had a Δtdi%≥ 30% and of the 10 patients who failed extubation, 6 had Δtdi%<30% and respiratory pump failure was the main reason.The remaining 4 patients who failed extubation had Δtdi%≥ 30%, 2 of them had fever with fluid overload, other 2 had acute onset altered sensorium leading to re-intubation.The sensitivity and specificity were 60% and97.8% respectively.Positive predictive value(PPV) for a Δtdi%≥ 30% was 75% and NPV of a Δtdi%<30% was 95.74%, area under the curve(AUC) was 0.85.The composite measures of Δtdi% with RSBI, Δtdi% with tidal volume were also evaluated but none of these improved the predictive value of Δtdi% when taken single.CONCLUSION:Ultrasonographic measurement of diaphragm thickening is a good predictor of extubation success or failure.

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A comparative study of ultrasound guided inferior vena cava visualisation in trans-hepatic and sub-xiphoid view to determine fluid status of patients

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Introduction: It is not uncommon to have difficulty in assessing the inferior vena cava (IVC) diameter in sub-xiphoid view due to intervention of bowel gas shadow, post abdominal surgery patients, epigastric tenderness, obese and in patients with hairy abdomen. **Objectives**: To identify whether trans-hepatic view can visualise the IVC without compromising the inference. To find out whether it can it be used as an alternative to sub-xiphoid view. **Methods**: This is a prospective comparative study done on patients admitted to ICU from April to September 2014. All adult conscious patients were included and patients with acute abdomen, post abdominal surgery cases and in those where there was difficulty in visualising the IVC were excluded. IVC diameter during inspiration and expiration was measured in M mode by placing the GE–Logic E low frequency cardiac probe (3.5-5Mhz, fig 1) below the xiphoid bone (Sub-xiphoid view, fig.2) and in right anterior axillary line in the 10th and 11th intercostal

space (Trans-hepatic view, fig 3) by viewing the long axis of IVC at hepatic vein confluence. Both were done by different interpreters who were blinded to each other. Five step analysis of mean time taken to measure, mean IVCD, collapsibility, patient and interpreter comfortability in both the views were analysed and compared. **Result**: 124 adult patients were included and 3 patients were excluded as it was not possible to visualise the IVC in sub-xiphoid view, hence left with 121 patients to study. The mean time to visualise IVCD was 73.81+/- 4.77seconds and 55.59+/- 4.07seconds, mean IVCD during inspiration was 1.20+/- 1.7cms, 1.124+/- 0.52cms and expiration was 1.70+/- 0.55cms and 1.58+/- 0.46cms respectively in sub- xiphoid and trans-hepatic view. The difference in measurement in both the views was statistically significant with a p value of <0.05. Collapsibility remained same. Patient comfortability and interpreter friendliness was better in trans-hepatic view. **Discussion**: Only difference in the study was with respect to marginal difference in IVCD though the p value was <0.05. It was further analysed that the measuring line cuts the IVC in sub-xiphoid view at approximately 120 degrees whereas in trans-hepatic view it cuts exactly at 90 degrees and this could be the reason for the difference in IVCD. **Conclusion**: Trans-hepatic view is a comparable alternative view to assess the fluid status and it is better with regard to patient comfortability, interpreter friendliness and time consumption and does not compromise on the inference.

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Comparison of the efficacy of Vinayaka Deep Vein Thrombosis Prophylaxis Device to ted stockings for conscious and unconscious patients in Intensive Care Units

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Introduction: In general all critically ill patients in ICU should receive deep vein thrombosis (DVT) prophylaxis within 24 hours of admission. Methods of DVT prophylaxis include both mechanical methods like Sequential Compression Devices (SCD) and pharmacological therapy. Pharmacotherapy contraindicated patients require mechanical methods. SCD are expensive and an alternative method of DVT prophylaxis is essential in peripheral set up. A Deep Vein Thrombosis prophylaxis device (DVTPD) was made by making modifications to standard traction pulley & cycling pedal set. Our study was aimed at assessing the efficacy of DVTPD. **Method**: All patients admitted in ICU and who had contraindications to pharmacotherapy for DVT prophylaxis were included and those who had fractures in lower limb and had DVT at the time of admission were excluded. All study group patients were given DVTP using Vinayaka DVTPD every 6th hourly for duration of 10 minutes. Control group patients were given TED stockings up to thigh level until mobilization. DVT screening using GE–Logic E Doppler probe was done every day until discharge and 15th day of post discharge. **Result**:Study group included 32 patients out of which 21 were medical cases and 11 surgical cases, 23 conscious patients and 9 unconscious patients. 3 were excluded as they had fracture of lower limb. Control group included 28 patients out of which 18 medical cases and 10 surgical cases, 22 were conscious patients and 6 were unconscious cases and 2 cases dropped out during the study. Study group did not have any DVT whereas control group had 3 positive cases of DVT. DVTP proved more efficacious than TED stockings. **Discussion**: This device can be used even in hemiplegic, semiconscious and unconscious patients. We have designed a cost effective (Rs.750), safer, simpler & user friendly which can be used in peripheral set up.

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Validation of the EQ5D in a regional Indian language (Odia) and its use to assess the quality of life (QOL) of patients discharged from the ICU- A pilot study

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Introduction: The EQ5D (Euro Quality of Life 5 Dimensions) has been widely used in critical care patients. It has not been validated in any Indian language. We aimed to assess 1) The reliability and validity of the EQ5D in Odia and 2) The quality of life of ICU patients post discharge. **Material and Methods**: STEP 1- Linguistic validation was conducted in collaboration with the EuroQOL group. Face to face interview of 351 patients attending the general surgery and cancer OPDs over a 3 month period with the translated EQ5D and WHO5 was done. Response was analysed to assess the linguistic, concurrent, discriminant and convergent validity. 30 patients were contacted after 2 weeks over phone to assess the test retest validity. STEP 2-ICU patients were contacted after 3 months of discharge and administered the EQ5D in Odia over the phone. **Statistics**: Construct validity was assessed by inter-item and inter-scale correlations. The intraclass correlation coefficient was used to explore the test-retest reliability. The internal consistency of the scale was calculated with Cronbach's alpha coefficient. Concurrent validity was assessed by calculating correlations between the EQ5D and WHO 5. **Results**:STEP 1) The EQ5D Odia presented good internal consistency and stability; Cronbach's α cofficient was 0.76 and test-retest intraclass correlation coefficient 0.84 . There was moderate concurrent validity; the correlations of its subscales with the WHO5 was 0.54 – 0.69. Intraclass correlation coefficient for test-retest reliability was 0.66 (95% CI = 0.55– 0.76). STEP 2) A total of 80 patients (mean (SD) age: 60.7 (12) years; 60.5% male were recruited. Response rate was 80% with nil missing data. Patients with more severe APACHE II, at admission reported more problems with their usual activity (p = 0.06) and pain (p = 0.08) and demonstrated lower median VAS scores (48 vs 72, p = 0.03). **Discussion & Conclusion**: The EQ-5D Odia is an acceptable, valid and reliable instrument. It may dependably be used for measuring HRQOL in adults post ICU discharge.

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An analysis of CPR performed at an oncological center

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Introduction: Incidence of in hospital cardiac arrest (IHCA) varies according to the study population. We present an analysis of IHCA and the cardiopulmonary resuscitation (CPR) performed in a period of two years in an oncology center. **Methods**: All the CPRs performed during the period of 1st Feb 2012 to 31st March 2014 were included in the study- a total number of 98 adult patients and 17 children. Information were collected from the CPR report form (CRF) in use in the hospital and verified by going through medical records, both in the physical form and the digital archive. The information were tabulated in a MS Excel data sheet, compiled and analysed statistically. **Results**: We found IHCA incidence in our hospital to be 10.08 (per 1000 patients) in adults and 8.16 in pediatric patients. The commonest preceding clinical events were hypotension and respiratory depression while the commonest presentation was that of unconsciousness. 13% of the presenting rhythms were shockable (VF and pulseless VT). The average time passed from identifying the collapse to starting CPR was 1.36 minute with a median of 1. 23.57% of the patients undergoing CPR received defibrillation while the time taken to deliver the first defibrillation shock was 16.73 minutes in average with a median of 10 minutes. On an average 3 doses of epinephrine were used in each patient but amiodarone was administered in only 4.3% of patients. Atropine was given in 55.71% of the patients. An average of 500 ml i.v. fluid was administered in adult CPRs. Return of spontaneous circulation was achieved in 30% cases out of whom 20.71% recovered from CPR temporarily. Re-arrest rates were 13.26 and 3.06% for second and third arrest respectively. Those who recovered had an average life span of 16.58 hours before they finally succumbed. Survival to discharge rate was 2.04% and 5.88% respectively in the adult and

pediatric categories. **Discussion**: Incidences of IHCA found in our data are well above the rates in a mixed population as per the American Heart Association (AHA) consensus 2013 data. Mixed population rate of shockable rhythm at presentation is twice (25%) of what we found. Also the survival rate of our patients from CPR was way below that of the rates established in a mixed population. However our survival rates are comparable to one study where the only the patients requiring vasopressor before cardiac arrest were considered. We have inferred from the study that although the CPR was started within admissible time, there was reluctance in administering defibrillation early in the CPR, as well as administering amiodarone. After adrenaline, atropine was the commonest medicine used, which may be explained by the fact that 39.29% of the patient's initial clinical sign was bradycardia. We have concluded from the study that compared to a mixed population cancer patients have a higher incidence of IHCA but a lower survival rate. End of life issues should be sorted out carefully before implementing CPR in a terminally ill cancer patient.

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Impact of clinical pharmacist in an Indian Intensive Care Unit

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Introduction: A critically-ill patient is reviewed and treated by physicians from different specialties; hence polypharmacy is very common practice in this setting. Even though the contribution of critical care pharmacist to improve the quality of patient care is accepted worldwide, there is no data from Indian intensive care units (ICU). This study was conducted to assess the impact and effectiveness of having a clinical pharmacist in an Indian ICUs. This study aims to evaluate the clinical pharmacist interventions with focus in optimizing the quality of pharmacotherapy and patient safety. **Methods**: The prospective, observational study was carried out in medical and surgical/ trauma ICU over a period of one year. All detected drug-related problems (DRPs) and interventions were categorized based on the Pharmaceutical Care Network Europe (PCNE) system with minor changes according to the applicability in the hospital setting. **Results**: During the study period, average monthly census of 1032 patients got admitted in the ICUs. A total of 986 pharmaceutical interventions due to drug- related problems were documented, whereof medication errors accounted for 42.6% (n=420), drug of choice problem 15.4% (n=152), drug- drug interactions were 15.1% (n=149), Y-site drug incompatibility was 13.7% (n=135), drug dosing problem were 4.8% (n=47), drug duplication reported were 4.6% (n=45) and adverse drug reactions documented were 3.8% (n=38). An average of 0.08 interventions per patient took place during the study period. Drug dosing adjustment done by the clinical pharmacist included 11.9% (n=140) renal dose adjustment, 5.2% (n=62) hepatic dose adjustment and 1.4% (n=17) pediatric dose adjustment. Glycemic control in the intensive care unit was also under the supervision of the clinical pharmacist which included 8.8% (n=104) Insulin dosing modifications. A total of 577 drug and poison information queries were answered by the clinical pharmacist. **Conclusion**: Clinical pharmacist in an intensive care unit has significant impact on quality patient care. Clinical pharmacist as a part of multidisciplinary team in our study was associated with a substantially lower rate of adverse drug event caused by medication errors, drug interactions or drug incompatibilities. Clinical pharmacy services are essential to improve patient safety and outcome, reduce costs and improve the quality of care in critically ill patients.

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In vitro antimicrobial susceptibility of fosfomycin against organisms isolated from various clinical specimens: A multi-centre trial from Kolkata

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Introduction: In the era of rising prevalence of serious infections caused by multi-drug resistant (MDR) organisms and paucity of in-flow of newer antimicrobial agents, the relatively older antibiotics that had been left out of clinical practice for various reasons are now being increasingly considered as the potential agents to combat such infections. Fosfomycin known for almost four decades, has **b**road spectrum of activity against several gram-negative and gram-positive bacteria. **Methods**: This study conducted in the Microbiology department of Medica Superspecialty hospital, between July-November 2014, was aimed at testing the *in vitro* sensitivity of fosfomycin against isolates identified from various clinical specimens from different parts of Kolkata. After confirming the identity and antibiogram by Microscan autoscan4, the isolates were tested for fosfomycin sensitivity by Epsilometer test. MIC values were interpreted in accordance with the currently recommended Clinical and Laboratory Standards Institute (CLSI) criteria for urinary tract isolates of Escherichia coli and Enterococcus faecalis and the European Committee on Antimicrobial Susceptibility Testing (EUCAST) criteria for Enterobacteriaceae and Staphylococcus aureus. **Results**: Out of the 1895 isolates tested, fosfomycin displayed an overall *in vitro* susceptibility against 90%, but only 64% against multi-drug resistant strains. Among the MDR organisms nearly 78% of Escherichia coli and 70% of Klebsiella spp. and 40% of MRSA isolates showed provisional MICs in the sensitive range while among the sensitive strains fosfomycin showed around 92% susceptibility. Our study results were comparable to the results obtained from an Indian study published from CMC Vellore in 2013 showing a fosfomycin susceptibility of around 75% among MDR uropathogenic E. coli. **Conclusion**: Being a broad spectrum bactericidal agent usable both orally and parenterally with low toxicity profiles and lesser prevalence of cross-resistance with other anitimicrobials, fosfomycin can be an alternative to other broad spectrum agents to treat uncomplicated infections as well as in the case of infections with MDR organisms where treatment options are very few. This study possibly reveals a much needed solution for the rising carbapenem resistance and also for the treatment of infections with such MDR-pathogens, thereby bringing down the length of stay in hospital, cost of therapy and suffering on the part of the patients. **Limitations**: Testing for Colistin or Tigecycline synergy can show a path towards an alternative to monotherapy with these agents to treat infections with MDR-organisms.

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Melatonin to prevent delirium in organophosphorus compound poisoning patients: A double blind randomised control trial

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Introduction: Delirium is a common finding in Organophosphorus compound poisoning (OPCP) patients on treatment with Atropine, which is known to cause central anticholinergic syndrome. Melatonin is a natural hormone secreted by pineal gland responsible for circadian rhythm and sleep regulation and has been studied in patients of organophosphorus compound poisoning (OPCP) for its anti oxidative property to prevent lipid peroxidation. **Methods**: The study was a double blind randomized control trial. Institutional ethical committee approval and informed written consent from patient's bystander was obtained.50 patients in whom Organophosphorus poisoning proved or suspected , with age > 18years and weight 50-100Kg were studied. Exclusion criteria were formulated. On arrival to ICU, following stomach wash, each of these patients were given 2 g loading dose of Inj.Pralidoxime followed by 500mg/hr infusion. Inj.Atropine was

administered as infusion to maintain heart rate 80-100/min. They were randomly allocated into study (Group M-25 subjects) to receive Melatonin 3mg through ryles tube and control groups (Group C- 25 subjects) to receive placebo at 9 PM daily. Parameters observed: Primary outcome: Delirium assessed by **ICU-CAM** scales. Secondary outcomes are: The level of sedation assessed by RASS. The total dose of atropine, sedation/analgesia (midazolam +Fentanyl) dose required each day. Duration of mechanical ventilation required and ICU stay. Rescue sedation was Inj.midazolam+ Fentanyl infusion, the doses of which in both the groups were noted and compared. The hyperactive form of delirium presenting with RASS ≥ +3 was treated with Inj Haloperidol 2.5mg. **Results**: Demographic parameters were comparable. The incidence of delirium of OPCP was lower after the 3ʳᵈ, 4ᵗʰ day in Group M (Melatonin) 9 (36%) , 8(32) % versus Group C(Control) 22(88%) , 20(80%) respectively, p value=0.047, 0.015. The dose requirement for analgesia and sedation in patients on mechanical ventilation such as Midazolam, fentanyl was 6±2, 75±25 in Group M vs 22±8, 300±100 in Group C (p value=0.0001) and haloperidol requirement in Group M vs Group C is 2.5±0.71 vs 3.92±1.33 (p value=0.03). RASS scale was better among patients in Group M as compared to Group S from the first day. Raise in blood pressure in Group M was Mean Arterial Pressure: MAP=90± 6.6 compared to Group C with MAP=114± 15.7, P value<0.05 on 3ʳᵈ 4ᵗʰ and 5ᵗʰ day, with no previous history of hypertension. At the end of ICU stay delirium improved in both the groups. The total duration of mechanical ventilation were not different among the groups. **Discussion**: Delirium, sleep deprivation or excessive sedation can interfere with assessment of patient's neck muscle weakness and general condition. This can lead to difficulty in weaning from mechanical ventilation in OPCP patients. We conclude that there is a definite decrease in incidence of delirium, reduction in dose requirement of sedatives, and reduction in secondary hypertension with Melatonin compared to placebo among OPCP patients.

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Observation about an observational study

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Introduction: Recruitment of participants has always been a major challenge in clinical research. It is well known that patient recruitment in Randomised Controlled Trials (RCTs) is extremely difficult and that only 14 to 31% of the screened subjects are generally recruited. This makes the study results less generalizable. It is however perceived that patient recruitment is less selective in observational studies and such studies are hence believed to capture the usual clinical practice more accurately. In this study, we explored the proportion of screened patients enrolled into an observational study. **Methods**: The observational study was conducted from August 2011 to September 2012, in a multi-disciplinary Critical Care Unit (CCU) in a tertiary care hospital, Chennai, India. Number of patients that were screened and recruited were tracked and noted in a screening log. Reasons for exclusion were noted and analysed. Prospective data on enrolled patients was entered into an online data collection form as part of a multicenter study. **Results**: A total of 1526 patients were admitted to the CCU during the study period. All the patients were screened for eligibility to be enrolled into the study. Out of the 1526 patients screened, 34 patients (2.23%) met the inclusion criteria and were included in the study. 1177 patients (77.13%) were excluded based on the exclusion criteria set for the study, while 315 patients (20.65%) were not included in the study, because of consultants'/investigator's discretion , though they fulfilled the inclusion criteria. **Conclusion**: We found that even in an observational study, a very small proportion of patients who are screened, were ultimately enrolled into the study. The highly selective enrolment limits the generalizability of such studies. Similar to RCTs, information regarding screening to enrolment

ratio of patients in observational studies should be made available routinely for the reader to determine its validity and applicability.

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Comparison of modified mini-bal and bronchoscopic-bal techniques in diagnosis of ventilator associated pneumonia in critically ill patients

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Background: Mini- Broncho-Alveolar Lavage (m-BAL) is a blind technique which is reported to be as good as Bronchoscopic-BAL (B-BAL) in terms of safety and microbiological yield. The m-BAL catheter is not always available; hence, we devised an alternative technique, the modified m-BAL. Objective of this study was to compare diagnostic yield, duration and safety of modified m-BAL and B-BAL in patients with clinical suspicion of VAP (Ventilator Associated Pneumonia) **Methods**: A prospective case control study was conducted on critically ill patients with clinical suspicion of VAP between June, 2014 and November, 2014, at a medical college ICU. Inclusion criteria were: age≥18 years, intubated>48 hours and with Clinical pulmonary infection score (CPIS) >6. Patients ventilated with high PEEP (>10 cmH$_2$O) and patients with refractory coagulopathy (nonresponsive to 10 mL/kg of fresh frozen plasma), or hemodynamic instability at time of procedure (MAP< 60 mmHg) were excluded. Initially modified m-BAL sampling was performed immediately after morning round; same patient underwent B-BAL sampling six hours after m-BAL. The following characteristics were recorded prospectively: age, sex, APACHE II score, CPIS, duration of procedure and adverse events. The cut-off point for significant growth was 10^4 CFU/ml for both techniques. Descriptive statistics were used. Sensitivity, specificity, positive and negative predictive values were determined considering B-BAL as gold standard. **Results**: Thirty one patients underwent paired procedure. One patient was excluded due to contamination of the sample. Mean CPIS on the day of study was 6.5±1.2. Mean duration of procedure was significantly shorter in modified m-BAL group as compared to B-BAL (10.3±1.1 min vs 21.6±3.2 min; p<0.0001). Twenty six patients showed concordance of culture reports. Significant growth was found in 73.3% (n=22) with m-BAL and 66.7 % (n=20) with B-BAL. Non-significant growth was found in 26.7% (n=8) with m-BAL and 33.3% (n=10) with B-BAL. Sensitivity and specificity of modified m-BAL were 90.9 % and 83.3% respectively. Incidence of hypoxia was more in B-BAL (2.6% vs 12%; p<0.0001). **Conclusion**: Modified m-BAL technique is equivalent to B-BAL in etiological diagnosis of VAP. Modified m-BAL might be a safer, quicker and cheaper alternative in resource poor settings. **Discussion**: This study attempted to compare two techniques (modified m-BAL and B-BAL) with regard to diagnostic yield, safety and duration of procedure. Due to unavailability of fiberoptic bronchoscope and qualified operators, organism specific antibiotic treatment is potentially delayed. This technique can easily be learned by trainee residents, provide easy and cost-effective modality for the diagnosis of VAP. Limitations of this study were its small sample size and non-randomized design.

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Use of lung ultrasound to assess extra-vascular lung water (EVLW) in patients undergoing haemodialysis (HD)

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Introduction:Multifrequency bioimpedance analysis(BIA) is an accurate and reliable method in assessing hydration status in HD patients.The lung ultrasound B lines has been shown to correlate with EVLW.Ultrasound(US)can be used as a point of care tool in patients undergoing HD.With the assumption that due to volume overload pre-dialysis, EVLW component can be studied using the US B-lines scores. The null hypothesis is US findings of EVLW as represented by B-lines wouldnot resolve following dialysis. **Methods**:This is a prospective observational study of 200 patients attending the nephrology dialysis unit for maintenance HD in a tertiary centre between october to december 2014.After obtaining consent from patients fulfilling the inclusion criteria, US lung and echocardiography were done using 3.5MHz cardiac probe(sonositeMAXX).BIA measurements using MALTRON BIOscan920 , tetrapolar electrodes unit were obtained. Baseline demographics and clinical parameters were noted.All measurements were taken by a single investigator pre and post dialysis as per the protocol.All data were expressed as mean±SD, median, interquartile range(IQR) or as % frequency as appropriate.Comparison among groups were made by P-value for linear trend(one way ANOVA or X^2 test).Paired 't' test or Wilcoxon signed rank test for comparison among patients and between variables, pearson correlation or spearman rank correlation coefficient as appropriate were used. **Results**:Patients with pre-existing lung disease(2%) had high USB-line score(median 34, IQR18-112) than those without(median 10, IQR 5-18, p=.002).40%of patients had New York Heart Association functional class of >=3. **Pre-dialysis**: Based on USB-line scores 55% patients were in mild lung congestion group with <14 lung comets, 35%in moderate(14-30 comets) and 10% in severe(>30)group.NYHA class were higher in moderate and severe lung congestion groups.BIA parameters (as per delta hydrations status-HS), 68% were ormohydrated and 20% were hyperhydrated. The latter group had significantly more USB-lines. Echocardiographic measurements in severe lung congestion group showed higher left ventricular mass index, Left ventricular end diastolic volume, E/e' ratio and lower EF% compared to other categories. **Post-Dialysis**: 91% patients had 0 or mild lung congestion while 4% in moderate and 5% in severe lung congestion groups remained.By post-dialysis delta HS, 97% were normohydrated and only 3% had hyperhydration status. The decrease in B lines category post-dialysis was strongly related to pre-dialysis values of EF%(r=(-0.62), P<0.001), E/e'(r=0.52, p<0.001), NYHA class (r=0.42, p=0.005).The USB-line score in the 4 patients with lung disease did not differ significantly(p=0.08). **Conclusion**:The USB-lines disappear in real time with HD and hence it can be reliably used as a point of care tool to assess EVLW in patients undergoing HD.

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Role of heparin binding protein in predicting outcomes among patients with sepsis and septic shock

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Background: Sepsis and Septic shock are associated with significant morbidity and mortality despite advances in delivery of intensive care. Prediction of onset of septic shock and mortality after development of shock could help in escalating therapy and for prognostication. Several biomarkers have been tested with ambiguous results. Heparin binding protein has been evaluated as a potential biomarker to identify febrile patients who progress to sepsis and septic shock. **Aim**: To evaluate the efficacy of HBP in predicting onset of shock and mortality among patients presenting with sepsis and septic shock respectively. **Material and Methods**: This was a pilot study done in all patients diagnosed with sepsis or septic shock in a tertiary care centre. Patients were classified into sepsis group and septic shock group. Twelve patients each were assigned to both the groups. Data was collected regarding

source of sepsis and demographic characteristics. APACHE was calculated at diagnosis of sepsis or septic shock as applicable. HBP was measured on day 0 and at 24 hours using an ELISA technique with the Axis Shield HBP kit. The primary outcome for the sepsis group was progression to septic shock, while for the septic shock group, ICU mortality was the primary outcome. The correlation was assessed by Pearsons coefficient with a two tailed analysis. **Results**: A total of 24 patients were recruited after due consent over a 6 week period from 1 august 2014 to 15 September 2014. The mean APACHE of the patients in the sepsis group was 15.77 and in the septic shock group was 25. Two out of the 12 patients in the sepsis group progressed to shock and one of them died. Six out of the 12 patients in the septic shock group died. The mean HBP0 in the sepsis group was 137.13ng/ml and HBP24 was 120.56 ng /ml. The corresponding values in the septic shock group were 84.88ng/ml and 109.55ng/ml respectively. The difference in the values did not approach statistical significance. The average vasopressor days for the septic shock group was 3.57 days. All the septic shock group were ventilated and 9 out of the 12 were supported by renal replacement. Three patients with sepsis needed ventilator support for primary lung involvement. 3 of the sepsis group needed RRT. The HBP values did not differ among those who progressed to shock and those who ultimately died. However, survivors seemed to have lower HBP24 when compared to HBP 0. This trend was reversed in the group with mortality. This however could not be quantified in statistically significant terms. **Conclusion**: HBP did not show a discriminatory ability in identifying septic patients with poor outcomes

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Comparison between marked versus unmarked introducer needle in real-time ultrasound-guided central vein cannulation- A prospective randomized study

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Introduction: Ultrasound (US) guided catheterization is now the recommended practice in central venous cannulation. However, introducer needle tip is not clearly visible even during the real time US. Blind tip leads to complications like arterial puncture and pneumothorax. This study was designed to evaluate whether real-time US-guided central vein cannulation with a marked introducer needle is superior to the existing unmarked introducer needle. **Methods**: Sixty two critically ill patients aged 18-60 years of either sex admitted to ICU were included in the study after written informed consent from their first of kin. Patients were randomized into two groups; both underwent real-time US guided central venous cannulation. Groups were divided based on whether a marked or unmarked introducer needle was used for cannulation. Portable US machine (Sonosite MicroMaxx® with a 7.5-MHz vascular probe) operated by a single operator with >5 and ≥1 year experience in central vein cannulation (CVC) and US guided CVC respectively. First, after making trendelenberg position, we aseptically prepared and draped the neck area. We used CVC set (Certofix Trio; B Braun, Germany) for both the groups. Aseptically, an 18 gauge introducer needle was indented with markings spaced 0.5 centimetres (single) and every 1 centimetre (double mark) with help of a sterile needle and scale. This needle was used as the marked introducer needle. Operator held the probe in a transverse plane to the internal jugular vein (IJV) to be canulated in the diversion of sternocleidomastoid muscle at the level of cricoid cartilage. Approximate depths of anterior and posterior wall of vein, anterior wall of artery and pleura were appreciated from midpoint of probe in short-axis view. Time required from skin puncture to central vein puncture (confirmed by aspirating free flow of venous blood) using a stop watch was recorded. Number

of attempts, complications like arterial puncture; pneumothorax of either procedures were compared. **Results**: Both marked needle and unmarked needle groups were comparable with regard to age, gender, and prognostication (APACHE II and SOFA) scores and platelet counts and prothrombin time (INR). Approximate depths from mid-point of probe to anterior and posterior wall of vein, anterior wall of artery and pleura were comparable in either group. Also comparable was the time taken from skin puncture to central vein puncture. However, complications like arterial puncture and hematoma were significantly lower (p=0.025) with the marked introducer needle group. Pneumothorax was not reported in any of the groups. **Discussions**: Our study supports the idea that a small modification of existing introducer needle i.e. marked introducer needle can help further reduce the iatrogenic complications of CVC. Prior information about the depth of vein and artery along with presence a marked introducer needle can be a step towards achievement of zero CVC complications.

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Clostridium difficile or clostridium different in Indian ICUs?

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Introduction: Minimizing antibiotic overuse and enforcing antibiotic stewardship program remains a challenge in Intensive Care Units (ICU) across India. Center for Disease Control (CDC) considers Clostridium difficile infection (CDI) a global menace and attributes it to antibiotic overuse. The incidence of CDI in a setting where antibiotic resistance is very high such as India is largely unknown and could exceed western rates. Hence, we explored the incidence of CDI in our hospital. **Methods**:This is a retrospective study done of all patients admitted to the ICU between from January 2013 to May 2014 at a tertiary care hospital in Chennai, India, Patients in whom the treating clinicians suspected and tested for CDI were included in the study. Two different tests were used during the study period: i) Enzyme Immune Assay (EIA) test for detection of toxins A and B during the initial part of the study period and ii) the Polymerase Chain Reaction (PCR) test subsequently used, as our hospital started offering this option which is considered to be more sensitive and specific. **Results**: A total of 172 patients with suspected CDI were included in the study. Initial 52 samples were analyzed using EIA of which 5 were positive (9.6%). Subsequently 120 samples were evaluated by PCR testing for C. difficile of which only 2 were positive (1.67%). In total, out of the suspected 172 patients, 7 (4.06%) patients had documented Cdifficile infection. **Conclusion**: The incidence of C difficile infection is very low despite high level of use of broad-spectrum antibiotics in Indian ICU. This is a paradox which needs further insight and explanation. It is likely that racial differences and dietary practices could play a role.

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Outcome of CPR in cancer patients in an Indian Tertiary Cancer Center

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Introduction: Cardiopulmonary resuscitation (CPR) after cardiac arrest in cancer patients is often discouraged as it is associated with poor outcome. In our 700 bed tertiary cancer hospital in Mumbai, India, the ICU runs an in-hospital cardiac arrest team (CAT). We reviewed our data to determine outcome from CPR, identify factors associated with improved outcomes and justify the presence of a CAT in our

cancer hospital. **Methods**: All in hospital patients from November 2012 to November 2014 (2 year period) with unanticipated cardio respiratory arrests were included. Data was recorded prospectively using the Utstein template. Only patients with cardiac arrest rhythms were included. Patients with anticipated progression towards arrest, those with seizures, hypotension without dysrhythmias or other medical emergencies were excluded. The outcomes studied were return of spontaneous circulation (ROSC) and survival on hospital discharge (SOHD). Binary logistic regression analysis was performed to determine factors associated with ROSC and SOHD. **Results**: One hundred and ninety three patients (110 males, 83 females, mean age 48.2 ± 18.3 years) were studied. The mean time interval between collapse and onset of resuscitation was 2.3 ± 2.1 minutes. 65.3 % arrests were witnessed. Sustained ROSC was in 36.8% patients and the SOHD was 24.9%.The initial rhythm recorded during CPR was asystole in 133 patients, pulseless electrical activity in 21 patients and ventricular fibrillation/tachycardia (VF/VT) in 39 patients. SOHD for these rhythms was 8.3%, 33.3% and 76.9%, respectively. On univariate analysis type of rhythm, witnessed arrests and time to resuscitation were associated with sustained ROSC and SOHD. On multivariate analysis, only type of rhythm, VF /VT (p= 0.000) PEA (p=0.017) were significantly associated with SOHD, while witnessed arrest and time to resuscitation were not. **Conclusions**: Sustained ROSC was in 36.8% patients and the SOHD was 24.9%. A reduced response time, witnessed arrest and type of rhythm are associated with ROSC and improved SOHD. The type of rhythm was independently associated with SOHD, with VF/VT and PEA having improved survival while asystolic patients had a poor outcome. These considerations justify the presence of a CAT in our cancer hospital.

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Point of care thromboelastoography versus conventional lab parameters in the evaluation of coagulation function in post surgical patients who develop multi system derangement: A single centre prospective study

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Aims To compare Point-Of-Care thromboelastography(TEG) parameters with conventional lab parameters in the evaluation of coagulation function in post surgical patients with multi system derangement.To review the usage of blood products in them using a teg based regimen. **Material & Methods**: Blood samples were simultaneously collected for coagulation studies by POC TEG (activated clotting time (R), kinetics (K), the alpha angle, the maximum amplitude (MA), LY -30, and the clot index(CI)and evaluation from coagulation lab (PT, APTT, INR, Fibrinogen and D-dimer) on day 1, day 2, and day 3 of the patients icu stay.. TEG parameters were used to decide upon transfusion of blood products.patients wre evaluated on all three days on the basis of the SOFA and APACHE II score. **Results**: In our study population (n=18) the mean PT on day 1, 2 &3 respectively were 19.1±4.5, 20.48±4.5 &19.81±4.6(control = 11.3), APTT were 36.94±7.07, 37.62±8.77 & 37.35±9.56 (control 29.1)INR were 1.95±0.65, 2.08±0.56 & 2.2±1.19; fibrinogen were 304.93±73.26 , 302.4±77.43, 304.71±78.83, haemoglobin of 9.13±1.78, 8.95±2.3, 8.84±1.82and platelets counts of 120.53±83.11, 117.33±74.5, 123±87.9. 47.8%, 52.2 % and 43.5 % patients had positive d-dimers on day 1, 2, 3 respectively. TEG parameters of R were 7.13±2.49, 9.7±2.8, 8.86±2.45, K were 2.66±1.48, 3.39±1.8, 2.83±1.6, alpha angle were 55.15±16.39, 48.80±17.2 & 52.3±19.5 MA were 58.25±18.98, 58.72±10.13, 57.21±14.10, ly-30 were 0.3±0.68, 0.19±0.45, 1.04±4.25, 1, 2 and 3 respectively.. We compared our actual transfusion requirement with the projected transfusion requirement of the same subgroup of patients if the existing lab based protocol had been used .We found significant difference in the FFP requirement of our study group (following TEG protocol) and the projected ffp requirement if we would have followed a lab based transfusion protocol, on day 1 and 2 (p =0.002, p=0.003) There were also significant

difference in SOFA scores between those who received transfusion and those who did not on day 1 , and day 2. **Conclusion**:.By using a TEG based transfusion we were able to significantly bring down the FFP requirement in our study population.We also noted that patients who had received transfusion tended to have higher SOFA scores and hence concluded that using TEG to decide upon transfusion requirement may help in decreasing the mortality and morbidity in the ICU.

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Comparison of the effectiveness of Conivaptan and Hypertonic Saline in the treatment of Euvolemic Hyponatremia in an adult Intensive Care Unit

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Background: Hyponatremia is the most common electrolyte abnormality encountered in clinical practice and has a significant impact on morbidity and mortality in hospitalized patients. The optimal management of hyponatremia is still evolving. Over the last decade, Vaptans have been increasingly used in clinical practice with promising results. **Methods**: Our study included 80 euvolemic hyponatremic patients treated in adult intensive care unit. We compared prospective data from 40 patients treated with conivaptan over a period of one year in 2013 with the retrospective data on 40 patients treated with hypertonic saline over a period of one year in 2012. The Conivaptan group received 20 mg iv bolus followed by 40 mg infusion over 48 hours. The hypertonic saline group received a 3% saline infusion, given according to standard protocol, with monitoring of serum sodium at 12, 24, 48 and 72 hours. The time taken to achieve normal sodium level, length of ICU stay, length of hospital stay, mortality and complications were compared between the two groups. **Results**: The demographic data was comparable in both groups. The baseline admission sodium levels were comparable and not statistically significant. At 12 and 24 hours, the correction in sodium level in both groups was not statistically significant. However at 48 hours, the patients in the conivaptan group had a sodium level of 132.94 ± 3.77 compared to the hypertonic saline group with a sodium level of 125.78 ± 20.29, which was statistically significant **(**P=0.03). The length of ICU was significantly less in the conivaptan group (3.35 ± 0.89) compared to hypertonic saline group (4.61 ± 0.91) **(**P<0.001) . Injection site phlebitis was noted in 25 % and 10 % of patients in the hypertonic saline and conivaptan groups respectively. There was no significant difference in mortality among both the groups. **Conclusion**: In euvolemic hyponatremic patients, conivaptan, with its "aquaresis" property has a significantly better sodium correction, resulting in reduced ICU and hospital length of stay with no significant side effects.

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"Early goal directed therapy in the treatment of severe sepsis and early- septic shock (An Indian prostective study)"

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Introduction: The surviving sepsis campaign guidelines recommend goal-directed therapy (GDT) for early resuscitation of patients with sepsis; endorsed as a key strategy to decrease mortality. This approach involves adjustment of cardiac preload, afterload and contractility to balance oxygen delivery to oxygen demand. Thus we, conducted a study to evaluate the efficacy of early goal-directed therapy in Indian setting in multi-specialty tertiary care centre catering both urban and rural population. **Methods**: This study is conducted in 4 Intensive care units (2 medical ICUs, 1 surgical ICU

and 1 Cardiac ICU) and an emergency department. We randomly assigned patients presenting to all these units with early septic shock to receive either EGDT or usual care. Primary end point was all cause mortality at 60 days. Regular clinical evaluation, evaluation of hemodynamic and APACHE II scores were obtained serially on admission, at 6 hrs, 24 hours, 48 hrs and 72 hrs   and compared between the study groups. **Results**:Of the 105 enrolled patients, 55 were assigned to the EGDT recommendations (Protocol group) and 50 to the usual-care group. Insertion of CVC and ScvO2 measurement was left to the discretion of treating physician in usual group.Primary outcome data were available for more than 99% of the patients. Patients in the EGDT group received a larger mean volume of intravenous fluids in the first 6 hours after randomization than did those in the usual-care group (2608 ± 601 ml vs 1506 ± 454 ml), vasopressors infusion(56.4% vs 66% respectively), red cell transfusions(12.7% vs 6%) and dobutamine (14.5% vs 6%) (P<0.001 for all comparisons). At 60 days after randomization, 9 deaths had occurred in the EGDT group and 13 had occurred in the usual care group, for rates of death of 16.4% and 26%, respectively(absolute risk difference with EDGT vs usual care, -9.6% percentage point, 95%confidence interval)There was significant difference in survival time, in hospital mortality, duration of organ support, or length of hospital stay. **Conclusions**:In critically ill patient presenting to the Intensive care unit and emergency department with early septic shock, EGT had mortality benefits at 60 days, improved APACHE II score at 72 hours; secondary end points like survival time, organ support duration and length of hospital stay also favoured EGDT.

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Impact of patient monitoring on afferent limb failure and admission to the intensive care unit: A point prevalence study

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Key words: Intensive care unit, Afferent Limb failure, diurnal variation, rapid response teams **Background**: There is robust evidence to support the predictive competency of monitoring, however monitoring practices vary enormously and this contributes to failure to detect and respond to deteriorating patients (afferent limb failure [ALF]). **Aims and objectives**: The primary aim was to explore the impact of patient monitoring as defined by documentation of vital signs ALF and unplanned admission to the Intensive Care Unit (ICU) during the day (08:00-17:59) and night (18:00-07:59) time and hospital mortality The secondary aim was to explore the relationship between night time admission to the ICU and age of the patient. **Study design**: A Point Prevalence study of unplanned ICU admissions from the ward, over a two day period in 2012 in 41 Australian and New Zealand ICUs. Ethics (HREC/12/RAH/157) **Results**: 51 patients were admitted to ICU, 48 patients (94%) had complete datasets and were included in the analysis. 32 (67%) were males, median age of 62.5 years (IQR 51.5-74.0) and median APACHE II score of 21.0 (IQR 17-26). The prevalence of ALF was 37.5% (18/48). There was an association between night-time ICU admission and age (P =0.01). There was a significant diurnal variation between the least recorded (less frequent; every two hours) observation systolic blood pressure (SBP) and the most recorded (more frequent; every hour) observation

heart rate (HR) (P value<0.001). Observations made in the night (1800-0759 hrs) had an increased odds of afferent Limb failure than observations made during the day (0800-1759hrs) (P value =0.92) There was no association between nocturnal admission and ICU and hospital mortality (P=0.94; P=0.53) **Conclusion**: SBP is the least recorded (less frequent) patient observation and inadequate monitoring was the most common cause for afferent limb failure in this study population. Increasing age is a risk factor for nocturnal ICU admission, however, this was not associated with increase in consequences of afferent limb failure in terms of mortality. A larger study is needed to explore the impact of patient monitoring on ALF.

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Outcome of patients admitted to a tertiary referral hospital ICU with acute respiratory distress syndrome – A 5 year prospective cohort study

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Introduction: Acute respiratory distress syndrome (ARDS) is a common cause of hypoxemic respiratory failure. Despite extensive research, no comprehensive treatment options have been defined so far. Treatment strategies, with the exception of low tidal volume mechanical ventilation, have had little impact on outcomes. This study reviewed patients with ARDS who were predominantly managed with intravenous steroids and non invasive positive pressure ventilation (NIPPV). Their outcome was assessed by ICU survival and ninety day mortality. **Methods**: This was a prospective cohort study conducted in the intensive care unit of Columbia Asia tertiary referral hospital. The data was collected from an electronic database over 5 years from January 2010 to November 2014. Subjects who met the ARDS criteria as per the Berlin Definition were selected. They were all administered with intravenous Methylprednisolone as a 1 mg/kg infusion for 1 week and tapered down over the next 3 weeks. Patients who had ARDS for one week or more, terminally ill patients, major gastrointestinal bleeding within the previous 3 months or requiring a higher dose of methylprednisolone or its equivalent were excluded from this study. They were given a trial of NIPPV and intubated only if they had failed or had contraindications for NIPPV. Variables analysed were conditions precipitating ARDS, APACHE II scores, PaO2/FiO2 ratio and PEEP at presentation, change in PaO2/FiO2 ratio and PEEP on days 2, 4, 6 and 8 of admission, hemodynamic parameters, duration of mechanical ventilation, ICU survival, hospital length of stay, 90 day mortality and adverse effects. **Results**: A total of 55 patients fulfilled the criteria of ARDS as per the Berlin Definition. 22 patients (40%) had moderate ARDS and 33 patients (60%) severe ARDS. The median age was 45 years (IQR 32-65) and 55% were males. The mean APACHE II score was 15 ± 3.5. Pneumonia (76.4%) was the common precipitating factor followed by Sepsis (16.4%). Patients treated with intravenous steroids (43 of 55) had a statistically significant better ICU survival rate of 79% [p = 0.046] and lesser ninety day mortality of 26% [p = 0.043] than those who did not receive steroids (50% and 41.6% respectively). Patients treated exclusively with NIPPV (32 of 55) had a statistically significant better ICU survival rate of 97% [p <0.01] and lesser ninety day mortality of 6% [p <0.01] than intubated patients [32% and 70% respectively]. However, patients who were intubated and mechanically ventilated had a high mean APACHE II score (23±2). The duration of mechanical ventilation, hospital length of stay, barotraumas, onset of new infections and steroid induced complications were similar in both groups. **Conclusion**: In this study, we observe that the use of intravenous Methylprednisolone in ARDS unless contraindicated, is associated with better ICU survival and decreased mortality. A trial of NIPPV could improve outcomes in patients with moderate ARDS than intubating them at the outset. Larger randomised controlled trials are needed to make definitive conclusions.

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Efficacy and safety of intravenous Ulinastatin therapy in patients with severe dengue admitted in ICU

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Introduction: Modifiers of the pro-inflammatory and anti-inflammatory strategies like Ulinastatin are widely used for sepsis. Ulinastatin is an effective agent for immune modulation to prevent organ dysfunction and promote homeostasis. The purpose of the study was to assess the efficacy and safety of Ulinastatin with standard supportive care in severe dengue patients admitted to the intensive care unit (ICU) and to identify factors related to poor outcome **Methods**: All patients diagnosed with severe dengue admitted to ICU over 6 months (March –August 2014) were randomized to receive intravenous administration of Ulinastatin (200, 000 International units) 12 hourly for 5 days or placebo. Severity of illness was assessed by the Acute Physiology and Chronic Health Evaluation (APACHE) II score, and organ failure was determined by the Sequential Organ Failure Assessment score. Primary outcome measure was 28-day mortality. **Results**: Of 160 patients randomized, 78 patients received Ulinastatin. Mean age was 40.56 ± 18.1 years, and 65.6% were male. The commonest indications to use Ulinastatin were shock (88.4%), ARDS (7.6%) and DIC (3.8%). Mean admission APACHE II and Sequential Organ Failure Assessment scores were 14.52 ± 7.8 and 5.52 ± 3.4, respectively. 88/160(55%) patients were requiring mechanical ventilation, 120/160(75%) were on vasopressors, and 50/160(31.25%) had multiple organ failure. 28 day all cause mortality was in 29.4 % in Ulinastatin group as compared to 40.2 % in placebo group. We could not find any infusion related adverse effects. We could also not attribute any hematological abnormality to Ulinastatin. **Discussion**: 5 day therapy with intravenous administration of Ulinastatin in severe dengue resulted in decreased 28 day all cause mortality. Reduction in new organ dysfunction was also noted. Outcome is good if appropriate aggressive care and organ support are instituted. The therapy with Ulinastatin was safe in severe dengue patients.

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Audit of compliance of intubation bundle in critically ill patients at tertiary care oncology hospital

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Introduction: Intubation in critically ill patient is associated with various complications. Earlier single study reported that implementing intubation bundle during intubation decreases the complication associated with it. We conducted an audit to evaluate the compliance of intubation bundle & associated complications. **Methods**: We collected the data prospectively & done retrospective review of compliance of bundle for patients intubated in the ICU during a period of 14 months. Intubations were done by residents & post M.D. fellows in critically care medicine. We included all patients with age > 12 years requiring intubation, excluding those during CPCR or immediately after unplanned extubations, awake fibreoptic intubation. The bundle comprised of ten elements divided in three parts preintubation (4 elements), during intubations (2 elements) & post intubation (4 elements). The bundle was considered compliant if all ten elements were performed & each part was considered compliant if all elements of that were followed. Recorded complications were severe complications (severe hypoxia, severe cardiovascular collapse,

bradycardia, cardiac arrest) & minor complications (esophageal intubation, aspiration, dangerous agitation, arrthymias, airway trauma). **Results**: Total 158 adult intubations were performed. Compliance of the bundle was in 39.2% (n=62) intubations. Compliance with pre-intubation, during intubation & post-intubation part of bundle was 62% (n=98), 67.1% (n=106) & 66.5% (n=105) respectively. Complications were seen in 74 (46.83%) intubations. Life threatening complications like severe hypoxemia, severe cardiovascular collapse, bradycardia, cardiac arrest occurred in 5.7% (n=9), 40.5% (n=64), 1.9% (n=3), 1.3% (n=2) intubations respectively. Some intubations encountered multiple complications. We also compare for any correlation between compliance of intubation bundle or its part & complication rates. We found that there was no statistically significant difference seen between complication & compliance of intubation bundle (p = 0.66) or its parts pre-intubation, during intubation & post intubation (p =0.8, p=0.9, p=0.33). **Discussion**:Compliance of intubation bundle is low & there is no correlation between compliance of intubation bundle & complications. Although the compliance of individual part of bundle is more as compared to full bundle, this do not make any difference in complication when compliance of each part is achieved or not achieved. Limitation of our study is single centre study. We do not have any previous data to compare complications when intubation bundle was not followed in our ICU.

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Impact of clinical pharmacist on medication errors in the Critical Care Unit

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Introduction: Medication prescription errors have been reported to be common in the Critical Care Unit (CCU). These could be either minor or serious errors that may or may not lead to adverse events. The objective of the current study is to explore types of prescription errors in a Critical Care setting and the impact of a clinical pharmacist. **Methods**: This was a retrospective observational study from July 2013 to November 2013 in a multi-disciplinary CCU of a tertiary care hospital in Chennai, India. Medication prescription errors were audited by the clinical pharmacists during their daily rounds using a validated prescription error system and interventions were done to resolve those errors. The prescription errors and interventions were collected, categorized and analyzed. **Results**: 429 patients were admitted during the study period and the average CCU length of stay was 8.9 days. The total medical prescriptions written during the study period was 38207. Of these there were 57 prescription errors (0.15%). The prescription errors, in order of frequency, were drugs prescribed not per indication (31.6%), incorrect dosage (22.8%), duplication (15.8%), erroneous units (12.3%), erroneous route of administration (7.0%) and transcription errors/incomplete drug prescription (7.0%). Of those categorized as errors by the clinical pharmacists, 8 (14.03%) were overruled by the physician as appropriate and the remaining were corrected. Antibiotics were the most frequent type of medication associated with errors (36.8%). **Conclusion**: While it is believed that medication prescription errors are very frequent, our study shows that the numbers were small (0.15%) considering the large number of prescriptions in the critical care setting. Prescription not per indications and incorrect dosage were found to be the common errors. A clinical pharmacist can impact this by identifying these errors earlier and bringing it to the notice of clinicians and taking appropriate action, thereby improving patient outcomes.

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Biomarkers of sepsis: Do they correlate?

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Introduction: To evaluate the association between N-terminal brain natriuretic propeptide (NT-proBNP), Procalcitonin (PCT), C-reactive protein (CRP) and total leucocyte count (TLC) as biomarkers of sepsis in patients admitted to medical ICU with suspected sepsis and its relation with ICU outcome. **Method**: In this retrospective, observational study, patients admitted to medical ICU from March to November 2014 with suspected sepsis were tested for NT-proBNP, PCT, semi-quantitative CRP and TLC levels were screened. Values of NT-proBNP, CRP and TLC reported within 24 hours of PCT report were analyzed. Demographic data, diagnosis, ICU outcome and length of ICU stay (LOS) were recorded. Statistical analysis was performed using Chi-square test, t test, the Mann-Whitney U test and Spearman ρ correlation coefficient (r_s). **Results**: One sixty eight patients (Median [IQR] 66.00 [55.00 -75.00] years age, 61.9% males) in the ICU with 181 separate observations were found to be eligible. Forty six (25.4%) patients died during the ICU stay while 114 (63.0%) patients were discharged alive from the ICU. Median (IQR) LOS in ICU was 3.0 (2.0-6.0 days) days. One hundred three (57.2%) patients had <4 days of ICU stay while 36 (20.0 %) patients had between 4 and 6 days of ICU stay. The median (IQR) PCT, NT-proBNP, TLC and median CRP were respectively 0.60 (0.21-5.61) ng/ml, 3320.0 (1103.5- 10728.5) pg/ml, 12.1 (8.7- 18.4) x10^3 /µl and ≥96, <192 (≥12 - <24 and ≥192) mg/L. Significant positive correlation was observed between PCT and NT-proBNP (r_s=0.314, p<0.001) and CRP and PCT (r_s=0.544, p<0.001), PCT and TLC (r_s=0.172, p=0.022) and NT-proBNP and CRP (r_s=0.213, p=0.003) in the whole group. Correlations between all other pair of biomarkers were found to be non-significant. There was significant increase in the PCT (0.38 vs 2.56 ng/ml, p<0.001) level in the patients who died during the ICU stay compared to those who were discharged alive. Though there was increase in the level of NT-proBNP (3237.0 vs 3918.5 pg/ml, p=0.12), TLC (11.9 vs 14.4 x10^3 /µl, p= 0.16) and CRP (>/=48 - <96 vs >/=96 - <192 mg/L, p=0.132) in patients who died, it failed to reach statistical significance. Procalcitonin correlated significantly with other variables in patients discharged alive from the ICU while it showed significant correlation with CRP in the patient who did not survive. Rest other correlations between the group was found to be non-significant. **Conclusion**: PCT has significant association with NTproBNP, CRP and TLC as biomarkers of sepsis in ICU patients. NTproBNP also has significant moderate correlation with TLC. Larger prospective trials are required for further evaluation. **Limitations**: Single center retrospective study with small number of cases

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Post operative nutrition practices in abdominal surgery patients in a tertiary referral hospital ICU: A prospective study

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Introduction: The benefit of early enteral feeds in surgical patients admitted to intensive care units (ICUs) has been emphasised by many studies, most notably the ASPEN guidelines. However apprehensions still remain about anastomotic leaks in patients who have undergone gastrointestinal surgery and hence the practice of early Enteral Nutrition [EN] is yet to be widely accepted. Also, the impact of these guidelines on outcome in an Indian scenario is yet to be evaluated. This study aims to compare the impact of early EN (within 48 hours after surgery) with that of late EN (48 hours post surgery) on the outcomes in patients admitted to ICU following abdominal surgeries. **Methods**:**Design**: This study analysed post abdominal surgery patients admitted to Columbia Asia Referral Hospital ICU over a two year period from August 2012 to August 2014. Patients were stratified into the early EN and late EN groups. Only those patients directly admitted to ICU after abdominal surgery

in this hospital were included in this study. ICU stay beyond 3 days was considered as prolonged; with average ICU length of stay for this ICU being 3 days.The primary outcome was patient mortality. ICU Length of stay (LOS), hospital LOS, infection rates and ventilator days were the secondary outcome measures. APACHE II scores were calculated for all patients. SPSS and Microsoft Excel were used for statistical analysis. Linear correlation was done to test for any association between delayed EN with hospital length of stay [LOS] and infection rates. Results were expressed as odds ratios (ORs) and 95% confidence intervals (CIs). **Results**: Of the 91 ICU patients admitted post abdominal surgery, 58 received early EN and 33 late EN.Hospital LOS (9.1 ± 0.87 days versus 14.3 ± 1.18 days; $P < 0.0001$) and infection rates [10 (17%) versus 16 (48%); p<0.05] were lesser in the early EN group. A direct correlation was noted between the timing of feed and hospital LOS (r = 0.41 versus r =0.18; P <0.001). Other independent predictors of prolonged hospital stay were the use of parenteral nutrition (OR 5.25, 95% CI; P =0.003) and the number of nil-per-oral [NPO] days (OR 8.25, 95% CI; P =<0.001). Parenteral nutrition was started in a larger proportion of patients in delayed EN group [9 (27%)] versus 1 in the late EN group (2%) [P < 0.05].ICU LOS (3.4 ± 0.68 days and 4.5 ± 0.58; p=0.22) and duration of mechanical ventilation (1.6 ± 0.7 days versus 2.6 ± 0.7 days; P = 0.304) was similar in both groups. **Conclusion** In this study, early EN in abdominal surgery ICU patients was associated with a reduced hospital LOS and infection rates. It did not have an impact on ICU LOS, duration of mechanical ventilation and mortality rates. This study suggests that initiation of early enteral nutrition in post surgical patients can lead to better outcomes.

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A prospective pharmacokinetics and dose optimization study of extended infusion of meropenem in adult critically ill cancer patients

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Introduction: Meropenem, has time-dependent bactericidal activity, needing f T>MIC (time for which the free concentration is maintained above the MIC during a dosing interval) > 40%[1] for optimum effect. Ideally Meropenem should be given as continuous infusion over 24 hours but such infusion may not be stable in tropical countries. However, since drug stability is up to 90% for 3 hrs in tropical countries, infusion may be extended to 3 hrs. Unfortunately pharmacokinetics after such extended infusion is largely unknown. Moreover, Plasma Meropenem level may vary in critically ill septic patients due to various factors causing change in volume of distribution (V) and drug clearance. Also Indian patients have lower average body weight compared with western population. **Aims and Objectives**: To determine the peak plasma concentration (Cmax) and time required to achieve peak concentration (Tmax) with Meropenem infusion.

- To determine the time required to achieve plasma concentration > MIC of intermediate strains of Enterobacteriaceae GNB's (2 microgram/ ml) with the first dose infusion.
- To determine whether fT>MIC of 40% of dosing interval at MIC 2 microgram/ ml
- To study pharmacokinetic properties of meropenem.

Methods: It was a Prospective, observational pharmacokinetic Study of 25 critically ill patients receiving Meropenem as 3 hour infusion. At the time of study original research molecule was not available in hospital pharmacy; hence available generic brand was used.

Inclusion criteria
- Adult critically ill patients with creatinine clearance > 50mL/minute.

Exclusion criteria
- Previously received Meropenem in last 2 days
- Patients weighing less than 40kgs
- Patients not expected to survive for 72 hours

Blood samples at various intervals were collected before and after first and 7th dose on day 1 and day 3. After centrifuge, blood samples were stored at −20 ∘C until analysis within 1 month. Plasma Meropenem concentration was measured using a validated reverse phase HPLC assay. **Results**: Day 1 sample (first dose) was collected for all 25 patients. One patient expired before day 3 (7th dose). Pharmacokinetic parameters are given below.

PK parameters	Day 1	Day 3
Tmax (hr)	2.095	2.8
Cmax (ug/ml)	19.1	18.1
T1/2 (hr)	3.18	3.83
Ke (1/hr)	0.21	0.18

We have observed that Meropenem level reaches >2 microgram/ ml (MIC for Intermediate strains of Enterobacteriaceae) within less than 1 hour and remains there for significantly longer time to achieve f T>MIC > 40 **Conclusion**: 3 hr extended infusion of Meropenem, achieves desired plasma concentration rapidly within less than 1 hour and also maintains it in desired range to achieve f T>MIC > 40%.

Reference

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Vitamin D deficiency in critically ill patients: A pilot study

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Introduction: Vitamin D is important in immunomodulation and regulation of inflammatory response. There are conflicting results of impact of Vitamin D deficiency on ICU outcome. **Objective**: The objective of the study was to evaluate the prevalence of 25-hydroxyvitamin D 25(OH)D deficiency in the intensive care unit (ICU) and its relationship with ICU outcome. **Method**: This was a retrospective observational study of patients admitted to the ICU between October to November 2014 in a 17-bed tertiary medical ICU. Data collected included demography, co-morbidities, admission diagnosis and 25(OH)D levels. SAPS score was calculated. Serum 25(OH)D concentrations were assayed at ICU admission by liquid chromatography-tandem mass spectrometry. In this study we categorized the concentrations of 25(OH)D as sufficient (>20 ng/ ml), mild deficiency (10- 20 ng/mL) and severe deficiency (<10 ng/mL). ICU outcome was recorded. Data was analyzed using SPSS 20. Median interquartile range [IQR]) and significance level using non parametric tests were calculated. **RESULTS**: Forty two patients were included (27 male; median age of 59.5 years [IQR 45-69.5]). Median serum 25(OH)D level was 8.5 ng/mL [IQR 3-14.2]. Low serum 25(OH)D was found in 33 (78.6%) patients, out of which 9 (21.4%) had mild deficiency and 24 (57.14%) had severe deficiency. Median SAPS score at ICU admission was 35.7[IQR 22-46.2]. There was no statistical correlation (p=0.366) between level of 25(OH) D and SAPS score at admission. Overall mortality was 22.5% (9 patients).

The ICU mortality was similar (p= 0.989) in all groups [Severe deficiency 20.8% (5 patients), Mild deficiency 22.2% (2 patients). and Normal 25(OH) D level 22%(2 patients)]. **DISCUSSIONS**: There was high prevalence of 25(OH)D deficiency in critically ill patients in our ICU. However, severe deficiency was not associated with increased risk of ICU mortality in our pilot study. Single center and retrospective observational study design and small number of subjects were the limitations of the study. Larger prospective (perhaps multicentric) studies are needed for definitive results.

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Ultrasonographic measurement of optic nerve sheath diameter to detect raised intracranial pressure in adult head injury patients in the ICU and its correlation with CT scan findings

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Introduction: Traumatic brain injury is a leading cause of mortality in patients younger than 45 years. Elevated intracranial pressure is a challenging and potentially fatal complication of head trauma in patients who present to the ICU. Clinicians need an accurate tool to detect elevated ICP. Increased ICP is transmitted to the subarachnoid space surrounding the optic nerve causing optic nerve expansion. Hence optic nerve sheath diameter can be used as a possible indicator of elevated ICP. **Aim**: To evaluate if ultrasonographic measurement of optic nerve sheath diameter can be used for early and accurate diagnosis of raised ICP in patients of traumatic brain injury. **Methods**: Observational study conducted at the ICU of a tertiary level teaching hospital. Clearance obtained from IEC . The study was conducted in patients of >18 years with traumatic head injury suspected to have raised ICP admitted to the ICU. Patients with bilateral ocular trauma and patients with age< 18 years excluded. 35 patients were included in the study. Ultrasonographic measurement performed with a sonosite machine using a 7.5 MHZ linear probe. A single ONSD was measured 3.0 mm behind the globe in each eye, and then the ONSD measurements from each eye were averaged to create a binocular ONSD. A binocular ONSD or uniocular measurement in patients with single eye measurement greater than 5.00 mm was considered abnormal. A CT scan of the head was performed with in 2hrs of ultrasonographic measurement and patient's CT considered to be positive if one or more of the following were present: Significant edema, midline shift, mass effect, effacement of sulci, collapse of ventricles or Compression of cisterns. **Data analysis**: Patient demographics , ultrasonographic measurements and cranial CT results were entered into a database. Sensitivity and specificity of ONSD (using 5.00 mm as the cut off point) for detection of elevated ICP were calculated using the radiologist's reading of the CT as the criterion standard for presence or absence of elevated ICP. **Results**: 35 patients enrolled in the study. 24 patients with an ONSD of 5.00 mm or more had CT findings that correlated with elevated ICP. 2 patients with an ONSD of more than 5.00 mm had no findings of elevated ICP on CT scan. 9 patients had no signs of elevated ICP both on CT scan and ultrasound. The sensitivity for the ultrasonography in detecting elevated ICP was 100% . The specificity was 81 %. **Limitations**: Centres with less experience with ultasonography may find varying results. Small size, convenience sampling and observational study were the major limitations. **Conclusion**: Bedside ultrasonographic measurement of ONSD has potential as a sensitive screening test for elevated ICP in adult head injury patients in the ICU.

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Demographic, clinical and microbiological profile of carbapenam resistant enterobacteriaceae (CRE) infections: A retrospective study from a Tertiary Care Intensive Care Unit of North India

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Introduction: The emergence of CRE in recent time has become a serious threat to public health due to high mortality , potential dissemination rates and limited treatment options associated with these organisms. This retrospective study was carried out in a tertiary care intensive care unit of a Delhi NCR to know the demographic, clinical and microbiological aspects of these patients. **Methods**: Retrospective analysis of data collected from the patients admitted in intensive care unit with positive Carbapenam Resistant Enterobacteriaceae (CRE) cultures were enrolled for the study.The ICU patients were selected from the microbiological tracker for CRE organism and all the relevant demographic, clinical & microbiological data was collected from the hospital information system. All the patients admitted to ICU between January 2014 till December 2014 were selected.The isolates were identified by the Vitek -2 compact system.(BIOMERIEUX, FRANCE).Patients less than 16 years of age were excluded from the stud_y **Results**: Total number of patients enrolled for the study were 190. 66.31 % of the patients were male and 33.68 % were female. Maximum number of patients were in the age group of 65-84 years (44.2%). Patients in age group 45-64 & 16-44 years were 34.21 % & 21.6 % respectively. Respiratory system was primarily involved in maximum number of cases (28.9%), followed by neurological(19.5%), gastrointestinal(13.2%), renal(8.4%) and cardiac(7.9%). The most common co-morbid condition associated with CRE were hypertension (37.90%), diabetes mellitus (26.8 %) followed by cardiovascular disease (18.9%) & chronic kidney disease (13.2%). From the data observed 86.8 % patients had urinary catheter in-situ while 81.1% patients had central venous catheter and 64.7 % patients were on mechanical ventilation during ICU stay. Carbapenam resistant Klebsiella Pneumoniae was isolated in 64.2%, E.coli in 23.7% and enterobactor family in 12.1%. The most common source of CRE isolates were respiratory secretions (52.1%) followed by urine (20.5%) and blood(8.9%). Sensitivity pattern of the isolates showed 81.2% sensitive to colisitin/polymixin-B, 53.6% to tigicycline/tetracycline followed by amikacin/gentamicin (15.85%) and β-lactam + BLI (10.5%). Average length of stay for these patients was found to be 21 days. Mortality rate among CRE patients was 40.5% & 59.5% patients were discharged from the hospital.

Discussion: We conclude from our study that patients with prolonged hospital stay and multi organ dysfunction are prone to get CRE infections. We also conclude that elderly male patients who had multiple invasive procedure are highly susceptible. So judicious use and rationalization of antibiotic therapy is of paramount importance.

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Screening of ward patients by daily acute physiological score and its effect on incidence of cardiac arrests

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Background:Failure to reduce unanticipated cardiac arrest became an area of increasing focus in patient safety after the CPR/ Code blue reports (Year 2009-2011). Various strategies are being employed to identify and reach the patients susceptible for unanticipated cardiac arrests in less monitored settings. Most are labour and cost intensive. Leveraging existing resources to achieve the same goals is imperative at least in developing and underdeveloped healthcare systems. **Aim**:The aim of our study was to assess the impact of once daily screening of ward patients by an objective scale followed by critical care team evaluation on incidence of unanticipated cardiac arrests and mortality.

Methods:This is a retrospective before- after study in a tertiary care center. We started once daily screening of adult patients inwards with a simple tool based upon the Early Warning system once a day, followed by critical care team evaluation for the patient considered high risk by the score. Two consecutive periods of 7 months each were studied with 5988 and 5903 patients each. Data was analyzed for number of unanticipated cardiac arrests. Results were corrected for the baseline covariates age, gender. **Results**: Number of cardiac arrests decreased from 25(0.417%) to 11 (0.186%), Odds ratio(OR) 0.44 CI-1976007 to .9392757 (P <0.0218) . Unscheduled admissions to ICU from the wards did not change significantly from 2.03% (122 /5988)to2.06% (119/5903). Interestingly deaths in the patients admitted from the ward to ICU decreased31% to 15% in the post screening period Odds ratio (OR) 0.485 CI0.2468865 to 0.9314125 (P<0.0198). **Conclusions**: Simple once daily intervention has led to nearly halving of number of unanticipated cardiac arrests in the ward patients. Leveraging existing resources without creating an outreach team should be considered as a model for patient safety and outcome improvement projects in developing countries and less equipped healthcare systems.

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The effect of blood transfusion on central venous oxygen saturation (SCVO2) in patients admitted to a neuro intensive care unit (NICU)

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Introduction: The cut-off value of haemoglobin is controversial in neurological patients. Recently, ScvO2 has been proposed as physiological trigger to guide transfusion. In this study, we aim to look at whether ScvO2 improves after blood transfusion (BT) and also to look at its changes over a period of 24 hours following BT in NICU patients. **Material and methods**: It's a prospective observational study approved by Institutional Ethics Committee. Adult patients >18 years were recruited. Patients with hemodynamic instability and requiring high FiO2>0.7 for maintaining oxygen saturation were excluded. Before starting transfusion, blood was sampled from CVC for analysing ScvO2, central venous partial pressure of oxygen (PcvO2) and Hb. Same measurements were repeated at the end of transfusion, 6, 12, 18 and 24 hours after transfusion. Hemodynamic parameters were also noted. Glasgow Coma Score (GCS) was recorded at the time of BT and at 24 hour post transfusion. **Statistical analysis**: Based on hypothesis that a single unit of BT increases ScvO2 by 5%, 47 patients were required for power of study to be 80%. Changes in Hb, ScvO2 and hemodynamic parameters over study period were analysed by repeated measures analysis of variance and P value of <0.05 was considered significant. Appropriate tests were used to compare the ScvO2 changes with the study variables. Receiver operator characteristic (ROC) curves were constructed to determine the best cut-off point for Hb and ScvO2. **Results**: Total seventy adult patients were analysed. Average age, pre and post GCS, temperature, FiO2 required was 42.4 years, 7.7, 8.4, 98°F and 0.5% respectively. Significant improvement was noted in Hb, ScvO2 and all other hemodynamic parameters (CVP, HR, MAP, SBP) except for PcvO2 following BT. The ScvO2 changes correlated significantly with number of BT (p=0.039), pre-transfusion Hb (p=0.010), ScvO2 (p=0.000) and PcvO2 (p=0.000). When ROC curves were drawn for ScvO2, optimum cut-off value of baseline ScvO2 was 70% with sensitivity of 80% and specificity of 87% and ACU 0.893. Similarly, best cut-off for baseline Hb was 8.6 gm/dl with sensitivity of 79.4%, specificity of 40% and AUC 0.622. **Discussion**: It has been shown that 2-3DPG might prevent immediate improvement in oxygenation which might take upto 24hours following BT. Also, increase in ScvO2 in neurological patients might be because of decreased requirements due to brain infarction, excessive sedation or hypothermia. But we did not observe any drop in the GCS during study period to suggest deterioration in the neurological condition, nor did we give excessive sedation and our patients were normothermic. Thus, immediate improvement in ScvO2 which we observed could be the direct effect of BT and predictability is significantly high at a cut-off of 70% ScvO2 and Hb<8.6gm/dl. Increase in the ScvO2 could also be because of improvement in the cardiac output, but we did not measure it and it's a limitation of our study. **Conclusion**: Baseline ScvO2<70% seems to have better accuracy in predicting the improvement in systemic oxygenation following BT. Thus, it can serve as a useful physiological trigger along with arbitrary Hb value based transfusion trigger practices. Whether improvement in ScvO2 can be extrapolated to the improvement in regional brain oxygenation, needs to be studied.

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Experience with decompressive craniectomy for acute cerebral edema

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Introduction: Decompressive craniectomy (DCT) reduces mortality in stroke by reducing the impact of swollen hemisphere on the brain stem. **Aims and objectives**: This study was undertaken to validate the effects of DCT in two groups of stroke (Ischaemc and Haemorrhagic) and identify factors affecting functional outcome. **Material and methods**: In this prospective observational study from October 2013 to July 2014, 30 patients who underwent DCT were divided into two groups–Infarct group(n=15) and intracerebral haemorrhage (ICH)(n=15).Patients with severe co-morbidity, age >70 years, infarction due to SAH and trauma were excluded.Data collected included patient age, sex, distribution of lesion, affected hemisphere dominancy, admission GCS, midline shift on imaging, anisocoria, stroke-surgery interval and ICU stay.Outcome was assessed with Glasgow Outcome Score (GOS) **Results**: The survivors and non-survivors were identified for each of the variables analysed.

Variable	Survivors	Non survivors
Age y: 23-65	9 (60%)	6 (40%)
Av. 46.46	Mean:44.55	Mean: 49.33
Gender n=15 (%)		
M-13	8 (61.54)	5 (38.46)
F-2	1 (50)	1 (50)
Location (%)		
Dominant-6	6 (100)	0
Non dominant-9	3 (33.33)	6 (66.67)
Pre op GCS (%)		
<8-11	5 (45.45)	6 (54.55)
>8-4	4 (100)	0
Pre op pupils (%)		
Aniso-10	5 (50)	5 (50)
Iso-5	4 (80)	1 (20)
Mid line shift		
Min.-6 mm	9 (av. 10.1)	6 (av. 10.3)
Max.-15 mm		
Vasc.territory (%)		
MCA-13	9 (69.24)	4 (30.76)
ICA-2	0	2 (100)
Uncal herniation (%)		
With-13	7 (53.84)	6 (46.16)
Without-2	2 (100)	0
Ictus-surgery interval		
Av-80.73 hrs	Av. 69.55 hrs	Av. 97.5 hrs
Min.-8 hrs		
Max.-222 hrs		
Ventilator need		
Total-12 (80%)	6 (50)	6 (50%)
ICU stay days		
Av-12.86	9	6
Max.-51		

All the survivors in this group had GOS of 3

Variable	Survivors	Non survivors
Age: 38-70 y		
Av-50.26 y	45.6 years	52.6 years
Gender (%)		
M-13	5 (38.47)	8 (61.53)
F-2	0	2 (100)
Pre op GCS (%)		
<8	3 (27.26)	8 (73.74)
>8	2 (50)	2 (50)
Location (%)		
Dominant	2 (33.33)	4 (66.67)
Non dominant	3 (33.33)	6 (66.66)
ICH volume (%)		
<60ml	4 (80)	1 (20)
>60 ml	4 (40)	6 (60)
Pre op pupils (%)		
Iso	1(50)	1(50)
Aniso	4 (30.80)	9 (69.2)
Mech ventilation		
Need (13)	4	9
Days	Av. 9.75	Av. days 8.1
Uncal herniation (%)		
With	0	10 (100)
Without	4(80)	1 (20)
Hospital stay-days		
Av.16.8	Av. 22.4	Av. 14
Mortality (%)	5 (33	10 (66)
Morbidity	4- GOS 4	
	1-GOS 3	

Discussion In both groups**,** age > 50 years, GCS ≤ 8 and Midline Shift > 5 mm were predictors of poor outcome. ICH Volume > 60 ml and Intraventricular extension had worse prognosis in ICH patients. ICA Infarcts had higher mortality.Dominant hemispheric infarct was not a contraindication for surgery. Hypertension was the most common risk factor (66.66 %) noted in our study.The limitation of this data is small number of patients as it is a single centre study. **Conclusions**:Early decompressive craniectomy could still be viable option in selected group of stroke patients.

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Inter-observer reliability of cam-ICU in Indian ICU

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Introduction: The CAM-ICU has been used over the past decade in numerous studies investigating delirium rates, risk factors, outcomes, and interventions. **Objective**: To evaluate the inter-observer reliability of CAM-ICU for use in the ICU to accurately diagnose delirium in critically ill patients. **Method**: This was a prospective cohort study of patients admitted to an adult medical and surgical tertiary ICU from 16-23 Dec 2014. Daily ratings of CAM-ICU of patients present in the ICU during the study period by two intensivists, one ICU nurse, one clinical psychologist and a research fellow were compared against the reference standard, a Psychiatrist and also amongst the raters. **Results**: The study included 37 [>24 hrs ICU stay, Mean (+ SD) age 66.3+12.7 years, 26 (63.4%) males] of the 42 patients admitted during the study period. Mean (+ SD) SAPS score was 30.1+10.6. A total of 75 evaluations were completed. The psychiatrist diagnosed coma in 45.3% (34/75). Of the remaining patients, delirium was diagnosed in 39% (16/41). Six (14.6%) and 5 (12.2%) evaluations were made in patients on Mechanical ventilation and Noninvasive ventilation respectively. Excluding

evaluations of comatose patients, the Intensivist-1, Intensivist-2, psychologist and research fellow demonstrated substantial inter-rater reliability for their CAM-ICU ratings with kappa statistics of 0.79, 0.74, 0.83 and 0.79, respectively (p < .001). However, the ICU nurse demonstrated fair inter-rater reliability for her CAM-ICU ratings with kappa statistics of 0.40 (p=0.018). The Intensivist-1, Intensivist-2, psychologist and research fellow sensitivities when using the CAM-ICU compared with the reference standard were 87.5%, 81.3%, 86.7% and 87.5% respectively, whereas their specificities were 92%, 92%, 95.8% and 92% respectively. The study nurse's sensitivity when using the CAM-ICU compared with the reference standard was 70%, whereas their specificity was 73.9%. Among 24 patients aged >65 years, the inter-rater reliability was higher [kappa coefficient 0.819 to 1.00 (p<0.001)], except the ICU nurse [kappa coefficient 0.319 (p=0.161)]. **Conclusions**: The CAM-ICU demonstrated substantial inter-rater reliability when used by physicians, psychologist and research fellow to identify delirium in Indian ICU patients but not by the ICU nurse. However, the findings of this study needs to be corroborated with larger studies.

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Thromboelastography for (TEG®) evaluation of hemostatic dysfunction in severe sepsis and septic shock

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Introduction: Sepsis induced coagulopathy manifests either as a procoagulant state or as a hypocoagulant state. Conventional coagulation assays (CCA) are unable to differentiate these states. To overcome this limitation, thromboelastography (TEG®) has emerged as a better diagnostic modality by providing complete dynamics in hemostatic disorder. We have evaluated hemostatic dysfunction in sepsis by TEG. **Methods**: This is a prospective, observational study done in a 12-bedded ICU at a tertiary care teaching hospital, during May 2014-Nov 2014. After ethical clearance, all consecutive patients at ICU admission with presence of either severe sepsis or septic shock, were considered for inclusion. Exclusion criteria were: age <18 yrs, haematological malignancy, history of medical condition with deranged coagulation, plasma and/or platelet transfusion in current illness, or on oral anti-platelet/ anti-coagulant. For TEG, 3.0 ml blood was collected in citrate vial during 24 hr of ICU admission. A kaolin-based thromboelastograph analyzer (TEG® Hemoscope 5000) was used; and parameters were recorded: reaction time (R), K time (K), alpha angle (α), maximum amplitude (MA), coagulation index (CI), lysis index (LY 30%). Other collected data were: demographic, clinical, routine laboratory including CCA at ICU admission; and outcome at ICU discharge. Continuous variables are presented as mean (±SD); and categorical as frequency (%). Comparison between groups was done by Student's t-test and Chi-square test. **RESULTS**: During study, 104 patients got admitted; 87 patients had severe sepsis/ septic shock. As per inclusion criteria, 55 patients (27 severe sepsis; 28 septic shock) were analyzed. Mean age 45.6(±17) yrs, male 62%, medical 76%, co-morbidities 60%. Primary source of infection was lung in 24%, followed by CNS (15%), UTI (7%), and tropical illness (7%). Mean APACHE II was 21.14±7.01; and SOFA score 12.57±3.19. Among CCA, mean values for PT, INR, platelet and fibrinogen were: 18.04±4.83 (sec), 1.63±0.57, 153.96±99.16 ($\times 10^3$/mm³), and 301.33±112.82 (mg/dl) respectively. In TEG, mean values of R, K, α, MA, CI, LY30 parameters were: 6.45±2.59 (min), 1.67±0.96 (min), 66.37±10.44 (⁰), 67.08±10.33 (mm), 0.63±3.46, 2.23±4.08 (%) respectively. In septic shock vs severe sepsis groups, mean R, K, alpha angle, MA, CI, LY30 were: 6.77±2.79 vs 6.06±2.29 (p=0.31) , 1.87± 0.86 vs 1.43±0.99 (p=0.08), 63.85±9.78 vs 69.29±10.22 (p=0.048), 63.55±11.39 vs 70.867.12 (p=0.006), -0.29±3.48 vs 1.65±3.14 (p=0.038), 2.79± 5.29 vs 1.49±1.93 (p=0.24) respectively. In follow up till ICU discharge, median length of stay was 13.5 (2-60) days; and 55% patients survived **DISCUSSION**:

TEG can differentiate hypocoagulant, procoagulant and normal state, which is useful in diagnosis and management of hemostatic abnormalities. In our study, patients with septic shock were in hypocoagulant state (higher K, lower α and CI values); while those in severe sepsis had procoagulant state (lower K, higher α and CI values)

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Comparative Study of Conventional Charcoal Hemoperfusion with additional Methyl – Prednisolone, Cyclophosphamide in oral paraquat poisoning

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Introduction: Paraquat ingestion is a leading cause of fatal poisoning in many parts of India. paraquat is a rapidly acting, nonselective herbicide that is relatively inexpensive. This characteristic contributes to its wide spread use in much of developing world.In rural areas of India where it remains readily available it is a common method for intentional self poisoning. The case fatality is very high in all centers despite large variations in the treatment. Activated charcoal and fuller's earth is routinely given to minimize further absorption. Elimination method such as hemodialysis and hemoperfusion have limited benefits. So the study was designed to evaluate effect of combined treatment with cyclophosphamide and glucocorticoid in patients with paraquat poisoning. **Method**:During two year period 35 patients with paraquat poisoning were admitted to Apple Saraswati Multispecialty Hospital & Research centre Kolhapur with moderate to severe intoxication. 14 patients received conventional treatment with charcoal hemoperfusion and 21 patients received conventional treatment plus IV infusion of CYCLOPHOSPHAMIDE 15mg/kg/2days, METHYL PREDNISOLONE 1 gm daily for 3 Days and MESNA 15mg/kg for 4 days. **Result**: The mean age +/- SD in a group 1 was 26+/-10 and group 2 to was 27+/-10 in group I- 6 patients were females and 8 patients were males, In group II -15 patients were females and 6 were males. There was no difference between the groups in the time elapsed from ingestion to presentation at the hospital or in the begning of hemodialysis. Incidence of multiorgan dysfunction, ARDS was significantly less in a group II. Mortality rate in the group I was 85.7% and second was 64%. Reversible pancytopenia was seen in group II which was statistically insignificant. **Conclusion**:Additional Methyl – Prednisolone and Cyclophosphamide to conventional treatment with charcoal hemoperfusion may be efficient in reducing mortality as well as incidence of multiorgan dysfunction in moderate to severe paraquat poisoning.

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Thrombolysis for acute stroke: Experience at Sultan Qaboos University Hospital

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Background: Thombolysis for acute ischemic stroke within 4.5 hours of onset is currently accepted to be the standard of care. Studies from several countries report fairly consistent benefits when performed within the limits of the recommended guidelines. Developing and implementing a protocol for stroke thrombolysis successfully in a hospital requires coordinated actions by several departments. **Aim**: To report on the experience of thrombolytic therapy for acute stroke at Sultan Qaboos University over the last five years. **Patients and Methods**: Case records of all patients with acute ischemic stroke who were treated with IV tPA over the last five years were reviewed. Demographic data, NIH Stroke Score (NIHSS), neurologic findings, risk factors for stroke, imaging observations, and outcome on modified Rankin Score (mRS) were recorded. Time from onset of stroke, response to thrombolysis in the form of change in neurologic status (GCS, NIHSS) and complications were noted. Profiles of patients with good (mRS 0-3) or poor (mRS 4-6) were compared. **Results**: Out of about 400 patients acute ischemic stroke seen over the last five years, 40 patients were treated with tPA (9.75%). 30 patients were men; mean age was 60+11 yr. 75% of patients arrived within 3 hours of stroke onset. The mean NIH Stroke Score at admission was 11.87+5. 28 patients had large artery stroke, 7- lacunar stroke and 5 cardioembolism. All patients received IV tPA at 0.9 mg/kg. Nine patients required IV labetalol for control of hypertension before IV tPA. 12 patients had good outcome at discharge, while 28 had poor outcome. Two patients died (5%) – one due to large MCA stroke and another due to intracranial hemorrhage. Three other patients experienced minor GI hemorrhage. Discharge NIHSS was 9+5.8. One patient with MCA thrombosis resistant to IV tPA underwent intra-arterial thrombolysis. Another patient received IV tPA for basilar artery thrombosis at 6 hr after onset and recovered. **Conclusion**: Our case series of patients receiving thrombolysis for acute ischemic stroke experienced outcomes similar to those reported in major trials. Though small, this series reflects the variety of cases as well as several complications encountered during in stroke thrombolysis. There is need for improving the infrastructure required for more efficient management of patient with acute stroke as well as networking of hospital which can deliver similar services.

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Outcome of OP (Organophosphorous) compound poisoning patients in a tertiary care hospital - A 6 years experience

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Objective: This study was undertaken to assess the distribution pattern, outcome and possible predictors affecting the mortality and the need for ventilatory support in patients who had consumed organophosphorus compound pesticides. **Material and Methods**: 543 patients, who were admitted to the ICU between April 2009 and December 2014 with history of ingestion of organophosphorus pesticide were studied. Baseline clinical assessment and investigations were undertaken and SOFA and APACHE II scores were calculated. **Results**: Out of 543 patients, 181 required ventilatory support. Of these 181 patients, 7 died, five due to severe sepsis and multiorgan dysfunction. Of the remaining, one patient who was comatose and was in severe shock since admission succumbed the next day itself and the other one, a chronic alcoholic with chronic liver disease died due to hepatic encephalopathy and multiorgan dysfunction. The time elapsed since ingestion of poison, SOFA and APACHE II scores on admission were significantly associated with patients requiring ventilatory support. However with logistic regression analysis, none of these variables were able to either predict mortality or the need for ventilatory support. **Conclusion**: The overall outcome in these cases was favourable as the mortality rate was 1.28%. Though the time elapsed since ingestion of the pesticide and the APACHE II score were found to predict the need for ventilation in many earlier studies, they failed to predict either the need for ventilation or mortality in the present study. The improved mortality rate could be attributed to an organized approach through protocols between the emergency department and the ICU in order to successfully manage patients with organophosphorus compound poisoning.

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Buying a ventilator: Financial and non-financial considerations

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Introduction: During our formative years as intensivist we are taught for of disease which endangers life of a human being. Text books deals in details about pathological changes, investigations, prognosis and management of critical illness. In workshops, CMEs and conferences we increase our knowledge and learn new modalities of treatment. We try to master basic modes of ventilators and try to know about intricacies of newer modes of ventilation. We visit stalls in scientific meetings and every company representative describes the suitability of their ventilator and they try to convince its worth for saving life. We grow with our knowledge and we become master of ventilator use. For its best use we have to purchase a suitable ventilator. Buying a ventilator needs more than academic knowledge of use of ventilator. **Methodology**: Literature search was done which produced scanty results. Interview with colleagues was done and compiled. It was analysed and salient points were noted. Methodology of purchase of ventilators in government and non government organisations were done and studied. Interview of representatives were done during scientific programmes and small videos made of their presentation. All these data was compiled and analysed. **Stages of Procurement**: Purchase of ventilator is amalgamation of scientific, financial and managerial knowledge. Purchase requires knowledge about types of ventilators, its modes, and its principle of working. It requires knowledge about various models, components and its availability in market. Procurement methodology varies from personal use to institutional need. There are stages of procurement starting from defining need, cost benefit analysis, market study, making of specifications, choosing type and deciding patient and institutional needs. Method of procurement varies in government and non government organisations. Government procurement: Government procurement needs knowledge about general financial rules, method of making specifications, tender process, technical evaluation and making reports. Non- governmental procurement: From personal use to corporate hospital purchase it has similar method as government procurement but generalisation of specification may not be essential. Scientific and non scientific knowledge about buying a ventilator: Other than medical knowledge of ventilator there is need for knowing terminology about warranty, comprehensive maintenance contract and other purchase principals. **Conclusion**: Buying ventilator is not only buying a machine or medical equipment it is buying a service. Buying requires scientific knowledge about ventilators, technical knowledge and knowledge about financial principals. It requires integration of knowledge about machines, human resources and their training needs.

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Role of ECMO in celphos poisoning: A retrospective analysis

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Introduction:Acute aluminium phosphide poisoning (AAlPP) is a large, though under-reported, problem in our country, the mortality ranges form 40-80%. In the severe form myocarditis, severe LV dysfunction, arrhythmia, severe metabolic & lactic acidosis, multiorgan failure may lead to death. We present our data of managing severest form of aluminium phosphide poisoning with use of VA ECMO with survival of 65% of patients. **Methods**: We collected the data retrospectively for all patients who referred to our center with history of celphos ingestion. They all were managed conservatively as per the guidelines but did not respond to the treatment. All pateints were hemodynamically unstable and were on high inotropic support including dopamine, noradrenaline & epinephrine infusions. (Inotropic support > 50). Seven patients were on vasopressin infusion as well. All the patients had severe myocardial dysfunction (EF 18-25%). 5 patients were intubated & mechanically ventilated before shifting to our hospital. ABG analysis of all patients showed severe metabolic acidosis (pH < 7.2) along with lactic acidosis (> 15). After intubation & Mechanical ventilation (those who were not intubated already) VA ECMO was initiated after securing femoral artery & femoral vein with appropriate size cannula. The distal perfusion was maintained with 8 Fr sheath. The flow was maintained through centrifugal pump and a flow of 2.5 – 3 L/min was maintained. Inotropic supports were reduced gradually and mechanical ventilation were kept at minimum. We collected the patient charecterstics, quantity of celphos ingested, duration of ECMO, duration of mechanical ventilation, other organ involvement such as renal or hepatic failure, other organ support required, any other complications such as infection, bleeding, amputation, neurological complications etc. **Results**: 20 patients out of 24 required VA ECMO support, remaining 4 were managed conservatively with invasive haemodynamic monitoring. 13 patients (65%) were weaned off successfully from ECMO and were discharged from the hospital. The mean duration of ECMO was approx 38 hours. 17/20 had bleeding requiring transfusion (surgical site, UGI, Hematuria). In the non survivors group one patient was recovering but during weaning trial developed DIC & pulmonary haemorrhage. Few patients required CRRT during & after ECMO. Organ damage was more common in the non survivor group. One patient required femoral artery ligation and another patient required below knee amputation after 6 weeks ECMO. **Conclusion**: VA ECMO may be used to support the myocardial dysfunction and support the cardiac out put not only to prevent the organ damage but to improve the organ function as well till the recovery of myocardium with toxin.

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High frequency oscillation in severe ARDS: The rise of the phoenix

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Introduction: Severe ARDS with refractory hypoxemia is very challenging with very few rescue modalities available. High-Frequency Oscillatory Ventilation (HFOV) has been used as rescue therapy in severe ARDS, with recent studies (OSCILLATE/OSCAR) showing harm, or no benefit. There are very few Indian studies regarding use of HFOV in ARDS as a rescue modality in severe ARDS, especially after these major studies, which signalled the reduction in the use of HFOV. We studied the utility of HFOV in our ICU in the post OSCILLATE/OSCAR era, as a rescue modality in severe ARDS **Methods**: Retrospective analysis of 5 patients with severe ARDS admitted in our ICU between March 2013 and November 2014 and who received HFOV.

Inclusion Criteria: Patients with ALI or ARDS, failing conventional ventilation with a protective lung strategy, who failed a trial of prone ventilation.

- ARDS defined by standard criteria, with $FiO_2 \geq 0.6$, $PEEP \geq 10$ cm $H2O$, with a P/F ratio < 100
- Difficulty in maintaining oxygenation, despite prone ventilation
- Worsening hypercarbia, despite maximal minute ventilation, and prone position
- Difficult to ventilate, with plateau pressure persistently > 30 cmH_2O, despite prone ventilation

Results: Patients were ventilated using the Sensor Medics 3100B High-frequency Oscillator, using standard recommendations for

HFOV. After improvement, they were transitioned to regular supine mechanical ventilation, and weaned with or without tracheostomy.

Patient Characteristics: Age: 45years (Mean18-76) APACHE score: 15-42
Etiology: Infective etiology in 4 patients & 1 patient of vasculitis and DAH.
Mean time before initiation of HFOV: 48hrs in 4/5 and within 12hrs in 1 patient
Mean duration of HFOV: 103 hrs (72 – 189hrs)
Mean duration of MV after HFOV: 9.2 days (2 – 29 days)
Mean length of ICU stay: 21.4 days (7 – 37 days)
Mean length of hospitalization: 24.2 days (7 – 46 days)
2 patients were tracheostomised and 1 received plasma exchange in view of Vasculitis induced DAH.

Outcome – 4/5 patients (80%) survived to hospital discharge and 180 days. **Conclusion and Clinical Implications**:This is the first Indian study after the OSCAR/OSCILLATE trials to show that HFOV can be used successfully as a rescue mode in severe ARDS in our population, when prone ventilation has not been successful. In our study, 80% of the patients using this rescue strategy survived, as against 41.7% in the OSCAR trial and 47%in the OSCILLATE trial. Though the sample size is small, it reflects the limited number of ARDS patients who will need rescue strategies after unsuccessful prone ventilation. Though this concept needs further study, our results question conventional wisdom about not using HFOV in ARDS, and highlight the need to validate most of these recommendations in our indigenous patient population. In our setting, HFOV still remains a useful rescue tool after prone ventilation, and before ECMO.

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Discharge delay in ICU patients – An Indian perspective

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Introduction: Intensive care beds are limited and expensive. Optimal utilization of the same is imperative. Discharge delays of patients from the ICU may have a significant impact on the efficiency and effectiveness of ICU services. Discharge delay is thus considered as one of the many quality indicators for critically ill patients. Discharge delays increase the number of after-hour discharges, which in itself is a risk factor for patient-related mortality and morbidity. This study aims to ascertain the prevalence of discharge delay in the setting of a tertiary level ICU in India. We also analysed the prevalence of after-hours discharges and their effect on readmission rates in the ICU. **Methods**: Discharge delay was defined as the time duration from the decision to discharge a patient to the actual exit from the ICU. Based on previous studies, a delay of > 8 hours was considered as significant (Aust Health Rev 2004: 28(1): 87–96). A retrospective analysis of all discharges from the ICU to the wards over 16 month period from August 2013 to November 2014 was analysed. The data was retrieved from the ICU database, maintained by the Nursing and Secretarial staff. As a routine, the ICU staff use a MS Excel spread-sheet regarding the admission and discharge details of all patients. We excluded patients who died or those who were directly discharged out of the hospital from the ICU (including Discharge against medical advice) in this study.

A monthly analysis of the following variables was performed:
1. Average delay – calculated by the formula

$$\frac{\text{Total No. of hrs of delay}}{\text{Total No. of patients discharged}}$$

2. Percentage of patients in various time categories of discharge delay:
   a. b< 4 hours
   b. > 4 hours to 8 hours
   c. > 8 hours to 24 hours
   d. > 24 hours
3. Percentage of patients discharged after–hours (defined as 6PM – 8AM).

4. Readmission rates of patients discharged during routine hours and after-hours.

RESULTS:

Month	Total discharges	Avg. delay (hours)	Percentage of patients discharged in various time categories of discharge delay (in hours)				% of after-hour discharges	% of readmission in patients discharged during routine hours	% of readmission in patient discharged during after hours
			<4	>4 to <8	>8 to <24	>24			
Aug-13	101	12.66	20.7	37.6	21.7	20	48.5	1.9	4
Sep-13	113	7.22	25	24.5	40.5	-	57.5	2	4.6
Oct-13	118	7.9	30	50	20	-	45.7	-	3.7
Nov-13	100	7.05	25	53.5	21.5	-	31	-	3.7
Dec-13	116	5.88	20.3	42.4	37.3	-	33.6	1.2	-
Jan-14	149	6.44	19.4	44.2	36.2	-	34.9	-	1.9
Feb-14	113	5.66	21.23	36.3	24.8	-	48.67	-	1.8
Mar-14	119	6.99	14.28	27.73	36.1	2.5	40.33	1.4	4.1
Apr-14	97	5.05	22.68	68.04	9.2	-	46.4	-	8.8
May-14	113	4.45	7.9	77.87	7.9	-	66.37	-	1.3
Jun-14	111	6.06	5.4	83.7	10.8	-	37.8	-	2.3
Jul-14	113	4.45	13.8	73.17	8	-	67.25	-	-
Aug-14	124	2.50	94.35	5.6	-	-	45.16	-	-
Sep-14	124	3.61	65.3	32.2	2.4	-	50	-	1.6
Oct-14	100	4.35	66	24	8	2	56	-	-
Nov-14	100	5.61	34	48	16	-	69	-	2.8

DISCUSSION: Discharge delays are considered as one of the Quality indicators for an Intensive care unit. Significant delays are known to impact quality of care adversely and thus affect mortality, morbidity and clinical processes. The SYMYUC group determined a limit of 9% for a Discharge delay of > 12 hours in the ICU. However, based on other studies, we chose a time limit of 8-hours as significant delay in discharge. We performed this study in our tertiary care ICU to ascertain the prevalence of discharge delay on a monthly basis. The study also aimed to ascertain the percentage of after-hours discharge and analyse if the same had a bearing on the readmission rates in the ICU. We found that the average delay varied from 2.5 to 12.6 hours every month. The percentage of significant delay (> 8 hours) was more than 9% in most months (ranging from 2.5 – 40%). The commonest reason for the significant discharge delay was exit block secondary to non-availability of ward beds. Furthermore, we also found in our study that a large percentage of discharges occurred after hours (defined as 6PM – 8AM). This percentage varied from 31-67.5%. Analysis of patients discharged after-hours was associated with a significant readmission rate (defined as readmission within 24 hours after discharge) into the ICU. During this period out of 1922 discharges, 874 (45.5%) occurred after hours. The remaining 960 (54.5%) occurred during routine hours. Among the after-hours discharges, a total of 21 readmissions occurred as against 4 in patients discharged during routine hours. This was statistically significant with a p-value of 0.004, indicating a higher rate of readmissions in patients discharged after-hours. Discharge delays and After-hours discharges and their impact on mortality, morbidity and various clinical processes including ICU admission and discharges have been studied by multiple authors over the last few years. A review of literature confirms a high prevalence of discharge delay. However, different authors have used different definitions to define the same. Data on this aspect is lacking in India. Our study confirms that the significant delays in discharge and a high prevalence of after-hours discharge does occur in critically ill patients in the Indian context as well. Discharge delays can impact the work flow pattern and clinical care in the following ways:

- Lack of availability of precious ICU beds for a critically ill patient.
- Interruption of clinical care and disruption of the continuity of care, especially aspects like rehabilitation.
- Cost implications to the patient and the hospital.
- Delays in hospital discharge of patients.

Our study has the following limitations:
1. Single centre study.
2. Retrospective design.

In conclusion, we observed a significant prevalence of Discharge delay in our ICU. This was also associated with significant after-hour discharges with the latter having an impact on the readmission rate as well.

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'Code blue team' building in our hospital, did it make a difference ?

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Background: As suggested by recent studies number of survival following in-hospital cardiac arrest is low and this was similar to the data available in our hospital. Since July 2012, our hospital has utilized a standard hospital wide "code blue team" to respond to cardiac arrest at all time. This team is always led by an emergency physician, and includes trained nurses. **Objectives**:To assess the in-hospital cardiac arrest survival rate when a trained consistent emergency physician led CBT was implemented. **Methods**: This is an analysis of prospectively collected data on initial survival rates /return of spontaneous circulation (ROSC) of all cardiac arrests that were managed by CBT from 2012 to 2014 in our hospitals. Cardiac arrests were also subcategorized based on co-morbidities and time of day to correlate the additional contributing factors. **Results**: We had 321 cardiac arrests for a total 1, 32, 967 admissions in 3 years. Maximum numbers of cardiac arrest were seen in nephrology patient on maintenance hemodialysis with cardiac comorbidities. Our CBT response was less than 5 minutes. Time spent at the place of arrest progressively decreased to less than 15 min. The details of the results **Conclusion**: Our utilization of standard hospital wide CBT response made a positive impact.

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Tele-ICU: 24/7 close monitoring from a distance

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Introduction: Telemedicine (Tele-ICU) has been increasingly employed in the Intensive Care Unit setting for providing care. Given the shortage of qualified intensivists and critical care nurses, Tele-ICU has been proposed as an alternative strategy to bridge the supply demand gap. In this study, we describe the profile of end users and impact of 24/7 remote monitoring through Tele-ICU. **Methods**:Retrospective data analysis done from June 2013 to June 2014, on the demographic profile of patients cared for by a Tele-ICU provider group at Chennai, India. Data relating to interventions, duration of monitoring and outcome were recorded and analyzed using standard statistical methods. **Results**: The Tele-ICU monitoring center provided services for 4 hospitals/nursing homes across two states covering 23 ICU beds. A total of 961 patients were admitted during the study period (70.4% Males, Age – 50.75 ± 19.54). A total of 8261 interventions (Average: 3.4 interventions/patient/day) were documented of which, 2295 (27.8%) were active recommendation and 5773 (70.3%) were routine evaluations. 51.7% of interventions were during the day (8AM to 8PM) and 48.3% during the night (p = 0.9, NS). The commonest interventions were for evaluation of new fever (11.8%), abnormal lab management (10.4%) and respiratory distress (9.1%). Ventilation management, sedation strategies and prescription or modification of medications contributed to 39.9% of the interventions. The average length of management in the Tele-ICU was 3.59 days (Range: 1 to 27 days). 27 (2.8%) patients expired during the study period, 139 (14.46%) left against medical advice and 27 (2.8%) were referred to other hospitals. **Conclusion**:Tele-ICU is feasible and offers continuous, round the clock titrated care. Contrary to common belief, interventions were required both during the day and at night justifying 24/7 remote monitoring. The commonest interventions by remote monitoring team included Ventilation, sedation, evaluation of new fever, abnormal lab management and evaluation of respiratory distress.

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A retrospective study to assess the outcome of Therapeutic hypothermia in hanging victims

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Introduction: There is plenty of clinical research to support therapeutic hypothermia in cardiac arrest survivors improves neurological outcome in patients with hypoxic ischemic encephalopathy. Currently there are no robust literatures which support that inducing hypothermia in hanging victims improves neurological status. This study aimed to evaluate the neurological outcome in hanging victims after inducing mild therapeutic hypothermia. **Methods**: The retrospective study was conducted with 18 hanging victims for whom therapeutic hypothermia was induced. Data was analyzed retrospectively from June, 2011 to November, 2013. Mild therapeutic hypothermia was induced for patients presenting with admission Glasgow Coma Score (GCS) of less than 12. Hypothermia was not induced in patients with coagulopathy or thrombocytopenia and prolonged QTc interval. Neurological outcome of all the patients were categorized based on Cerebral Performance Category (CPC) scoring.

Results: In our study, the mean (SD) age was 28 (9.59) years and male to female distribution was equal. 13 (72%) of the patients had complete hanging. The duration of hanging was less than 10 minutes in 14 (77.7%) patients. Admission GCS in the ICU was less than 8 for 14 (77.7%) patients. Most of the hanging victims presented early to our hospital and the interval from recognition of hanging to initiation of therapeutic hypothermia was less than four hours for 12 (66.6%) patients. After initiating therapeutic hypothermia, target temperature was achieved within six hours for 12 (66.6%) patients. None of our patients developed complications of infections after inducing hypothermia and 6 (%) patients developed mild to moderate left ventricular dysfunction. Mean (SD) days of ICU stay was 3.88 (1.1) days and mean (SD) duration of hospitalisation was 8.11 (3.7) days. 15 (83.3%) patients improved and the remaining patients went against medical advice. At the time of hospital discharge, 16 (88.8%) patients had a CPC score of 1 or 2, considered to be good neurological outcome and 2 (11.1%) patients had CPC score of 4 considered as poor neurological function. **Conclusion**: Mild therapeutic hypothermia in hanging victims improves their neurological outcome. This study warrants trials with more sample size to investigate the benefit of therapeutic hypothermia after hanging.