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Clinical Profile of Critically Ill Patients Presenting to Emergency Department of Tertiary Level Hospital of Nepal

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ABSTRACT

Introduction

Among critically ill patients presenting to Emergency Room (ER) of Tribhuvan University Teaching Hospital (TUTH), a number of patients have to either remain in ER or have to be referred outside due to unavailability of critical care beds. Studies have shown significant association between delayed admission and mortality rates along with increased length of stay and higher cost. This study aimed to present an audit of critically ill patients presenting to ER of TUTH.

Methods

This was a prospective study conducted over a period of one month. All patients presenting to ER of TUTH were triaged and critically ill patients were shifted to Red area of the ER. All patients ≥ 16 years of age shifted to Red area during the study period were enrolled in our study.

Results

Out of 3718 patients presenting to ER during the study period, the number of critically ill patients ≥ 16 years of age was 526 i.e. 14.14% of total patients. Among them, the common diagnosis were Cerebrovascular Accidents (CVA) followed by Intoxication, Acute Exacerbation(AE) of Chronic Obstructive Pulmonary Disease(COPD), Pneumonia and Chronic Kidney Disease(CKD) respectively. Almost 20% of these patients were admitted, 31% were referred and 40% were shifted for observation. The median length of ER stay was 6 hours (Mean: 8.5 hrs; Range: 20 min to 70 hr 15 min).

Conclusion

Among critically ill patients presenting to our ER, almost 1/5th of the patients were admitted whereas more than 2/3rd were either referred or remained in our ER. This data highlights the need for solutions to provide optimal care for the acute phase management of the critically ill patients.

Keywords : *Critically ill patients, monitoring beds, red area*

INTRODUCTION

Critically ill patients are those who are physiologically unstable, requiring continuous monitoring and regular titration of therapy in accordance with the clinical situation.¹ They may require different levels of critical care depending on the clinical needs. Critically ill patients awaiting for critical care beds is common in both developing and developed countries.^{2, 3} Reasons for these delays being increasing volume of critically ill patients, various comorbidities, hospital admission

policies, inpatient consultations, financial constraints, delay in investigations, and shortage/occupancy of well-equipped and staffed ICU beds.⁴⁻⁶

When managing a patient, who needs ICU admission, in ER with no available ICU beds, the clinician often faces a dilemma of whether to transfer the patient as ERs are not intended, equipped or staffed to provide continuity of care to these critically ill patients.^{6, 7} Transferring the patient for admission to another hospital means risking possible complications during

transportation. At the same time, keeping the patient in the same ER means risking potential deterioration during the uncertain length of waiting for a monitoring bed. The waiting time for ICU admission varies between hospitals and nations from few hours to few days.^{8,9} ER boarding can have substantial consequences leading to delay in time-sensitive interventions.

Delay in transfer of patients to ICU bed was associated with increased mortality, morbidity or high cost in different studies.¹⁰⁻¹² In our hospital, delay in admission of critical patients is not an uncommon phenomenon. In India, as per the draft prepared by committee for minimum standards for ICUs to be adopted throughout the country, up to 20% of total hospital beds in tertiary care hospital should be allocated for ICU¹³. Furthermore, there is no data from our hospital regarding the number of critically ill patients presenting to ER, getting admitted to different units of TUTH, their diagnosis, number of hours these patients have to wait to get admitted and the number that are being referred to outside hospital.

In this prospective study, we aimed to get the audit of critically ill patients with a view to identify number of critically ill patients presenting to ER, getting admitted to different units of TUTH, their diagnosis, number of hours these patients have to wait to get admitted and the number that are being referred to outside hospital.

METHODS

This was a prospective observational study conducted in tertiary level teaching hospital in Kathmandu, Nepal over a period of one month (April 16- May 15 2019). It is 717 bedded hospital with 11 ICU beds and 30 monitoring beds. The study was approved by the Institutional Review Board of the hospital along with Department of General Practice and Emergency Medicine and Critical Care Unit, Department of Anesthesiology. Emergency Room of TUTH, under Department of General Practice and Emergency Medicine, being a tertiary care hospital of the country, receives significant number of patients every year. Critically ill patients are transferred to

ICU, monitoring beds and other wards based on the needs of the patient and availability of beds.

Study population

This study included all adult patients (≥ 16 years) admitted to Resuscitation Area of Emergency Room of Tribhuvan University Teaching Hospital (TUTH) between April 16 2019 to May 15 2019. We excluded all other patients i.e. < 16 years of age. As per ER protocol, all patients presenting to the ER of TUTH are initially triaged and shifted to Red, Yellow and Green area based on the clinical presentation. Patients shifted to Red area include those with life threatening conditions and must be seen within 1 minute. This includes patients with cardiorespiratory arrest, major trauma, ingestion of rapidly acting poison, anaphylaxis, extreme respiratory distress, shock, profound hypotension, ongoing or prolonged seizures, coma (GCS <9 or responding to pain/unresponsive), major burns ($>10\%$ in child/ $>15\%$ in adults) and tachy/ bradyarrhythmia. Length of stay in Red area was defined as time from ER registration until the patient was physically transferred after admission/ referral/ shifted for observation or death.

Data collection

Data of critically ill patients presenting to the Red area of the ER were prospectively collected and entered in the preformed performa and subsequently entered in an Excel mastersheet. Admission/ discharge sheets along with patient's investigations and charts were also evaluated. We extracted the following data: baseline demographics including age, gender, address, presenting date and time, diagnosis, patient's admitted/ referred/ shifted/ expired and length of stay in ER. SOFA scores and number of organ systems involved were also included. We grouped the diagnosis as: Neurological, Respiratory, Cardiovascular, Gastrointestinal, Renal, Intoxication, Trauma, Obstetrics and Gynaecology (OBG), Endocrine/ Haematology, Burns, Brought dead and others. The data was analyzed using descriptive statistics. Mean, median values and range along with frequencies were calculated.

RESULTS

During the study period, 3718 patients presented to the ER and 526 patients met the inclusion criteria. This accounts for the proportion of critically ill patients presenting to ER as 14.14%. The median age of the study population was 45 years and the patients in different age intervals are depicted in Figure 1. Among them, 269 (51.1%) were male and 257 (48.9%) were female.

The distribution of patients based on major organ/ system involvement are depicted in Figure 2. However the most common admitting diagnosis was CVA (42) followed by intoxication (37), AE of COPD (35), Pneumonia (30) and CKD (30) respectively.

Regarding disposition of patients, 104 patients were admitted, 162 were referred and 208 were shifted for observation (Figure 3).

Critically ill patients were admitted to ICU, SICU, MICU and POW based on availability and needs. At the same time, those requiring operative interventions were shifted to the OT (Figure 4).

In terms of length of ER stay, the median length of ER stay was 6 hrs with a mean of 7 hr 46 min and range between 20 min and 70 hr 15 min. Similarly, among admitted patients, the median length of ER stay was 8 hrs with

a mean of 11 hr 11 min and range between 30 min and 70 hr 15 min.

SOFA score and the number of organ systems involved were also recorded in our study. There was 1 patient in whom 5 organ systems were involved. 21 patients had 4 organ systems involved whereas 68 patients had 3 organ systems involved. The outcome based on number of organ systems involved is shown in Figure 5.

DISCUSSION

In this prospective observational study spanning 1 month, we sought to get the audit of critically ill patients presenting to ER of TUTH. On an average, 17 critically ill adult patients presented to ER per day. Almost 32% of them were 60 yrs and above. In terms of gender, there was almost equal gender distribution (51.1% were male vs 48.9% were female). Patients presented to ER with involvement of various organ system. The most common diagnoses in our study was CVA (42), followed by intoxication (37), AE of COPD (35), pneumonia (30) and CKD (30) respectively.

Only 20% (104) of the critically ill patients were admitted. Among them, 35.6% (37) were admitted to ICU/SICU/MICU and POW whereas 45% (47) patients were admitted to

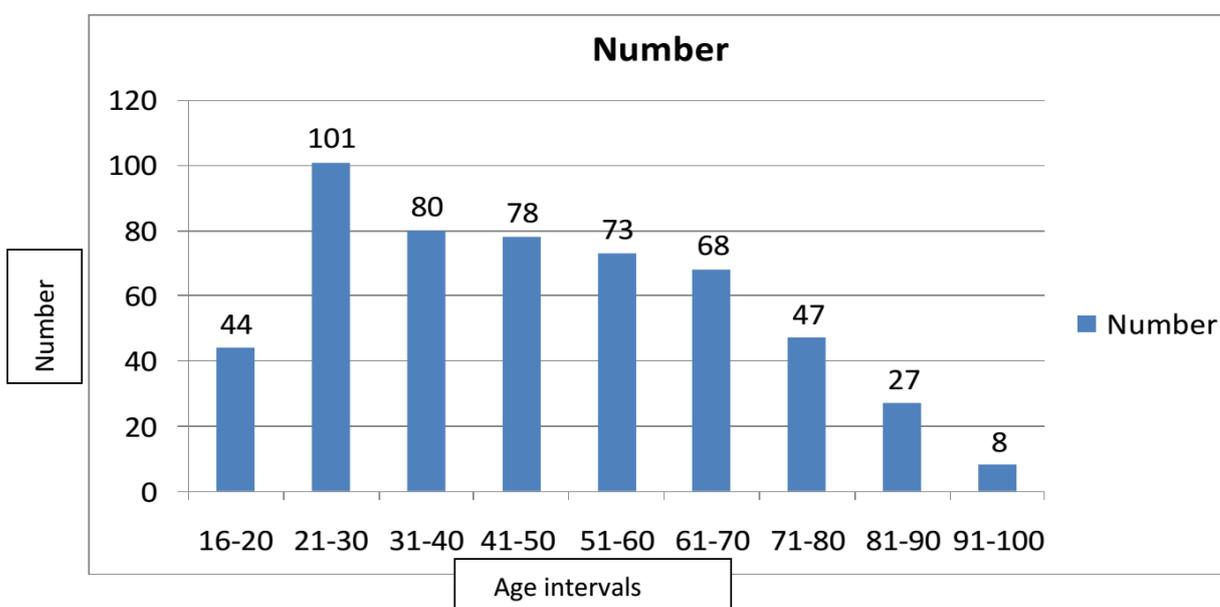


Figure 1: Age distribution of patients

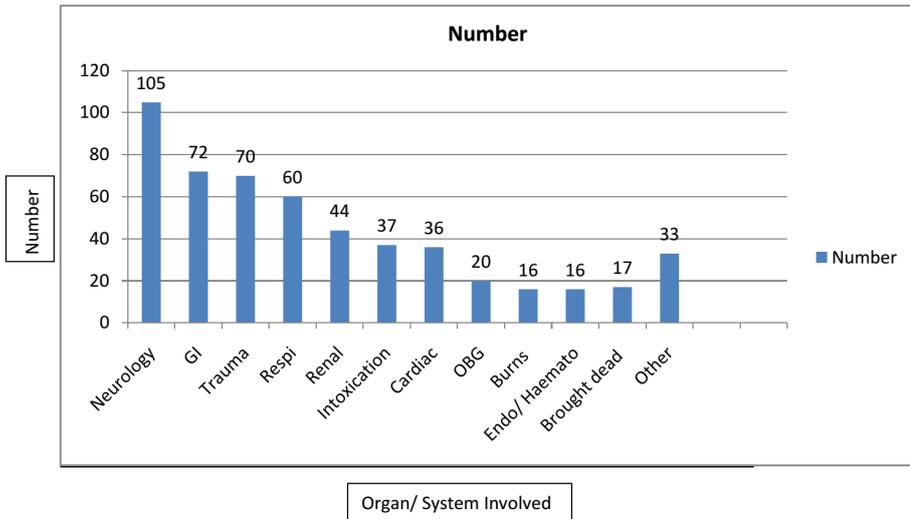


Figure 2: Distribution of patient based on major organ/system involvement

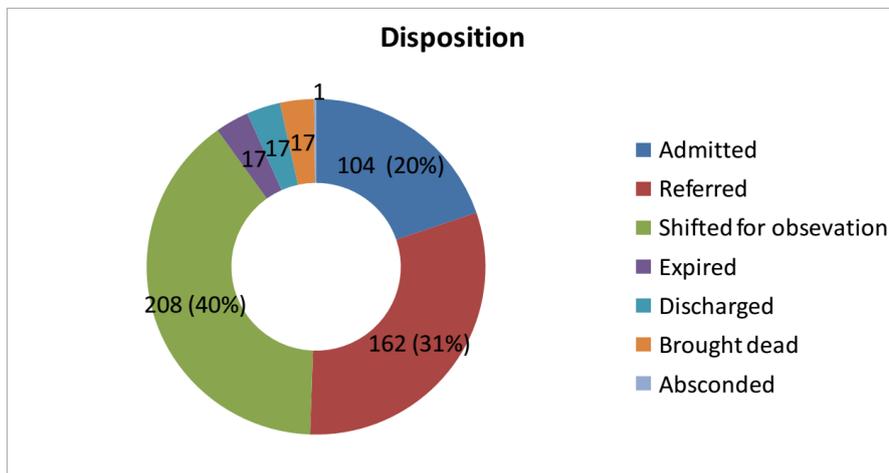


Figure 3: Disposition of critically ill patients

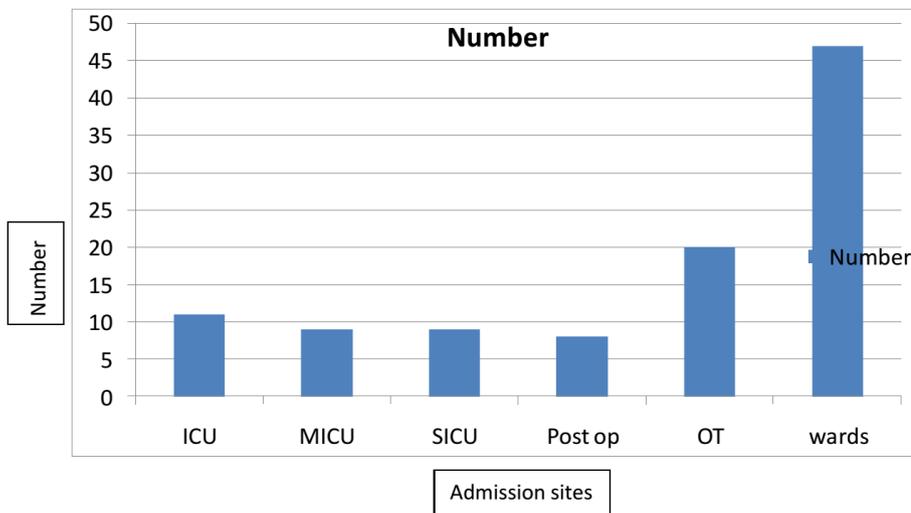


Figure 4: Admission sites of critically ill patients

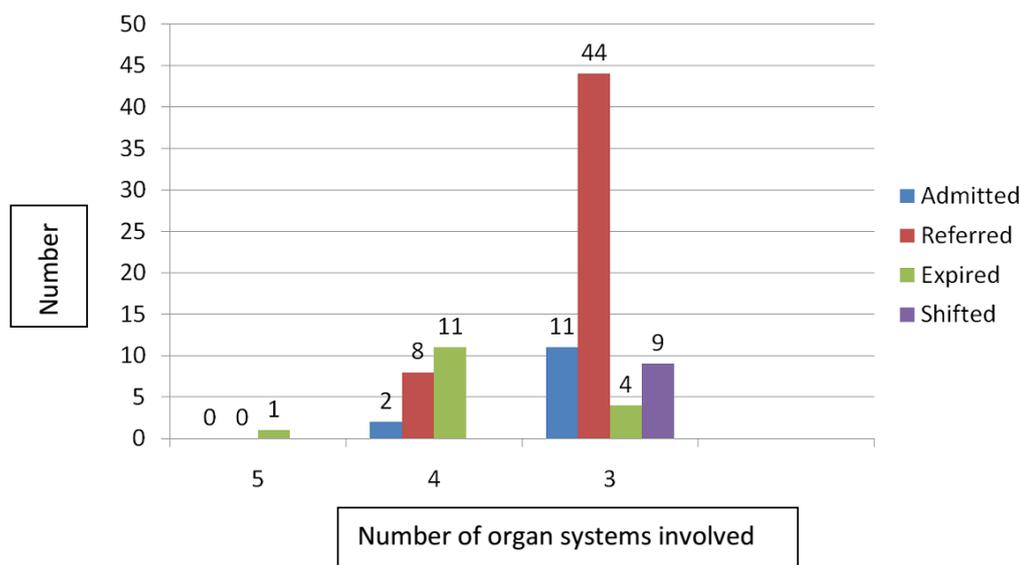


Figure 5: Outcome based on number of organ systems involved

different wards. Whether more patients should have been admitted to ICU is the question of availability of resources. It may also have been that patient’s condition may have improved after the management in ER making the admission to general wards possible.

Among our patients, 268 (51%) patients spent 6 hours or less in the ER. Among admitted patients, only 45 (43.2%) patients spent 6 hours or less in the ER. This duration has been recommended by the Canadian Association of Emergency Physicians and is also an internationally recognized performance indicator to assess the quality of Emergency care^{14,15}. Even more concerning was the fact that 48 (9.1%) patients remained in the ER for ≥ 24 hours. Overall, the median length of stay in our ER was 6 hrs with a mean of 8.5 hrs with range from 20 min to 70 hr 15 min. However, the median length of ER stay for our admitted patients was 8 hours. In one study from Pakistan, among 2356(13%) admitted to SCU/ICU, 67.7% stayed in the ED for >6 hours before being shifted to intensive care¹. However the duration of stay was prolonged compared to US (5 hours), Australia (4 hours), and Canada (7 hours)¹⁶⁻¹⁸.

At the same time, 17 (3.2%) of the patients expired while in ER. Among them, 14 had a SOFA score of ≥ 10 and 16 patients had ≥ 3 organ systems involved. Multisystem involvement may have been accountable for

the death. The median length of ER stay of expired patients was 3 hours with a mean of 7 hr 46 min and range between 35 min and 50 hrs 35 min. 10 patients spent less than 6 hrs. Those with prolonged ER stay may have been benefitted from early admission to ICU.

The causes of prolonged ED stay are complex and multifactorial^{19, 20}. However, the two most important determinants have been identified as increasing volume and insufficient inpatient capacity. To identify the increasing volume, the trend of ER flow has to be determined. It has been documented that there is 59% increase in critically ill patients in California ERs from 1990 to 1999²¹. This has been attributed to age shifts and higher prevalence of patients with chronic conditions. The percentage of elderly in most Western countries is on the rise²². Life expectancy of Nepalese people is also increasing as shown by 2018 reports by WHO (70.2 years).

ERs are basically a site for rapid triage, stabilization, and initial treatment. But with increasing boarding times, it is now developing as a site for ongoing (i.e. longitudinal) care in the acute phase. In such scenarios, it should serve as expandable extensions of the ICU. However, ERs are not designed, equipped, or staffed for such care. They have not only been identified as a barrier but also as a high-risk environment for medical errors²³. Most ERs of developing countries are deficient

in required facilities like equipment, skilled staff and trained physicians. The necessary infrastructures which may help to provide longitudinal care of critically ill patients include dedicated resuscitation area, ability to perform hemodynamic monitoring (i.e. CVP, IABP), mechanical ventilation capability, and training program for ED staff⁷. The aim is neither to keep the patient for prolonged period in ER nor to delay the admission to ICU. It is simply as a temporizing measure until an ICU bed becomes available.

Our study has used SOFA score for all critically ill patients. This scoring system is generally used in ICU setting. It has been used in our study to remove clinician bias in the accuracy of the assessment of severity of illness. But various scoring systems used as severity of illness measures in critical care needs to be validated for use in ER.

Delayed admission of patients in our study may have been partly contributed by delay in the decision making either from the physician or the patient party. However it was not possible to track the delay in decision-making. We were only able to record the time when the bed was available in ICU and other units. Further work is needed to identify the specific factors responsible for prolonged ED stay with special focus on modifiable factors contributing to prolonged ED LOS.

These data highlights the need for increase in the number of ICU beds as the delay in admission is very high and high proportion (30%) of the patients are being referred. Although admission is delayed, focus has to be on the timely instigation of specific interventions and organ support.

The strength of the study was that it was a prospective study with real time evaluation of patients and simultaneous documentation with minimal chances of missing data. We were also able to document the severity of illness and follow the outcomes.

In terms of limitations, it was a single-centre study with limited external validity. It was an observational study design with lack of randomisation. There was heterogeneity of population. Another limitation was that

patient's goals of care are often revisited during patient's hospital course. Detailed information of clinical reasoning regarding acceptance or denial couldn't be gathered. Similarly SOFA score was collected only at the time of consult. Our data did not contain a dynamic measure of clinical severity which may have helped to better predict persistent organ dysfunction and death.

We recommend prospective multi-centre studies to identify various causes of delay in admission of critical patients from ER. Besides, networking among the hospitals is of utmost importance since it helps to identify the hospitals with available monitoring beds. This aids in saving the valuable time of critically ill patients which may prove vital. At the same time, improvement of facilities in ER such as dedicated resuscitation area, staffing pattern and regular training may help in providing longitudinal care in ER to critically ill patients⁷.

CONCLUSION

This study demonstrates that a large number of critically ill patients present to our ER on a daily basis. Among them, almost 20% are admitted whereas more than 70% patients have to be either referred to outside hospital or have to remain in the Emergency Room. Networking among the hospitals along with other solutions may be required to save lives of critically ill patients.

CONFLICTS OF INTEREST

None declared.

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