CLINICAL PROFILE AND PROGNOSTICATION IN PATIENTS ADMITTED AT MEDICAL INTENSIVE CARE UNIT AT B. P. KOIRALA INSTITUTE OF HEALTH SCIENCES

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ABSTRACT

Introduction

Critical Care management is an important issue in developing countries where Medical Intensive Care Units (MICU) patients have comorbidity or complications of multisystem involvement.

Objective

The objective of study was to analyze clinical profiles of patients in Medical Intensive Care Unit and identify applicable factors that prognosticate outcomes.

Methodology

Study conducted at Medical Intensive Care Unit of B. P. Koirala Institute of Health Sciences, Dharan, Nepal. Records from July 31, 2013 to August 1, 2014 were retrospectively studied. Clinical profiles were analyzed, outcomes defined as improved, referred, Leave Against Medical Advice (LAMA) or death. An online calculator (MD+Calc) was used to calculate Sequential Organ Failure Assessment Score (SOFA). Descriptive statistics were used, values <0.05 were statistically significant.

Result

Of 70 patients 36 (51.4%) were female, 30 (42.9%) had sepsis of which 12 (40%) had Community-Acquired Pneumonia. 8 (11.43%) had Acute Respiratory Distress Syndrome, 7 (10%) had congestive cardiac failure. 43 (61.43%) improved, 17 (24.3%) expired, 9 (12.86%) LAMA, one patient was referred. Sequential Organ Failure Assessment Score was >9 in 23 (41.07%) cases. Of 17 expired cases, 14 (82.35%) had SOFA score >9.

Conclusion

Sepsis with pulmonary involvement is primary diagnosis in patients requiring Medical Intensive Unit Care. Sequential Organ Failure Assessment Score was useful for prognostication and can be used for better clinical decision-making.

KEY WORDS

Critical care, pneumonia, sepsis

INTRODUCTION

Patients admitted to Medical Intensive Care Unit may require management of multisystem derangements and critical care. In developing countries, with limited resources in intensive care, prognostication to predict outcomes remains necessary. The capital of Nepal, Kathmandu has 11 government hospitals, 8 community-based hospitals, and 32 private hospitals. Of these 51 hospitals, 33 have intensive care facilities, with a total of 331 beds, of which only 161 beds have mechanical ventilators.[1] The Central Bureau of Statistics in Nepal in 2011 observed 15.2 beds per 100000 population, and 7.2 beds with ventilator facility per 100000 populations.[2] Data on profiles and outcomes of patients admitted in intensive care units outside the capital city are few. Research on clinical characteristics and outcomes of intensive care unit patients are an important tool for improving the standard of care.

There are different validated severity of illness scoring systems and prognostic scores, and the ease of use of the SOFA (Sequential Organ failure Score) scoring system for classifying the severity and risk for poor outcomes has made the tool favorable in MICU.[3-7]

The study aimed to study clinical characteristics of patients admitted to the medical intensive care unit, and to identify the applicable factors that could prognosticate the outcomes.

METHODOLOGY

The study employed a retrospective design. Medical records of patients admitted in the Medical Intensive Care Unit (MICU) of the B. P. Koirala Institute of Health Sciences (BPKIHS) over 1 year, dated August 1, 2013 to July 31, 2014 were evaluated from the Medical Records Section of B. P. Koirala Institute of Health Sciences, Dharan, Nepal. Permission for the study was granted by the Institute's Hospital Medical Records Section.

70 patients had been admitted in this period. BPKIHS is a 700-bed tertiary university hospital that is equipped with intensive care support.

A structured proforma was prepared for data collection that included information on demographic profiles such as date of admission, age and gender of patient and address, personal and social history on alcohol consumption and smoking.

Clinical profiles recorded were primary diagnoses, duration of ICU stay, comorbid conditions, procedures performed during MICU stay, laboratory investigations such as blood gas analyses, FiO2, platelet count, Glasgow Coma Scale score, biochemical parameters such as serum bilirubin, serum creatinine and/or urine output, presence of hypotension and records of mean arterial pressure, and use of vasopressors for calculating the SOFA score (Sequential Organ Failure Score). The SOFA score was calculated using an online calculator MD+Calc.

The SOFA score comprises point system for variables at the MICU admission time which include the ratio of paO_2 (partial pressure of arterial oxygen) to the FiO_2 (fraction of inspired oxygen), platelet count, Glasgow Coma Scale, serum Bilirubin, blood pressure and/or use of vasopressors ≥1 hour, and serum creatinine level or urine output. The worst value in a 24-hour period is used for all the variables. An initial SOFA score of <9 predicts mortality of <33% and an initial SOFA score of >11 predicts mortality of 95%.[8-13]

Prognosis of the cases were recorded as outcomes of the patients, which were recorded as improved, referred, leave against medical advice (LAMA) or death. Improved outcome was defined as patients being transferred back to the referring department or ward with the attending team's note mentioning improved status; referred was defined as referral to another center of patient's choice; left against medical advice (LAMA) was defined as patient or primary care-taker opting to withdraw medical care against advice.

Data and Statistical Analyses:

Data was recorded using Spreadsheet of Microsoft Excel 2007, and converted into Statistical Package for Social Science version 11.5 for statistical analyses. Descriptive statistics was calculated as Mean, Standard Deviation, percentage and proportions, Median and interquartile range, and the information was presented in graphical and tabular formats. For inferential statistics, Chi Square test was applied to find out the significant differences between SOFA scores and the outcome of MICU stay at 95% Confidence Interval, where $p < 0.05$.

RESULTS

There were 70 admissions, of which 36 (51.4%) were females, and 34 (48.6%) males. Majority of the patients belonged to the younger age group of ≤50 years (65.71%), and 17.14% were above 71 years. Common comorbidities were Diabetes Mellitus (15.7%) and Systemic Hypertension (14.3%), Chronic Liver Disease (5.7%), Ischemic Heart Disease (4.3%) and Chronic Obstructive Pulmonary Disease (2.9%). 90% of the patients were smokers and 45% consumed alcohol regularly, amount and duration of consumption being unspecified.

Of the patients referred by Internal Medicine department, 65% were admitted directly from the Emergency Room. 28 patients (40%) were from the home district of Sunsari. The median duration of stay was 8 days.

Primary diagnoses and their respective outcomes are depicted in table 1. The primary diagnosis was sepsis in 30 (42.9%) cases, of which 12 (40%) were diagnosed with Pneumonia.

Table 1. Distribution of primary conditions on admission and their outcomes

Primary condition	Number of Cases (%)	Outcome (%)			
		Improved	Expired	Referred	LAMA
Sepsis	30 (42.9)	12 (40)	11 (36.67)	1 (3.33)	6 (20)
Sepsis with Pneumonia	12(40)	11 (91.7)	1 (8.3)	0	0
Acute Respiratory Distress Syndrome	8 (11.43)	6 (75)	2 (25)	0	0
Congestive Cardiac Failure	7 (10)	5 (71.43)	2 (28.57)	0	0
Acute pancreatitis	5 (7.14)	5 (100)	0	0	0
Meningoencephalitis	5 (7.14)	5 (100)	0	0	0
Cerebrovascular Accident	4 (5.7)	3 (75)	1 (25)	0	0
Organophosphorus Compound Poisoning	4 (5.7)	3 (75)	1 (25)	0	0
Snake Bite	2 (28.57)	1 (50)	0	0	1 (50)
Chronic Kidney Disease	2 (28.57)	1 (50)	0	0	1 (50)
Hypertensive Emergency	2 (28.57)	1 (50)	0	0	1 (50)
Diabetic Ketoacidosis	1 (14.29)	1 (100)	0	0	0

Mortality was higher among females (55.55%) with equal distribution between the younger and the older age groups (50% respectively). The total number of deaths observed was 17, most comprising of sepsis, followed by cardiorespiratory involvement. The cause of death in 15 patients was documented as Multiple organ dysfunction syndrome (MODS). In remaining 2 expired cases, cause of death was mentioned as cardiorespiratory arrest.

In 5.5% cases, records noted a multidisciplinary approach with surgery and psychiatry department consultations.

Complications were noted in 10% as hospital-acquired pneumonia, with two cases of ventilator-associated pneumonia. Mechanical Ventilation was required in 40%, of which 14.3% were deprived owing to unavailability of the support, while 4.3% had refused the treatment. The most common indication for ventilator support was ARDS in 17.14%, others being refractory septic shock (5.71%). Three patients had developed complications when on ventilator support such as pneumonia, oral candidiasis and laryngitis. 20% received central line support, and 8.6% had to undergo dialysis with acute kidney injury as an indication. 31.4% cases had developed clinical shock on admission with MAP<70 in 25.7%.

The outcomes were observed to be 61.43% improved, 24.3% expired, 12.8% Leave Against Medical Advice and one patient was referred to center of choice.

Table 2. Distribution of Sequential Organ Failure Assessment Score and outcome

Outcomes	SOFA score		P value	Remarks
	≤9	>9		
Improved	23	4	<0.001	Significant
Expired	3	14	<0.001	Significant
Referred	1	0	0.507	Not significant
Leave Against Medical Advice	6	5	0.742	Not significant

The SOFA score was documented in 56 patients only, with a score >9 in 41.07%. The SOFA score of 14 patients could not be calculated due to missing data. SOFA score of >9 were observed in 14 (82.35%) expired cases and in 4 (14.81%) improved patients as tabulated in table 2.

DISCUSSION

The study highlights the unique clinical characteristics of medical critically ill patients. The clinical characteristics and outcomes of adult patients admitted to the medical intensive care units are diverse and oftentimes with unpredictable outcomes. Most ICU facilities in Nepal are managed by intensivists and anesthesiologists, and relevant data that include such patient profiles are predominantly of those requiring mechanical ventilator support, such as in the study by Koirala S et al from the department of Anesthesiology and Critical Care, in which majority (49%) of the 255 patients studied over 1 year were referred from the surgery unit, unlike in this study where most patients were from the medical unit.[14] The difference is accounted by the fact that

medical intensive care units such as ours cater primarily to medical patients, irrespective of the requirement for mechanical ventilator support, prioritizing patients with sepsis with or without MODS, are managed by the attending team with less tendency for multidisciplinary approach, as observed in the results section. Our study conforms to a median duration of stay of 8 days as in the study by Koirala S et al that was also initiated in the same institution.[14] The smaller number of patients observed are due to the limited number of beds in the MICU, besides a smaller male to female ratio of 0.94 as compared to their 1.43. While studies have argued on the skewed attitude of health care against female gender, our study doubts this misconception, where females were of equal numbers on admission.[14] The finding of the primary condition of sepsis is similar to other studies on ICU patients, which was expected of a tertiary university hospital.[11,15] The most common condition associated with sepsis in our study was pneumonia (40%). Few complications such as hospital acquired pneumonia and ventilator-associated pneumonia was observed in the present study, and where mechanical ventilator was required, the common indications were ARDS. While many studies have validated and recommended severity of illness scoring systems for prognostication of illness based on the evolution of multiple organ dysfunctions, in our study data on calculating the SOFA score were inadequate, and only 56 patients were documented to have record of the SOFA scores which was >9 in 41.07% cases. The SOFA score of patients who expired was high (>9) in 82.35% cases and was statistically significant (P<0.001), and similarly patients who were discharged improved (23 patients) who had SOFA score of ≤9 (41.07%), which was statistically significant (P<0.001). The patients who had had a longer duration of stay mostly had initial SOFA scores of >9, although it was not statistically significant. There were no studies comparable to our study in Nepal that could inform on the importance of the use and the ease of use of the SOFA scoring system, and how relevant a tool it could be in predicting the outcomes of critically ill patients, and how serial SOFA scores may help in the follow up period in critically ill patients. In this study, of the 70 patients admitted in Medical Intensive Care Unit over a 1-year period, 40 (61.43%) were discharged improved while 17 (24.3%) expired, a figure that is similar to other intensive care unit data in Nepal.

CONCLUSION

Patients were of younger age group, with a female preponderance, and were from regional locales. Sepsis was the most frequent primary diagnosis among patients requiring medical intensive care support. Multidisciplinary approach to care for critically ill patients in the intensive care unit was low. The MICU standard of care is incomplete without a standard protocol of categorizing patients based on severity of illness, and the facility will benefit from the use of severity of illness scoring systems such as the Sequential Organ Failure Assessment Score (SOFA) for critically ill patients, whereby prognostication and counseling on the clinical condition will be more scientific.

RECOMMENDATIONS

An urgent need to establish a standard protocol for the medical intensive care unit for routine use of a severity of illness scoring system, along with multidisciplinary team approach is necessary.

ACKNOWLEDGMENT

LIMITATIONS OF THE STUDY

A complete analysis of severity scores and proper records of cause of death was not feasible in its entirety due to lack of uniformity in documentation of medical information.

CONFLICTS OF INTEREST

None

FINANCIAL DISCLOSURE

None

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