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Original Article

INTERVENTION AND THERAPIES ASSOCIATED MORTALITY IN INTENSIVE CARE UNIT OF BSMMU, DHAKA

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SUMMARY:

In the general ICU of BSMMU, Dhaka. 157 critically ill patients were studied for association between mortality and interventions/therapies. Among the patients 123 received mechanical ventilation (major interventions) and 100 of them expired which is very highly significant (P< 0.001). Among the patients who got minor interventions (urinary catheterization, nasogastric tube insertion, central venous line, tracheostomy)-none was significant. The patients who received therapies (fresh frozen plasma, whole blood, ionotropes/vassopressor drugs, platelet rich plasma)-no parameter was significant except the patients who got ionotropes /vassopressor therapy (P<0.05). From our study it is apparent that mortality is more associated with major interventions like mechanical ventilation and mortality associated with minor interventions are non-significant. Mortality associated with ionotropes /vassopressor therapy was significant.

INTRODUCTION:

While the majority critically ill patients require admission in ICU for a short period, some have particularly complicated courses of illness requiring admission for prolonged periods, as commonly defined by lengths of ICU stay for 2 to 3 weeks[1]. ICU length of stay is clearly influenced by a number of variables including the presence of intermediate care units and availability of ward beds and associated with increased risk for infection related complications, adverse outcomes, and consumption of a considerable amount of ICU resources[1,2]. Sixteen percent of the Dutch patients had an ICU-acquired infection in a European prevalence survey participated by 78 ICUs in Netherland[3]. Nosocomial infections lead to suffering of patients and cost burden of family as well. Majority infections at the ICU are device associated[4,5]. The effects of critical illness or treatments received in ICU contribute to mortality is poorly understood[6].

Intensive care unit is expensive and scarce in worldwide including Bangladesh[7]. Total number of ICU beds in Bangladesh is about 190 for 150 million peoples. Therefore admission to the intensive care unit (ICU) should be restricted, so that patients likely to benefit from ICU care[8]. This restriction excludes patients whose death is inevitable as well as those patients who should survive and do well without the need for intensive care. The working practices and outcomes from intensive care units are poorly documented in our country. The patients were admitted in the Intensive care unit from different discipline of Bangabandhu Sheikh Medical University hospital and also referred from other hospitals.

This study was instituted to investigate retrospective review of stored data from the archive. Demographic details, length of stay in ICU, any new diagnosis or any complications, usage of invasive devices and therapies associated with outcome were recorded to provide data for future development of Intensive Care Facilities.

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METHODS:

We studied retrospectively of 157 patients admitted in General Intensive care unit of Bangabandhu Sheikh Mujib Medical University Hospital in the year 2007 from January to June. Ethical clearance was taken from the departmental Ethical Committee of the Department of Anaesthesia, Analgesia and Intensive Care Medicine, BSMMU. Patients were admitted from the general medicine and surgical wards and emergency department. Patients developing a medical problem following surgery and patients admitted under the care of surgical specialties and did not need any surgery were also included in the study.

In accordance of criteria for analysis, a structured questionnaire was used and data were obtained from admission register, patient follow-up sheets, mortality record books and also from patients admission files. We observed admission diagnosis, co-morbidities, length of stay, different procedures and overall outcomes. We divided the total patients in different age groups, observed relationship of mortality with interventions performed in ICU and categorized the patients as recovery and death and their relation with different procedures and therapies.

Summary statistics are given as means for normally distributed data. Association in distribution was examined using Chi-square test. A p-value of d"0.05 was considered statistically significant. SPSS 11.5 was used for data entry and analysis and Endnote X for creating reference library.

RESULTS:

A total of 157 admissions with complete records were available. It was observed that the highest concentration of the population was in age group 61-70 years which was 20.4% of total ICU admission and second highest was in age group 51-60 years which was 19.7%.

Among 157 patients, 60 were found female which was 38.2 % and 97 were male, 61.8 in percentage. It is not exactly same distribution of national average of sex.Hospitalization in ICU was highest for the first 5 days and 66 patients hospitalized which were 42.0 in percentage.

Consultants outside ICU gave their valuable opinion in patient's treatment. Single consultant visited 39 patients and two consultants visited 16 patients and seven consultants visited 1 patient only. 88 patients out of 157 patients were treated under consultation of intensivists only. From 157 admitted patients 46 new diagnosis or complication were noted by reviewing the medical records of the patients. Among those, septicemia, acute renal failure were notable.

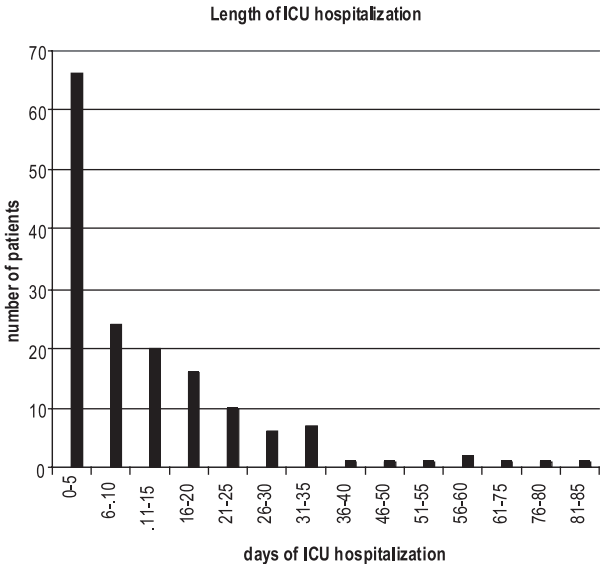

Fig.-1: *ICU length of stay*

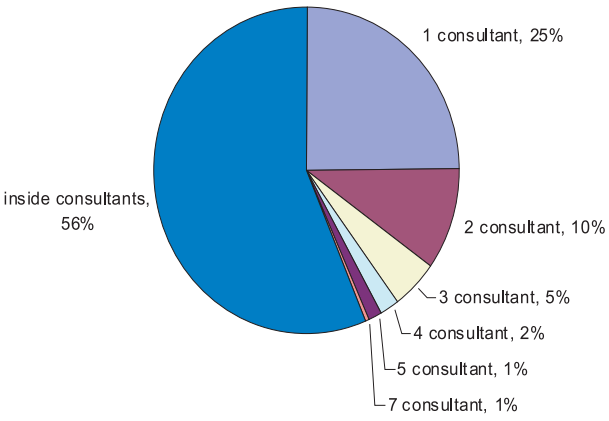

Fig.-2: *Number of Consultants per Patient*

Table - I

Relationship with interventions and outcome

Procedures or interventions		Recovery	Death	Total	Chi-square (P-value)
Mechanical ventilation	N (%)	23 (18.7)	100 (81.3)	123(100.0)	34.674(0.001)***
Urinary catherization	N (%)	37 (27.8)	96 (72.2)	133 (100.0)	0.302 (0.582)NS
Nasograstic tube insertion	N (%)	35(26.7)	96 (73.3)	131 (100.0)	1.463 (0.226) NS
Central venous line	N (%)	3 (37.5)	5 (62.5)	8 (100.0)	0.322 (0.570) NS
Tracheostomy	N (%)	0 (0.0)	1 (100.0)	1 (100.0)	0.404 (0.525) NS
Fresh frozen plasma	N (%)	3 (18.8)	13 (81.3)	16 (100.0)	0.856 (0.355) NS
Whole blood	N (%)	5 (18.5)	22 (81.5)	27 (100.0)	1.641 (0.200) NS
Ionotropic / vasopressor drugs	N (%)	9 (17.6)	42 (82.4)	51 (100.0)	4.483 (0.034)*
Platelet riched Plasma	N (%)	2 (18.2)	9 (81.8)	11 (100.0)	0.635 (0.425) NS

*** Very highly significant ($P < 0.001$)

* Significant ($P < 0.05$)

NS – Not significant.

N- Number

Urinary catheterization was done in 133 patients and 96 of them died. Nasograstic tube was inserted in 131 patients and 96 of them died. Central venous line was inserted to 8 patients 5 of them died. Tracheostomy was done in one patient and died none of them alone mortality relations was significant fresh frozen plaszma was given in 16 patients and 13 patients died. Whole blood was transfused to 27 patients and 22 patients died. Ionotropic/Vasopressor drugs were administered in 51 patients and 42 of them died which is significant ($P< 0.05$). Platelet riched plasma was given to 11 patients and 9 patients died.

DISCUSSION:

Our analysis was based on total number of ICU admission for the time period of six months. The data were gathered as a collaborative clinical ICU survey. The method of data collection, training and data validation was designed to minimize errors. However, the information was likely to be most accurate for objective information, such as ICU length of stay, therapies and invasive procedures and mortality rates, which were used to support the main themes of this article.

In our country, by the time patients reach the ICU, it may be possible to identify those with a high risk of death but it may be too late to do much to influence the outcome of those who die within the first day or two of admission. Such patients include those patients with brain damage after trauma or anoxia, with terminal cancer, and end stage respiratory failure. Many of these patients had underlying pathology and physiology too deranged to respond to a short period of intensive care therapy. Much intensive care research is focused on treatments directed at sepsis, adult respiratory distress syndrome, and multiple organ failure, problems that occur primarily in the long stay ICU patient. To appreciably decrease early ICU mortality, it may be necessary to intervene before ICU admission.

In our study in first 5 days, 66 patients hospitalized which were 42.0 in percentage. Among 46 new diagnoses or complication, septicemia and acute renal failure were notable. Major intervention (Mechanical ventilation) had strong association with outcomes (P value < 0.001). Eighty-one percent of patient died with Mechanical ventilation may be due to their moribund status, terminal stage of illness, lacking of proper knowledge of primary health care provider to deal with the primary illness, late referral of patients along with irreversible patho-physiological changes. On the

other hand, there is no significant association with minor intervention, which may be due to least nosocomial infections among the patients received medical therapies mortality is significant who received Ionotropic / vasopressors which is due to moribund status of patients.

The small proportion of patients with a longer ICU stay has the highest utilization of resources whereas ICU length of stay is the most important determinant of ICU cost and resource use[9]. Fourty-four percent patients were admitted for less than 2 days, 31% were admitted for 2 to 3 days, 21% were admitted for 4 to 13 days and 4% had a prolonged more than 14 days of admission to the ICU which is consistent with our study. The distribution of primary admission diagnosis was significantly (p £ 0.001) different among the patients who had intermediate (from 2 to 13 days) as compared to prolonged (³ 14 days) ICU admissions[1]. We have found more frequent usage of ventilation and indwelling catheter in comparison to a study whereas overall 58% of patients were mechanically ventilated, 61% had a CVC, and 86% had an indwelling catheter[4]. The incidence densities of patients at risk of developing an infection according to the duration of device they used. Patients with a device-associated infection had significantly longer ICU stays. When all patients were considered, developing nosocomial sepsis or two or more nosocomial infections independently increased mortality[4].

We enrolled all the patients during our study period, therefore, selection bias was minimized. Additional strength of our study was that we did not have such study before. A limitation of observational studies is that not all confounding variables can be taken into account. There is no explicit clinical diagnosis rule; therefore independent intensivists may classify a similar patient differently. As an analysis of a previous established database, we had limited clinical details of the course of illness. We did not have standard laboratory diagnosis for all patients and could not define a possible earlier infection of another type. We could not assess long-term outcome with follow-up.

Further study is needed to better define the determinants and clinical outcomes associated with prolonged admission to the ICU. Prevention of cross transmission of microorganisms may be more effective in patients housed in single rooms or cubicles.

Now ICU hospitals can use specific regular active surveillance systems, which take more treatment specific risk factors into account and may better support the critical care policy on the ICU.

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