

Original Article

An Analysis of 1255 ICU Patients at a Tertiary Military Hospital

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Abstract:

An intensive care unit (ICU) is a special part of hospital where expertise medical and nursing care has been provided along with monitoring and organ support. An analysis of 1255 patients was carried out to investigate retrospective review of data from ICU of combined military hospital (CMH) Dhaka. During this study period, the frequency of admission into ICU was more from medical discipline (59.92%) than other disciplines like surgical (37.52%), gynaecological, obstetric and other disciplines (2.55%). The incidence of survival was 53.86% from medical, 69% from surgical and 84.38% from gynaecological, obstetric and other disciplines and mortality was 46.14%, 31% and 15.62% respectively. Occurrence of total ventilatory support provided in all disciplines was 45.34%. In other studies it was found that the ICU mortality varies between 15% to 44% depending on various factors like age, severity of diseases, length of stay and organizational capability of the ICU. The most prevalence of diseases admitted into this ICU was cardiovascular diseases, which were 42.47% and second prevalent diseases were head injury (11.34%). The incidence of immediate mortality within 12 hours was 7.97%.

Introduction:

An intensive care unit (ICU) provides special expertise support to the vital organ and utilizes the skill of medical, nursing and other staffs experienced in the management of the problems^{1,2}. It not only improves the probability of patients with hopeless illness but also likes to improve in general level of medical and nursing care. The modern ICU has developed from the fusion of lessons learned from respiratory and coronary care with continued momentum provided by the clinical and technological development in resuscitation, pharmacological and mechanical circulatory support and advances in renal replacement therapy, respiratory failure, cerebral oedema and multi-organ failure³. Intensive care today is a separate specialty and while some period of training in ICU is valuable to all specialties⁴; it can no longer be regarded as parts of anesthesia, chest or internal medicine, general surgery or any acute discipline². There is a worldwide increase in the demand for critical care services⁵. This is

related to the aging of the population, the extended survival of previously incurable diseases, the increase number of immunocompromised patients and the availability of new therapies or surgeries that typically require intensive care support⁶.

CMH Dhaka is 850 bedded tertiary hospital of Bangladesh armed forces with some special centers like nephrology, orthopedic, neurosurgery and cardiac for better management, close monitoring, organ support and early intervention of patients if required. There are three intensive care unit in this hospital and serves the critically ill patients belonging to various disciplines. Therapeutic decision made by the attending medical doctors or from the physicians of patient's originating department who review the patient daily. After office hours, care of the patients is delegated to the resident who is remaining in ICU and on-call specialists of respective department. These medical staffs consisted from resident rotated from various disciplines. Nursing staffs of ICU are mainly intensive care assistants (ICAs) and armed forces nursing staffs (AFNS) rotated eight hourly. An admission into ICU is from two sources, the wards and emergency department (Medical inspection room) and depends on bed availability. There are no formal defined entry criteria to enter into these ICUs.

A potential analysis was conducted from data of ICU of CMH Dhaka to find out the number of patients from various departments admitted into ICU, to see the most prevalent

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diseases admitted into this unit, the number of patient required ventilatory support, the mortality of the patients in this study period and immediate death of patients after admission into ICU.

Material and Methods:

This study was carried out to analyze retrospective data of patients of ICU-1 of CMH Dhaka from January 2007 to December 2009. To fulfillment of the criteria of analysis; data were collected from records of ICU-1 of CMH Dhaka and from patient's files. The number of patients admitted into ICU-1 from various departments was found out from record book, the most prevalent diseases were categorized, the number of patients required ventilatory support were sort out, the survival and mortality rate were found out and immediate death of patients within 12 hours were classified separately.

Results:

A total 1255 patients were admitted into this ICU during this period, among them 752 (59.92%) were medical patients, 471 (37.53%) were surgical, and 32 (2.55%) were patients of gynecological, obstetric and other disciplines which is showed in Table-I.

Table-I

Department-wise admission of study group patients in ICU

Departments	Years			Total patients & Percentage
	2007	2008	2009	
Medical	261	317	174	752 (59.92%)
Surgical	196	168	107	471 (37.52%)
Gyne, obs & other	16	7	9	32 (2.55%)
Total	473	492	290	1255

Incidence of survival and mortality rate of study group patients were depicted in Table-II, which showed that 53.86% and 46.14% from medical, 69% and 31% from surgical, 84.38% and 15.62% from gynecological, obstetric and other disciplines and total ICU survival and mortality were 60.31% and 39.68% respectively.

The number of patients provided ventilatory support in medical discipline were 389 (51.73%), in surgical were 161 (34.18%), in gynecological, obstetric and others were 19 (59.37%) and total ventilatory support provided in all disciplines were 569 (45.34%), which were shown to the Table-III.

Table-II

Survival and mortality of study group patients of ICU

Total patients as Disciplines	Total No. of patients as discipline	Total survived	Total death
Medical	752	405 (53.86%)	347 (46.14%)
Surgical patients	471	325 (69%)	146 (31%)
Gynae-obstetric	32	27 (84.38%)	5 (15.62%)
Total	1255	757 (60.31%)	498 (39.68%)

Table-III

Discipline-wise ventilatory support of study group patients

Disciplines	Total no. of patients per	Without ventilator	Put on ventilator
Medical	752	363 (48.27%)	389 (51.73%)
Surgical	471	310 (65.81%)	161 (34.18%)
Gynae, Obs & others	32	13 (40.62%)	19 (59.37%)
Total patients	1255	686 (54.88%)	569 (45.34%)

The most prevalence of diseases admitted into this ICU during this period is depicted in Table-IV; where it was found that frequency of cardiovascular diseases like acute myocardial infraction, heart failure, cardiovascular accident is more and it was 42.47%, second prevalent diseases were head injury (11.34%), the third were malignancy (7.41%), fourth and fifth were respiratory and renal diseases and were 6.85% and 5.74% respectively.

Table-IV
Incidence of predominant diseases in ICU of CMH Dhaka during study period

Diseases	Diseases	No. of Patients	No. of Patients	
CVS	AMI /IHD	287	533	
	Congestive Card Failure	24	(42.47%)	
	Left Ventricular Failure	16		
	HTN			
	Cardiovascular accident	7950		
	Cardiac arrest	8		
	Chest pain	38		
	SVT	5		
	Complete heart block	15		
	Atrial Fibrillation	7		
	Dilated cardiac myopathy	4		
	Respiratory	ARDS	14	86(6.85%)
		COPD	34	
Pul oedema		18		
Br. Asthma		20		
Head injury	RTA	124	143	
	Accident	19	(11.34%)	
Renal	ARF	19	72	
	CKD	25	(5.74%)	
	ESRD	28		
Infectious	Septicemia/MOF	11	27	
	Encephalitis	16	(2.15%)	
Metabolic	DM	57	57(4.54%)	
	Tumour/ Carcinoma	57	93(7.41%)	
Malignancy	Brain tumour	17		
	Spinal tumour	01		
	ICSOL	18		
Gynae-obstetric	PIH (OP)	23	32	
	Uterian mass (OP)	9	(2.55%)	
ICH	ICH (OP)	53	53(4.22%)	
GIT	Gastroenteritis	30	30(2.39%)	
PUO	PUO	26	26(2.07%)	

The incidence of immediate mortality of study group patients is depicted in Table-V. This table illustrated that the patients who died immediately within 12 hours period were 100(7.97%) and within 6 hours were 88 (7.01%).

Table -V
Incidence of immediate mortality of study group patients

Diseases	Period		
	Immediate death	0-6 hours	6-12 hours
Cardiovascular diseases	65 (5.18%)	60 (4.78%)	5 (0.39%)
Respiratory diseases	7 (0.56%)	6 (0.48%)	1 (0.08%)
Renal diseases	13(1.03%)	10(0.79%)	3(0.24%)
Metabolic diseases	5(0.39%)	5(0.39%)	-
Head injury	9(0.71%)	6(0.48%)	3(0.24%)
Gastriintestinal diseases	1(0.08%)	1(0.08%)	
Total	100(7.97%)	88(7.01%)	12(0.96%)

Discussion:

This analytic study was based on total 1255 patients who were admitted in this ICU for a period of three years. The method of data collection and data validation designed to minimize errors⁷. The information which was collected to be most accurate for objective information, such as discipline of the patients, number of patients required ventilatory support, most prevalent diseases admitted into this ICU, immediate death of patients and survival and mortality rate. The prevalence of admission into this ICU was more from medical discipline (59.92%) than that of other disciplines like surgical (37.52%), gynaecological, obstetric and other disciplines (2.55%) and this is the usual finding of general ICU of all hospitals.

Mortality in intensive care unit patients remains high in all hospitals. Severely ill patients may experience higher mortality rates when assigned to ICU⁸. It was found in one study at Singapore that the mortality rate was 26% in ICU and 42% in hospitalized patients⁹. In another study at France, it was found that mortality was 15% in ICU and 20% to 30% in hospitalized patients with substantial variations across studies¹⁰. In other different studies it was found that ICU mortality rate varies between 15 to 44% depending on the case mix, age, length of stay and organizational aspects of the unit and corresponding mortality in the hospitalized patients was 30 to 42.2%^{11,12,13}. In this study it was found that the incidence of mortality was more in medical discipline (46.14%) than surgical discipline (31%) and least in gynecological and other disciplines (15.62%) and total ICU mortality rate was

39.69%, which is comparable to other ICUs, which is depicted in Figure-I. It was customarily practice in this hospital that the high risk patients were sent to ICU before death from any department. Over the study period, the incidence of ventilatory support provided as discipline wise was 51.73% in medical, 34.18% in surgical and 59.37% in gynecological, obstetric and other disciplines and the total patients required ventilatory support was 45.34%. But in other studies it was 70.30% to 76.30% for a period ranging from one to 34 days in ICU^{12, 14, 15, 16}. In this study it was found that requirement of ventilatory support is much less than that of other ICUs (45.34% vs 76.3%), which is depicted in Figure-II. Number of patient admitted into this ICU was more of cardiovascular diseases, and it was 42.47%, the second prevalent disease was head injury and it was 11.34% due to road traffic and other accidents and third prevalent disease was malignancy and was 7.41%. But in one study it was mostly trauma related cases entity responsible for admission into the ICU, which constitutes 45.6%¹⁴.

In our country, by the time the patients reach into the ICU, it was identified that the patient remain in high risk of death, because of severe compromised physiological reserve and irreversible organ failure and it may be too late to do much influence the outcome of those who die within 12 hours to 48 hours of admission. Such patients are head injury, severe hypoxia, end stage organ failure and terminal cancer¹⁸. In this study it was found that the incidence of immediate mortality rate within 12 hours was 7.97%. The incidence of immediate mortality of cardiovascular diseases was 5.18%, renal diseases were 1.03% and head injury was 0.71% (Table-V). In this situation, physiological reserve and severity of acute illness could not be appraised within short period of time.

Conventionally, the ICUs are manned by respective medical or surgical specialty e.g. coronary, respiratory, medical, neurological, neurosurgical, anaesthesia, paediatric or neonatal units. The newer generations of critical care physicians, popularly known as ‘intensivists’ undergo training to cater multi-specialty patients. The ICUs run by ‘intensivists’, provide first 24 hours of aggressive treatment, monitoring and stabilization of diverse emergencies, and seem to have significantly reduced the mortality, especially in patients with acute myocardial infarction, cerebrovascular accident, adult respiratory distress syndrome (ARDS) arising out of diverse aetiologies and poisonings¹.

The mortality in ICU is due to higher patient-to-doctors and patients to nurses’ ratio, which causes staff fatigue. Beside this, lack of modern monitoring appliances, lack of organ support facilities and delays in getting complex

diagnostic tests also a cause of higher ICU mortality. To decrease mortality in ICU, it is necessary to adopt admission criteria, develop speedy settlement of patient after admission in ICU, to utilize modern monitoring appliances, organ support facilities and early intervention by the trained doctors (‘intensivists’) who are familiar with stressful ICU environment. To decrease early mortality in ICU, optimization of physiological values before surgery or any procedure of high risk patients should be done¹. The provision of early enteral nutrition (EN) was associated with a significant reduction in mortality in trauma patients¹⁹. An early anticoagulation therapy may reduce mortality for patients with acute pulmonary embolism²⁰. Recently surviving sepsis campaign (SSC) has introduced to reduce mortality of septic patients, which reduces the ICU mortality up to 25%²¹. The lactate-guided therapy significantly reduces the ICU mortality of hyperlactatemic patients²². Staffing constitutes the greatest challenge to our ICUs; with only one consultant anaesthetist and a few supporting staffs with minimum organ support facility falls below the international standard. A more intensive staffing produces with high intensity physicians in ICUs is causing higher quality of care and reducing the mortality and shorter ICU and hospital stays²³. Some researchers have found that where intensivists managed all ICU patients have lower mortality rates than that of other ICUs¹⁵.

Conclusion

It is primarily necessary to optimization of patient to doctor ratio and patient to nurse ratio to reduce the mortality rate of ICU. The modern monitoring appliances, including central monitoring system for vital parameters and organ support facilities should be available to reduce the ICU mortality. Finally the ICU should be run by the critical care physicians (‘intensivists’) because they are psychologically familiar with this situation and developed endurance with ICU milieu and used to provide precise and aggressive treatment, monitoring and intervention of various emergencies which will also decreases the ICU mortality significantly.

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