Outcomes of Surgical Patients Admitted to the Intensive Care Unit of Jimma University Medical Center

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Abstract

Background: Intensive Care Unit is a part of a hospital where critically ill patients that required advanced airways, respiratory or homodynamic support are admitted. However, the patterns of admission and outcome of the critical surgical patients admitted to Intensive Care Unit of Jimma University Medical Center not well understood. Therefore, the aim of this study was to assesspatterns of admission and outcome of surgical patients admitted the intensive care unit of Jimma University Medical Center.

Methodology: A cross-sectional retrospective study was conducted in Jimma University Medical Center. Records of surgical patients admitted to intensive care unit from Sept1, 2016-Sept1, 2017 were reviewed. Data abstracted from patient records include diagnosis at admission and outcome of admission. Descriptive statistic, such as frequencies, proportions and means were calculated. Possible association patients' outcome and predictor variables were determined using Chi-Square Test.

Result: Duringone year, 113 surgical patients admitted to intensive care unit of Jimma University Medical Center. Males accounted 61.1% of the admission. Commonest diagnosis at admission was isolated head trauma accounting 36 out of 113 admissions (31.9%). Overall ICU complication rate was 46.9 %. Overall ICU mortality rate was 39.8%. The highest mortality rate was recorded for head injury at 52.8%

Conclusion: High complication rate and mortality rate is indicative of poor quality of care in the intensive care unit of Jimma University Medical Center. Head injury mortality rate is particularly higher and need preventive measures.

Keywords: Intensive care unit, Surgical; Jimma university medical center

Introduction

Surgical intensive care unit (SICU) is special unit primarily concerned with the care of patients with critical illness and demand a broad based knowledge to provide for all aspect of management of their patients to achieve good out comes. They can benefit from more detailed observation, monitoring, and treatment than is generally available in the standard ward [1].

ICU in most of the developed nations are high technology facilities with the most advanced medical technologies, electronic monitoring mechanical ventilation and other life supportive measure, as well as up-to-date drugs and highly trained and skilled personal. In tropics however, various levels of care for critically ill patients have been described and intensive care in the developing countries have been defined as doing the best for critically ill with the resources available. Caring for critically ill patients in developing countries is challenging, where health needs often outstrip available resources, necessary equipment is scarce. Moreover, equipment malfunctions are common and trained man power is limited. Furthermore, identifying patients who could benefit most from admission to ICU without overwhelming the unit is a major challenge [2-4].

A 2 year retrospective study was done in Aqaba-Jordan showed that 24% of ICU patient were surgical and 72% of these surgical patient were trauma cases. The average length of stay was 2.3 days per patient. Only 54% of total admission was appropriate [2]. Mortality in this ICU was 11% [5].

In 5-year review at Nigerian Teaching Hospital Enugu,

neurosurgical patients accounted for 41.2% admissions. Patients admitted as a result of critical incidents in anesthesia formed the lowest number of cases admitted 1.3%. An overall admission of neurosurgical cases, 92.4% was for severe traumatic brain injury (TBI) due to motor vehicular accident (MVA). The average length of stay was <24 h to 72 days with a mean of 4.9 ± 3.2 days. Mortality rate was 34.6% in this study [6].

In 12-month retrospective observational study conducted in Jimma University Specialized Hospital ICU in 2011, the overall ICU mortality rate was 50.4% and major causes included trauma, cardiac disease, acute abdominal presentations, septic shock, tetanus and hysterectomy secondary to uterine rupture. Surgical admission accounted for 43.2% with 48% mortality [7]. However, there is no updated study in this center. Therefore, the aim of this study was to determine diagnosis at admission and outcome of surgical patients admitted to JUMC intensive care unit.

Methods and Participants

Study setting and design

The study wasretrospective cross-sectional study. It was conducted in ICU of JUMC. JUMC is found in Jimma town, which is located 350 km southwest of Addis Ababa. It is the only teaching and referral hospital in the south western part of the country. There are 8 specialty Units (Internal Medicine, Surgery, GYN/OBS, Ophthalmology, Dermatology, Psychiatry, pediatrics and Anesthesia) run by the Hospital. The center has newly developed pediatric surgery subspecialty and emergency medicine units. JUMC ICU has 5 beds and 4 mechanical ventilators.

The study was carried out in mid-2017.

Sampling technique

All surgical patients admitted to ICU of JUMC in between September-2016 and -2017 were included.

Operationalization

Outcome: patient status after critical are in the SICU which include survived, referred and died

Survived: patient discharged alive by physician fulfilling discharge criteria

Died: patient expired after SICU admission

Referred: patients sent to other hospital for special intervention after admission to ICU

Diagnosis at admission: condition of patients prioritized for regular admission to ICU

Data collection instrument and methods

Data was collected by review of patient records from their cards. Trained data collectors used to retrieve information about patient socio demographic characteristic, causes of ICU admission, ICU stay, ventilated or not and patient out come through abstraction of information patient card and ICU registration review.

Data processing and analysis

Checking, coding and organization of the collected questionnaires were done manually. The completed questionnaire were coded and entered into a statistical package for social science (SPSS) version 23. In the descriptive statistical analysis, frequencies, proportion and mean were calculated and the results of the analysis were presented in text, tables and graphs as appropriate. Finally possible association was determined between patients' outcome and different variables using Chi-Square Test.

Results

Sixty nine out of 113 patients (61.1%) admitted to the ICU of JUMC were male. About half of admissions, 51.2% were between the age range of 15 and 45 **(Table 1)**.

The commonest diagnosis at admission was isolated head trauma which accounted for 36 out of 113 admissions (31.9%), followed by acute abdomen (23.9%)**.**

Regarding length of ICU stay in JUMC, 48 patients (42.5%) stayed 2-7 days. Only 3 patients stayed more than 28 days **(Table 2)**.

Out of 113 admissions 45 (39.8%) had complications. Organ failure was the leading complication and developed in 26 (57.7.2%) patients. There was electrolyte abnormality that needed treatment developed in 7 (13.2%) patients **(Table 3)**.

Regarding mortality in the ICU out of 113 surgical patients admitted to JUMC ICU 64 (56.64%) patients discharged with improvement.

Possible association of patients out come with different variables was assessed; in chi- square test only development of complication in ICU and having mechanical ventilation was

Table 1 socio-demographic characteristics of surgical patients admitted to Intensive Care Unit of Jimma University Medical Center, Sept 2016-Sept 2017(n=113).

Variable	Category	Frequency	Percent
Sex	male	69	61.1
	female	44	38.9
Age	</=4	5	4.4
	5-14	13	11.5
	15-24	18	15.9
	25-34	22	19.5
	35-44	19	16.8
	45-54	20	17.7
	55+	16	14.2

Table 2 Length of ICU stay of surgical patients admitted to Intensive Care Unit of Jimma University Medical Center, Sept 2016- Sept 2017(n=113).

Length of ICU stay (in day)	Number	Percent
<1day	14	12.4
1-2 day	23	20.4
2-7 days	48	42.5
7-14 days	12	10.6
14-28 days	13	11.5
≥ 28 days	3	2.7
Total	113	100.0

Table 3 Overall complications of surgical patients admitted to Intensive Care Unit of Jimma University Medical Center, Sept 2016- Sept 2017(n=113).

Type of complications	Frequency	Percent
Organ failure	26	64.15
Electrolyte imbalance	7	13.20
Hospital acquired infection	3	5.66
Shock	3	5.66
Others	6	11.32
Total complications	45	100

Table 4 Association between complications in ICU, having mechanical ventilation and outcome of patients in ICU (n=113).

Variables		Outcome				Chi-Square Tests
		Discharged from ICU	Died In ICU	Died in ward	Total	Fisher's Exact Test
Complication in ICU	Yes	8	43	2	53	p-value <0.001
	No	53	7	0	60	
Mechanical ventilation	Yes	34	47	1	82	p-value <0.001
	No	30	1	0	31	

associated with outcome status of patients. But, there is no statistically significant association between other variables and outcome of patients in ICU **(Table 4).**

Discussions and Conclusion

During one year a total of 113 surgical patients were admitted to JUMC ICU. Of these 69(61.1%) were males. Head injury was frequent cause of ICU admissions which represented 46(40.7%) patients, of these 36 patients were isolated head injury and 10 patients were with other associated injury. In study conducted in Kenya, severe traumatic brain injury accounted for 14.3% [8]. Thispattern of admission difference may be attributed to high prevalence of road traffic accident.

In this study the overall mortality rate was 43.3%, and mortality rate following head injury was 19 out of 36(52.8%). The overall mortality rate in the ICU of JUMC was much higher when compared with a 2 years retrospective study done in Aqaba-Jordan which was 11% and a study done in Intensive Care Unit of Tikur Anbesssa Specialized Hospital which was 31.5%.The difference might be due to the majority cases admitted to the ICU were medical and surgical patients founded 24% of total intensive care unit admissions with 72% of these surgical patients were trauma cases in the former; from total admission 69.1% of patient had no association with trauma in the later[2,5]. The finding on mortality rate following head injury was like with other studies done in Kenya and Nigeria which were 54% and 52.2%

respectively [8,9]. However, this result showed only minimal improvement in overall mortality with no improvement in head injury when compared with previous 5 year retrospective study done in Jimma University Specialized Hospital on August, 2011; overall ICU mortality rate was 50.1% and head injury related mortality rate (52.1%). This shows that there are still challenges in critical care delivery in Jimma University Medical Center ICU [7]. In many of the studies including this, ICU mortality rate is higher when majority of causes for admission were trauma cases; road traffic accident (RTA) was common cause for injuries in developing countries [2,4,8-11].

Among total number of patients admitted to ICU of JUMC, 49 (43.4%) of patients stay 2-7 days in ICU, 71% patients stay 1-7 days; only 3 patients stay more than 28 days in ICU. The result was comparable with study done in southern Nigeria where among 182 surgical patients admitted to ICU, 139 (76%) stay 1-7 days ;only 06 patients stay >21 days [9].

In this study, the overall complication rate is 45(39.8%) patients, the ICU mortality rate among patients who developed complication at least during their course of ICU stay was very high 91% (41 patients died out of 45 who developed complications) and there is significant statistical association between development of complication and ICU mortality rate in Chi-Square Test. The most common complication was organ failure. The result goes with the study done using large database from European study where 2,933 patients who stayed more than 48 hours in ICU studied. Of this 57% had at least one organ failure during their stay and the overall mortality rate for more than three organ failure was 73 % [12].

Regarding to mortality related to mechanical ventilation, ventilated patients had higher mortality rate than none ventilated. Out of 82 patients who needed ventilation 48(58.5%) died versus 1 died out of 31 who did not need ventilation and there is significant statistical association between mechanical ventilation and ICU mortality rate in Chi-Square Test. This finding is comparable with study done in Malawi ventilated patients died more than non-ventilated [13].

In conclusions this study in JUMC ICU, found overall mortality unacceptably high. ICU course complication rate which contribute to mortality is also high. The head injury burden with significant mortality points to importance of prevention. All of these mortality and complications at least partially reflects limited human and technological resources in ICU of JUMC.

For these, our recommendation is to JUMC, so that adequate human and material resources are required to decrease unacceptably high mortality and complication rate in ICU. The overall public awareness of head injury prevention should be done at government level involving all public sectors.

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