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Original Research Article.

Prospective Analysis of Post-Operative Admissions in the Intensive Care Unit of a Tertiary Care Hospital

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ABSTRACT

Background: The Intensive Care Unit (ICU) is a special unit primarily concerned with the care of patients with acute, recoverable, life- threatening, critical illness and injuries, which require constant close monitoring and support. ICU services are expensive and limited resources require stratification of patients. The present prospective study was undertaken to evaluate the post-operative admissions in the intensive care unit of a tertiary care hospital.

Materials and Methods: Present study was conducted to evaluate all the post-operative admission in the Intensive Care Unit for a period of one year (Nov 2013 and Nov 2014). All post-operative patients were divided into three groups: Group 1 – Informed Admissions, Group 2 – Uninformed Admissions, Group 3 – Post surgical Admissions. At the time of admission to ICU, the following data were noted: demographic data, initial diagnosis, vital parameters, pre-operative and peri-operative variables were collected from patient's case sheet and anaesthesia case sheet. Additionally, various hemodyanamics variables, duration of stay at ICU and outcome of the patients were noted. All the statistical analysis was performed using SPSS version 20. A p value of <0.05 was considered significant.

Results: The present study is a prospective evaluation study conducted on 341 patients who were admitted in the ICU of a tertiary care hospital from the operating room. On the basis of gender distribution more males were admitted in the ICU (61.6% in compare to 38.4% females) among the total ICU admissions within a year. For hemoglobin percentage in planned admissions and in unplanned admission was not significant with P-value of<0.001. The average duration of anaesthesia is more in planned admissions of total post-operative ICU admissions. This was not significant with P-value of< 0.001. In planned admission to ICU, males are 47.2%, females 29.0%, in unplanned admissions male are 14.4%, female 8.8 % and in emergency condition males are 0.0%, females 0.6%. This was significant with P-value of>0.001. The post-operative Oxygen desaturation was not significant with P-value of <0.001. The post-operative admissions were not significant with P-value of <0.001. The total post-operative ICU admissions were able to sustain head for more than 5 sec. This was not significant with P-value of <0.001. The post-operative ICU admissions had hypotension was not significant with P-value of <0.001. In post-operative ICU admissions, tachycardia in was not significant with P-value of <0.001. Maximum number of hospital stay was 2-4 days of total post-operative ICU admissions. And minimum days for ICU stay was > 7 days This was significant with P-value of >0.001.

Conclusion: It was observed that the unplanned admission to ICU rates in thiscentre was 0.40%. The predominant reasons for unplanned post-operative admissions to ICU were intra-operative complications. Nearly 50% of admissions were purely for monitoring and observation. Early recognition of complications, timely intervention and timely intensive care and monitoring are essential to improve outcomes.

Keywords: Post-Surgical Admissions, Intensive Care Unit, Post-Operative.

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INTRODUCTION

The Intensive Care Unit (ICU) is a special unit primarily concerned with the care of patients with acute, recoverable, life- threatening, critical illness and injuries, which require constant close monitoring and support from specialized equipment and medications i.e., continuous artificial ventilation, vasopressors, inotropes, renal dialysis.[1] Over 40 % of ICU admissions are post–operative patients.[2,3] These admissions may result from the primary disease, intra-operative factors, anticipated or unanticipated peri-

operative complications or unrelated factors such as local hospital policy regarding admission of a sub-specialty. Appropriate triage of postoperative patients to intensive care may have a large impact on outcomes after surgery. It has been proven that ICU management reduces the mortality and morbidity by 60%.[4] Unanticipated post-operative ICU admission is generally taken as a quality control measure of overall peri-operative anaesthetic care. The reasons for unplanned ICU admission are multi-factorial occurring in the pre-, intra- and post-operative period being an amalgamation of inherent risk factors surrounding a combination of coincidences and even misjudgments in the peri-operative period. Many may be beyond the scope of the Anaesthesiologist's role in patient care.[2,5] Thus, to formulate preventative strategies for high risk groups, information must be gathered on how clinicians identify patients in the peri-operative period (or fail to identify patients) who require admission to ICU. This gives a rough guide to the patients needing post-operative ICU admission. With this background, this study is undertaken to do a prospective evaluation of post-operative admissions in the Intensive Care Unit of a tertiary care hospital

MATERIALS AND METHODS

After the approval of Hospital Ethical Committee, the present study was conducted to evaluate all the post-operative admission in the Intensive Care Unit of a Tertiary Care Hospital for a period of one year (Nov 2013 and Nov 2014). All post-operative patients were divided into three groups:

Group 1: Informed Admissions: These patients were labelled the Planned Admission Group.

Group 2: Uninformed Admissions: The group of such patients was labelled as Unplanned Admission Group.

Group 3: Post-surgical Admissions: This includes those patients who were admitted to the ICU after forty-eight hours of the primary surgery for post-operative complications. These patients were labelled as Emergency Group.

Inclusion Criteria

1. All surgical patients admitted to ICU from Operating Room who needed intensive observation, management or monitoring in the post-operative period.
2. All patients who needed ICU care in view of unexpected peri-operative complications.
3. All patients with post-operative complications arising within forty-eight hours of primary surgery.

Exclusion Criteria

1. Patients already admitted to ICU for any other surgical/medical condition and who developed a surgical complication necessitating surgery
2. Paediatric cases (<12 years of age) in view of separate intensive care unit
3. Cardiac cases as these are routinely admitted to ICU post-operatively

Data Collection

At the time of admission to ICU, the following data were noted: demographic data, initial diagnosis, vital parameters, pre-operative and peri-operative variables were collected from patient's case sheet and anaesthesia case sheet. Additionally, various hemodyanamics variables, duration of stay at ICU and outcome of the patients were noted.

Data Analysis

All the statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 20. A p value of <0.05 was considered significant. Quantitative independent sample t-test was used to calculate mean and standard deviation.

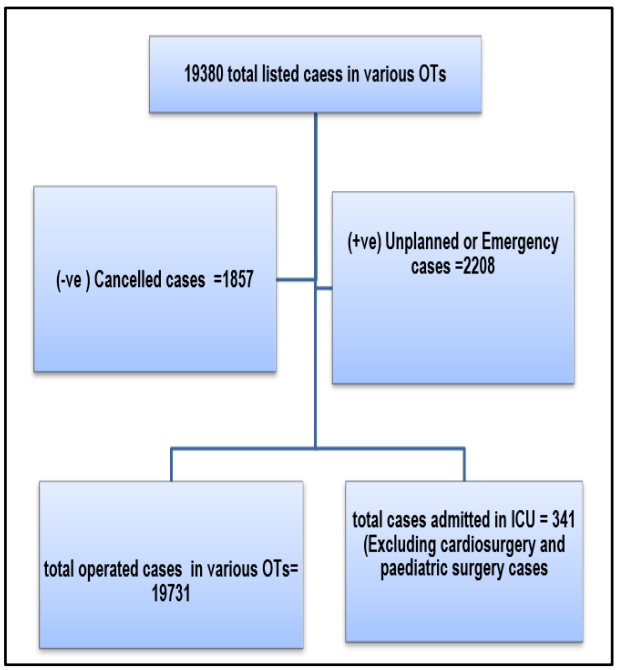

Figure 1: Distribution of cases

Table 1: Gender Distribution of ICU Admissions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	210	61.6	61.6	61.6
	Female	131	38.4	38.4	100.0
	Total	341	100.0	100.0	

Table 2: T-Test

Group Statistics	Nature of Admission to ICU (Planned/Unplanned)	N	Mean	Std. Deviation	Std. Error Mean	P-value
AGE	Planned	260	51.0154	16.33079	1.01279	0.506
	Unplanned	79	52.4430	17.84603	2.00783	
Hb%	Planned	260	12.1200	2.20811	.13694	<0.001
	Unplanned	79	11.1785	2.15440	.24239	
Duration of Anaesthesia in min.	Planned	260	305.94	126.581	7.850	< 0.001
	Unplanned	78	186.86	87.975	9.961	

Table 3: Nature of Admission to ICU (Planned/Unplanned) *Gender

			Gender		Total	P-value
			Male	Female		
Nature of Admission to ICU (Planned/Unplanned)	Planned	Count	161	99	260	0.199
		% of Total	47.2%	29.0%	76.2%	
	Unplanned	Count	49	30	79	
		% of Total	14.4%	8.8%	23.2%	
	Emergency	Count	0	2	2	
		% of Total	0.0%	0.6%	0.6%	
Total		Count	210	131	341	
		% of Total	61.6%	38.4%	100.0%	

Table 4: Post-Operative variables related to admissions in the ICU

Post-operative Variables		Frequency	Percent	P-value
Nature of Admission to ICU (Planned/Unplanned)	Planned	260	76.2	
SpO2 (< 90%)	Unplanned	79	23.2	<0.001
	Emergency	2	.6	
Causes of Post-operative ICU admissions	No	321	94.1	<0.001
	Yes	20	5.9	
Inability to maintain head tilt> 5 sec	Not reversed	53	15.5	<0.001
	Post Op Care	182	53.4	
	Not Reserved D/T	57	16.7	
	Others	49	14.4	
Hypotension (SBP< 80 mm Hg for more than 10 min)	No	220	64.52	<0.001
	Yes	121	35.5	
Tachycardia (HR>120/min for more than 10 min)	No	264	77.4	<0.001
	Yes	77	22.6	
Length of Stay at ICU (<1 day/1-2 days/ 2-4 days/ 4-7 days/ >7 days)	< 1 days	36	10.6	<0.001
	2-4 days	135	39.6	
	1-2 days	111	32.6	
	4-7 days	31	9.1	
	> 7 days	28	8.2	
Outcome of the patients (Discharge/ Death)	Death	45	13.2	<0.001
	Discharged to ward	296	86.8	

RESULTS

The present study is a prospective evaluation study conducted on 341 patients who were admitted in the ICU of a tertiary care hospital from the operating room. This study was conducted over a period of one year. The aim of this study was the prospective evaluation of post-operative admissions in the intensive care unit of a tertiary care hospital. During the one-year period from 20 Nov 2013 to 30 Nov 2014 the total listed cases in various OTs were 19380, cancelled cases 1857 and unplanned or emergency cases were 2208. Emergency cases were mostly of gynecology and obstetrics, Gastro-Intestinal surgery, Neurosurgery, Vascular surgery, Ear-Nose-Throat surgery and some Reconstructive surgery.

On the basis of gender distribution more males were admitted in the ICU (61.6% in compare to 38.4% females) among the total ICU admissions within a year. (Table 1)

Mean age for planned ICU admission is 51.02 ± 16.33 yrs; for unplanned it is 52.44 ± 17.85 yrs. Gender wise, the mean age for males for ICU admission is 52.77 ± 16.52 yrs and for females it is 49.05 ± 16.87 yrs. This is significant with P-value of 0.506. (Table 2)

For hemoglobin percentage (Hb%) mean value is 12.12 ± 2.21 gm% (male =12.21 ± 2.36 gm% and female = 11.42 ± 1.91 gm%) in planned admissions and in unplanned admission it is 11.18 ± 2.15 gm%. This is not significant with P-value of<0.001. The average duration of anaesthesia (in minutes) is more in planned admissions (305.94±126.58 mins in compare to 186.86±87.97 mins in unplanned admissions) of total post-operative ICU admissions. This is not significant with P-value of< 0.001. (Table 3) In planned admission to ICU, males are 47.2%, females 29.0%, in unplanned admissions male are 14.4%, female 8.8% and in emergency condition males are 0.0%, females 0.6%. This is significant with P-value of>0.001.

The post-operative Oxygen desaturation was not significant with P-value of <0.001. The post-operative admissions were not significant with P-value of <0.001. The total post-operative ICU admissions were able to sustain head for more than 5 sec. This was not significant with P-value of <0.001. The post-operative ICU admissions had hypotension was not significant with P-value of <0.001. In post-operative ICU admissions, tachycardia in was not significant with P-value of <0.001. Maximum number of hospital stay was 2-4 days of total post-operative ICU admissions. And minimum days for ICU stay was > 7 days This was significant with P-value of >0.001. (Table 4)

DISCUSSION

The Intensive Care Unit (ICU) is a special unit primarily concerned with the care of patients with critical illness.[1] The cost of caring for ICU patients is estimated to be three to five times more than conventional ward care.[6] Relatively attention should, therefore, be directed to improving patient selection for ICU admission.[7]

The present study is a prospective evaluation study conducted on 341 patients who were admitted in the ICU of a tertiary care hospital from the operating room. On the basis of gender

distribution more males were admitted in the ICU (61.6% in compare to 38.4% females) among the total ICU admissions within a year. Mean age for planned ICU admission is 51.02 ± 16.33 yrs; for unplanned it is 52.44 ± 17.85 yrs. Gender wise, the mean age for males for ICU admission is 52.77 ± 16.52 yrs and for females it is 49.05 ± 16.87 yrs. This is significant with P-value of 0.506. For hemoglobin percentage in planned admissions and in unplanned admission was not significant with P-value of<0. 001.The average duration of anaesthesia is more in planned admissions of total post-operative ICU admissions. This was not significant with P-value of< 0.001. In planned admission to ICU, males are 47.2%, females 29.0%, in unplanned admissions male are 14.4%, female 8.8% and in emergency condition males are 0.0%, females 0.6%. This was significant with P-value of>0.001. The post-operative Oxygen desaturation was not significant with P-value of <0.001. The post-operative admissions were not significant with P-value of <0.001. The total post-operative ICU admissions were able to sustain head for more than 5 sec. This was not significant with P-value of <0.001. The post-operative ICU admissions had hypotension was not significant with P-value of <0.001. In post-operative ICU admissions, tachycardia in was not significant with P-value of <0.001. Maximum number of hospital stay was 2-4 days of total post-operative ICU admissions. And minimum days for ICU stay was > 7 days This was significant with P-value of >0.001.

The mean age of post-operative patients admitted to the ICU of this Institution was 50.94 years. This is slightly lower compared to other studies who have variously reported a mean age of 60 years[7] and more than 60 years.[8,9] This discrepancy may be due to the Institution being a service hospital, catering mainly to the younger serving persons. Ejiro BA et al reported a mean age of 45 years but their study had included post-operative pediatric patients.[10]

In the present study it was observed that compared with the reference population, the rate of post-operative ICU admission was higher in patients who were male (male 61.6% v/s female 38.4%).The reasons postulated for males having a greater risk are varied.[7,11] In this study it was observed that maximum post-operative admissions were neuro-surgery (49.3%). This observation is different with other studies where 74.5 % of the total number of post-operative intensive care unit admissions had undergone abdominal surgery.[7,11]

Post-operative oxygen de-saturation was found in 5.9% (20 out of 341) patients. In the present study, it was found that, the patients who were unable to sustain head tilt, were more in the planned admission group 25.2%[12] as compared to 20.8%[9] and 0.6%[13] patients of unplanned and emergency admission group respectively. Keith Rose and colleagues and Swann D and colleagues, however observed that main unplanned ICU admissions are mainly due to respiratory events.[2,3]

The study by James K and colleagues who reported an incidence of 22% hypotension and 7.5% abnormal heart rate in post-operative patients.[14]

The incidence of postoperative pulmonary oedema more in younger or pediatrics patients.[15]

There is wide variation in the length of stay of the post-operative patients in ICU. In the current study, the length of ICU stay of 2-4 days is 39.6% of 341 (total ICU admissions). This correlates with the study by U V Okafor et al. where the average duration of postoperative ICU admissions is 3.2 days[16] and study of Jacobson T et al who observed the lengths of intensive care and hospital stay as 4.4 days.[17]

Mortality rates reported in the literature again vary with rate of 31% in a Nigerians study[18] and 36% in a study from Mumbai, India.[7]

CONCLUSION

Post-operative surgical patients continue to make up a substantial proportion of ICU admissions in most hospitals. Beds are limited, being 8-10% of the total hospital beds. Attention should, therefore, be directed to improving patient selection for ICU admission. In conclusion, it was observed that the unplanned admission to ICU rates in this centre was 0.40% (n=79/19731). The predominant reasons for unplanned post-operative admissions to ICU were intra-operative complications. Nearly 50% of admissions were purely for monitoring and observation. Early recognition of complications, timely intervention and timely intensive care and monitoring are essential to improve outcomes.

REFERENCES

1. Smith G, Nielsen M. ABC of intensive care, Criteria for admission. British Medical Journal 1999; 318 (7197):1544-7.

2. Rose K, Byrick RJ, Cohen MM. Planned and unplanned postoperative admissions to critical care for mechanical ventilation. Can J Anesth 1996; 43: 333-40.

3. Swann D, Houston P, Goldberg J. Audit of intensive care unit admissions from the operating room. Can J Anaesth 1993;40(2):137-41.

4. Jhanji S, Thomas B, Ely A, Watson D, Hinds CJ, Pearse RM. Mortality and utilisation of critical care resources amongst high-risk surgical patients in a large NHS trust. Anaesthesia 2008; 63: 695-700.

5. Wanderer JP, Anderson DJ, Levine W, Bittner EA. Development and validation of an intraoperative predictive model for unplanned postoperative intensive care. Anesthesiology 2013;119(3):516-24.

6. Nightingale P, Denis E. Healy T, Cohen PJ. A Practice of Anaesthesia. London: J. Critical Care 1996;1309-45.

7. Satyawan AB, Shinde VS, Chaudhary LS. Audit of intensive care unit admissions from the operating room; Indian J. Anaesth 2006;50(3):193-200.

8. Piercy M, Lau S, Loh F. Unplanned admission to intensive care unit in postoperative patients – an indicator of quality of anaesthetic care. Anaesth Intensive Care 2006; 34:592-8.

9. Haller G, Myles DS, Langley J, et al. Assessment of an unplanned admission to the intensive care unit as a global safety indicator in surgical patients. Anaesth Intensive Care 2008;36:199-200.

10. Ejiro BA and Endomwonyi NP. Audit Of Intensive Care Unit (ICU) Admissions From The Operating Room; JMBR: A Peer review Journal of Biomedical Sciences 2012;11(2):9-17.

11. Forrest J, Rehder K, CahalanM. Multicenter study of General Anesthesia. Predictors of severe perioperative adverse outcomes. Anesthesiology 1992;76:3-15.

12. David LR, Guerrero EB, Bodian CA, et al. Intra-operative tachycardia and hypotension are independently associated with adverse outcomes in noncardiac surgery of long duration. Anesth Analg 2002;95:273–7.

13. Chandra A, Mangam S, Marzouk D. A review of risk scoring systems utilised in patients undergoing gastrointestinal surgery. J Gastrointest Surg 2009; 13:1529-38.
14. James K, Bellomo R, Poustie S, Story DA, McNicol PL. The Epidemiology of Major Early Adverse Physiological Events After Surgery. Critical Care and Resuscitation 2000; 2:108-13.
15. Azarfarin R, Ashouri N, Totonchi Z, Bakhshandeh H, Yaghoubi A. Factors influencing prolonged ICU stay after open heart surgery. Res Cardiovasc Med 2014;3(4):201-59.
16. Okafor UV. An audit of unplanned postoperative intensive care unit admissions in Enugu, Nigeria: Causes and outcome. Southern African Journal of Critical Care 2009;25(1).
17. Jakobson T, Karjagin J, Vipp L, et al. post-operative complications and mortality after major gastro-intestinal surgery. J. Medici 2014; 50(2):111–7.
18. Khuri SF, Henderson WG, DePalma RG, Mosca C, Healey NA, Kumbhani DJ. Determinants of long-term survival after major surgery and the adverse effect of postoperative complications. Ann Surg 2005;242(3):326-43.

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