Original Article

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Postoperative Outcome of High Risk Patients in the Intensive Care Unit: A Retrospective Study

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Abstract

Background: This study was to evaluate the postoperative clinical outcome of high risk surgical patients admitted to Intensive Care Unit (ICU). *Methodology:* This retrospective study reviewed the details of all the 501 postoperative patients admitted to the ICU during a one year period during 2016. The data analyzed were the age and gender distribution, American Society of Anaesthesiologists (ASA) physical status, surgical specialty, emergency or elective nature, type of anesthesia, inotropic and ventilator support provided and the clinical outcome was evaluated. *Results:* Among the 501 patients admitted to the ICU, majority were of the age 51-70 years with a male predominance of 56.1%. Majority of the patients were of ASA grade II, followed by III and IV. 79.7% were general surgical patients followed by urologic and ENT patients (5.9% each). 73.3% of patients were operated as elective procedure, and the rest were done as emergency. Most of the patients were operated under general anaesthesia (92.6%) and the remaining was administered regional. 9.98% patients required hemodynamic instability with inotropic support and 51.09% required ventilator support. The clinical outcome was graded as good (57.5%), fair (36.1%) and poor (6.4%) depending on whether the patient was shifted to the postoperative ward, concerned specialty ICU or expired. *Conclusions:* Increasing ASA physical status, hemodynamic instability requiring inotropic and ventilatory support was found to be bad predictors in the outcome of these patients. Choice of anaesthetictechnique did not have a significant effect in the postoperative outcome.

Keywords: Postoperative Outcome; High Risk Patients; Intensive Care Unit.

Introduction

Patients undergoing high risk surgical procedures are mostly shifted to Intensive Care Unit (ICU) postoperatively for their continued monitoring and supportive care. High-risk non-cardiac surgical procedures represent a large proportion of ICU admissions in the developed world [1]. Postoperative outcomes are often related to patient factors, nature of the surgery, American Society of Anesthesiologists (ASA) physical status, elective versus emergency nature of surgery and type of anaesthesia administered. Perioperative factors such as the requirement of inotropic and ventilatory support also determine the postoperative outcome of these patients. Good postoperative care in the ICU can reduce the postoperative morbidity and mortality by early recognition and proper management of postoperative complications. This study is aimed at identifying the factors that determine the outcome of high risk surgical patients shifted to the ICU for their post-operative care.

Materials and Methods

This retrospective study was conducted in the Anaesthesiology Intensive Care Unit (AICU) of Government Medical college Hospital, Thrissur, India, which is a 1500 bedded tertiary care teaching hospital. AICU is a three bedded unit attached to the major operation theatre complex, where critically ill postoperative patients are taken care for under the direct supervision of the anaesthesiologist. Patients admitted to AICU included

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general surgical, orthopedic, neurosurgical, ENT, urologic and obstetrics patients. Case records of all the patients directly admitted to AICU from the operating room (OR) during a one year period from January to December 2016 were analysed in the study.

The data collected were the age of the patient, gender distribution, American Society of Anaesthesio-logists (ASA) physical status, surgical specialty, type of the procedure, emergency or elective nature of the surgery and the type of anesthesia administered. Details of inotropic and ventilatory support given to these patients in the ICU were also recorded.

Statistical analysis was made with Statistical Package for Social Sciences (SPSS) software version 21.0. Descriptive statistics were given as numbers and percentage for categorical variables or as the mean ± standard deviation and median for numeric variables.

Results

During the one year study period, a total of 501 patients were directly admitted to the AICU from the operating room. Among this, 281(56.1%) were male and 220(43.9%) were female patients. Majority of the patients were of the age group 51-60 years and 61-70 years (124, 24.8% each) followed by 41-50 years (94, 18.8%). Regarding ASA physical status, 10(2.0%) patients were of Grade I, 247(49.3%) were of Grade II, 130 (25.9%) were Grade III, 105(20.9%) were Grade IV and 9 (1.9%) were Grade V.

Patients who underwent general surgical procedure with 399(79.7%) ranked the top among the AICU admissions which included laparotomy, thyroid and breast surgeries and chest trauma. This was followed by urological and ENT procedures (29 patients, 5.8% each), orthopedic procedures, 20 patients (4%), neurosurgical procedures, 18(3.6%) and obstetric patients, 6(1.2%).

Of the total 501 patients, 367 (73.3%) patients had undergone elective surgery, whereas 134(26.7%) patients had it as emergency procedure.

While 464(92.6%) patients underwent surgery under general anaesthesia, 37 patients (7.4%) were operated under regional anesthesia.

Among the 501 patients, 50(9.98%) required inotropic support and the rest 451(90.02) did not require inotropic support. While 256(51.09%) patients required ventilatory support, 245(48.91%) patients did not require this.

The clinical outcome of the patients studied was graded under three categories as follows. Good outcome was graded to those who were shifted to the postoperative ward after stabilization from AICU. Those who were stabilized, but later shifted to the concerned specialty ICU for continued care was graded to have fair outcome. Patients who expired in the AICU were graded with a poor outcome.

Of the total 501 patients admitted to the AICU, the overall clinical outcome was as follows. 288(57.5%) patients were shifted to the postoperative ward that had good outcome, 181(36.1%) patients were shifted to the concerned specialty ICU, who had fair outcome and 32(6.4%) patients expired in the AICU who had poor outcome.

The clinical outcome as per ASA physical status was as follows. Among the 10 patients belonging to ASA Grade I, 6(60%) had good outcome and 4(40%) had fair outcome. None of the ASA Grade I patients had poor outcome. Of the 247 patients of ASA Grade II, 175(70.9%) had good outcome, 70(28.3%) had fair outcome and 2(0.8%) had poor outcome. Of the 130 patients of ASA Grade III, 75(57.7%) had good outcome, 48(36.9%) had fair outcome and 7(5.4%) had poor outcome. Of the 105 patients of ASA Grade IV, 32(30.5%) had good outcome, 59(56.2%) had fair outcome and 14(13.3%) had poor outcome. All the 9(100%) patients of ASA Grade V had poor outcome.

The clinical outcome as per the type anaesthesia was as follows Out of the 464 patients who underwent surgical procedures under general anaesthesia, 261(56.3%) had good outcome, 173(37.3%) had fair outcome and 30(6.5%) had poor outcome. Out of the 37 patients who underwent surgical procedures under regional anaesthesia, 27(73.0%) had good outcome, 8(21.6%) had fair outcome and 2(5.4%) had poor outcome.

Of the 50 patients who required inotropic support, 8 (16.0%) had good outcome, 15(30.0%) had fair outcome and 27(54.0%) had poor outcome. Of those 451 patients who did not require inotropic support, 280(62.1%) had good outcome, 166(36.8%) had fair outcome and 5(1.1%) had poor outcome.

Among the 256 patients who required ventilatory support, 124(48.4%) had good outcome, 100(39.1%) had fair outcome and 32(12.5%) had poor outcome. Among the 245 patients who did not require ventilatory support, 164(66.9%) had good outcome, 81(33.1%) had fair outcome.

Of the 501 patients studied, the overall outcome revealed good in 288(57.5%) patients, who were shifted to the postoperative ward, fair in 181(36.1%), who were shifted to the concerned specialty ICU and poor in 32 (6.4%), who expired in the AICU.

Table 1: Age wise distribution

Age	No. of patients	Percentage
0-10	8	1.6
11-20	15	3.0
21-30	29	5.8
31-40	61	12.2
41-50	94	18.8
51-60	124	24.8
61-70	124	24.8
71-80	46	9.2
Total	501	100.0

Table 2: Distribution as per ASA Grade

ASA Grade	No. of patients	Percentage
I	10	2.0
II	247	49.3
III	130	25.9
IV	105	20.9
V	9	1.9
Total	501	100.0

Table 3: Department Distribution

Department	No. of patients	Percentage
General Surgery	399	79.6
Urology	29	5.8
ENT	29	5.8
Orthopaedics	20	4.0
Nerosurgery	18	3.6
Obstetrics	6	1.2

Table 4: Type of Anaesthesia

Anaesthesia	Frequency	Percentage
General Anaesthesia	464	92.6
Regional Anaesthesia	37	7.4
Total	501	100.0

Table 5: Inotropic Support

Inotropic Support	Frequency	Percentage
Yes	50	9.98
No	451	90.02
Total	501	100.0

Table 6: Ventilatory support

Ventilatory Support	Frequency	Percentage
Yes	256	51.09
No	245	48.91
Total	501	100.0

Table 7: Clinical Outcome as per ASA physical status

Outcome	ASA Physical status Grade									
	I		II		III		IV		V	
	No.	%	No.	%	No.	%	No.	%	No.	%
Good	6	60.0	175	70.9	75	57.7	32	30.5	0	0.0
Fair	4	40.0	70	28.3	48	36.9	59	56.2	0	0.0
Poor	0	0.0	2	0.8	7	5.4	14	13.3	9	100.0
Total	10	100	247	100	130	100	105	100	9	100

Total no. of Patients: 501
Chi square = 189.632**; p-value < 0.001
** significant at 0.01 level

Table 8: Clinical Outcome as per Type of anaesthesia

Outcome	Type of Anesthesia				Total	
	General		Regional			
	No.	%	No.	%	No.	%
Good	261	56.3	27	73.0	288	57.5
Fair	173	37.3	8	21.6	181	36.1
Poor	30	6.5	2	5.4	32	6.4
Total	464	100.0	37	100.0	501	100.0

Chi square = 4.054^{ns}; p-value = 0.132*ns non- significant at 0.05 level*

Table 9: Clinical Outcome as per Inotropic support

Outcome	Inotropic support				Total	
	Yes		No			
	No.	%	No.	%	No.	%
Good	8	16.0	280	62.1	288	57.5
Fair	15	30.0	166	36.8	181	36.1
Poor	27	54.0	5	1.1	32	6.4
Total	50	100.0	451	100.0	501	100.0

Chi square = 214.342**; p-value < 0.001, *** significant at 0.01 level*

Table 10: Clinical Outcome as per Ventilatory Support

Outcome	Ventilatory Support				Total	
	Yes		No			
	No.	%	No.	%	No.	%
Good	124	48.4	164	66.9	288	57.5
Fair	100	39.1	81	33.1	181	36.1
Poor	32	12.5	0	0.0	32	6.4
Total	256	100.0	245	100.0	501	100.0

Chi square = 39.327**; P-value < 0.001, ***significant at 0.01 level*

Fig. 1: Gender wise distribution

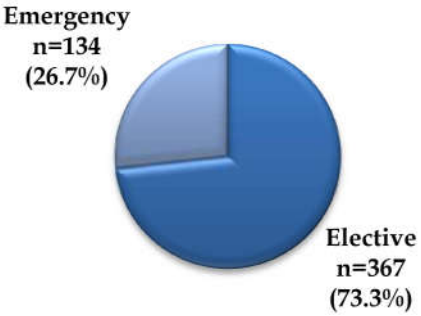

Fig. 2: Emergency versus elective surgery

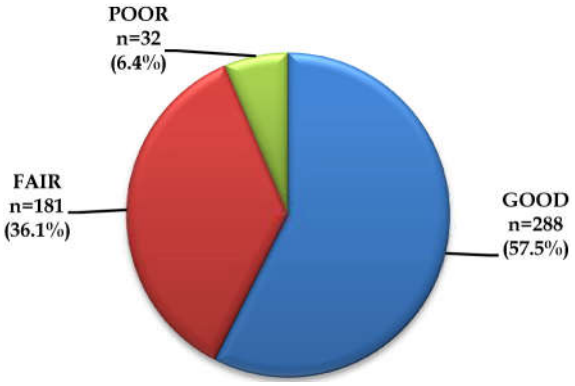

Fig. 3: Overall Clinical Outcome

Discussion

It is a common practice to shift high risk postoperative surgical patients to ICU for continued monitoring and providing better postoperative care and providing analgesia. The ratio of postoperative ICU admissions varies according to centers and the available ICU facilities. The vast majority of postoperative patients in this studywere those who underwent major abdominal surgery which carried a higher mortality rate, which is comparable to similar studies. It is reported that gastrointestinal and neurosurgical procedures are associated with higher

postoperative morbidity and mortality which require better postoperative care [2].

The higher incidence of AICU admissions in the age group of 51-70 years may be due to the higher incidence of co-morbidities which may add to the perioperative risk factors of these patients. As pediatric patients are routinely managed in separate ICUs, may be contribute to the lower incidence of these patients in this study. The gender distribution amongst the patients was comparable with a male dominance of 56%, which is common in similar studies [3].

ASA classification, which is a reflection of the severity of preoperative comorbidities,has been recognized as a predictor of postoperative morbidity and mortality [4]. Most of the patients in this study belonged to ASA grade II which is similar in comparable studies [2]. ASA grade I is a normal healthy patient and none of them had a poor outcome. On the contrary, ASA grade V patients are moribund and is not expected to survive may be the reason for 100% poor outcome in this group. The study showed a poor outcome as the ASA grading is increasing as shown by p value <0.001. This reflects the severity of the preoperative physical condition of the patientas the ASA grade increases [5].

This study showed a very high incidence of elective postoperative cases to be admitted in the ICU (73.3%) when compared to emergency cases (26.7%), which is comparable to the study by Uzman Set al. However in many studies emergency cases exceed elective cases in ICU admissions with higher risk of mortality [6]. The higher incidence of elective cases may be due to the better postoperative planning of these high risk cases, which require close monitoring and better care. The lesser incidence of emergency cases in the ICU admission may be due to the non-availability of ICU beds in such situations, which may be previously occupied. Hence increasing the number of ICU beds will result in providing better care for these high risk emergency post-operative cases.

The type of anaesthesia administered to the patients was evaluated in the study, which showed a very high rate of general anaesthesia (92.6%), when compared to regional anaesthesia (7.4%), which is also comparable in some studies [2]. The reason for which is that these high risk patients being shifted to ICU postoperatively tolerate regional anaesthesia poor and hence general anaesthesia is mostly preferred. However, statistical analysis showed no significant differences in the clinical outcome as per the type of anesthetic technique administered (p value 0.132). From this, it can be concluded that preoperative patient condition as determined by the ASA grade is a major factor in the clinical outcome than the choice of anaesthetic technique.

Intraoperative hemodynamic instability as assessed by the requirement of inotropic support was studied, which showed that 90.02% of the patients did not require this, which had a better outcome.The clinical outcome was poor in those who required inotropic support (9.98%) as shown by a significant p value < 0.001. Hemodynamic instability with use of inotropic supportindicates a poor prognostic factor in postoperative patients and is associated with increased mortality and major postoperative morbidity in similar studies [7,8].

Ventilatory support was required in 51.09% of patients in the postoperative period whereas 48.91% did not require this. Among those ventilated patients, there was a mortality of 12.5%, while none of the patients expired in the other group, which is statistically significant with p value < 0.001. Association betweenmechanical ventilation and clinical outcome in patients undergoing abdominal surgery are similar in other studies also [9].

Conclusion

Increasing ASA physical statuswas found to have a worse clinical outcome in high risk post-operative surgical patients shifted to the ICU. Hemodynamic instability requiring inotropic support and ventilatory support were also found to be bad predictors in the outcome of these patients. However, the choice of anaesthetic technique, whether general or regional do not have significant influence in the outcome of these patients.

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