

**"AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE"-RETROSPECTIVE
ANALYSIS OF EMERGENCY SURGERIES PERFORMED IN A TERTIARY CARE
TEACHING HOSPITAL.**

¹Dr. James Chacko, MBBS, DNB, DA, DCH, ²*Dr. Asish Karthik, MD, FCA, FIPM, ³Dr. Dhanesh S., MBBS, MD, ⁴Dr. Sruthy Unni, MBBS, ⁵Dr. Randeep A. M., MBBS and ⁶Aparna Satish, MBBS

¹Associate Professor, Department of Anesthesiology, Government Medical College, Thrissur, Kerala.

²Associate Professor, Department of Anesthesiology, Government Medical College, Thrissur, Kerala.

³Senior Resident, Department of Anesthesiology, Government Medical College, Thrissur, Kerala.

^{4,5,6}Junior Resident, Department of Anesthesiology, Government Medical College, Thrissur, Kerala.

***Corresponding Author: Dr. Asish Karthik**

Associate Professor, Department of Anesthesiology, Government Medical College, Thrissur, Kerala.

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ABSTRACT

Background: surgeries performed in emergency operating room are challenging, demands significant work force and quick mobilization of resources, causing significant brunt on health care system. Can we reduce this patient load and damages? We performed a retrospective analysis of a year's data in search of an answer. **Methods:** A retrospective chart review of 2026 patients who underwent emergency surgery in a tertiary care teaching hospital with a round the clock functioning EMD and operating room. We analyzed demographic data, type of anaesthesia, American Society of Anaesthesiologists physical status(ASA PS), intraoperative inotropic support,ICU admission and finally the patient outcome. **Results:** Only 70 (2.5%) of ASA PS I patients needed ICU admission. The incidence of ICU admission in ASA PS II category were 43 (6.1%) and ASA PS III category were 63 (21.6%). 260 (73.4%) of ASA PS IV needed ICU admission. 363 (42.9%) patients following general anaesthetic technique were admitted in the ICU postoperatively where as only 20(1.7%) patients needed ICU admission following regional anaesthesia. 69 (3.4%) patients among 2026 needed inotropic support during the study period of which 66 (95.7%) needed ICU admission postoperatively. **Conclusion:** This data confirm the association between increasing ASA PS designation and need for postoperative intensive care. General anesthetic techniques and intraoperative inotropes also led to more incidences of postoperative ICU admissions and poor outcome emphasizing the significance of preventive strategies and early resuscitation.

KEYWORDS: ASA PS, Anaesthesia, Emergency surgery, outcome,

INTRODUCTION

Patients who undergo non-cardiac emergency surgical procedures represent a large proportion of admissions to intensive care units (ICUs) with the aim of providing highest level of postoperative care. However, accurately identifying which patients are at high risk of complications or death after major surgery remains difficult. Postoperative outcomes are a result of the complex interplay between surgical procedures performed, elective and emergent nature and perioperative events. Outcomes may also be influenced by aspects of the particular healthcare system, such as the surgical procedure, volume of patients treated, institutional protocols as well as the availability and optimal use of intensive care beds. Appropriate triage of patients to intensive care postoperatively may have a large impact on outcomes.

Predictors of postoperative outcomes may be divided into three categories; preoperative risk factors, risk associated with the specific surgical procedure and the unique aspects of each operative case. This may predict patient's risk being high risk for complications or death after surgery.^[1] An unplanned admission to an intensive care unit within 24 hours of surgery is an event that most patients and physicians would consider as an important adverse outcome. Early recognition and intervention remains the key to avoidance of unfavorable outcome.^[2] Postoperative outcomes are related to the nature of the surgery, surgical procedure performed, previous health of the patient and specific intra- and postoperative events.^[3]

The American Society of Anesthesiologists Physical Status score (PS) is an attempt to quantify preoperative illness for patients receiving anesthetics, taking into consideration all preoperative factors of significance.

Previous studies have shown that increasing ASA Physical Status scores were associated with an increased risk of mortality following anesthesia and surgery. Patients undergoing high-risk, noncardiac surgery constitute a significant part of intensive care unit (ICU) admissions.^[4] ASA physical status and emergency surgery are recognized predictive factors of mortality.^[5]

In 2000, Rodgers and colleagues published an extensive meta-analysis showing a reduction in postoperative mortality and morbidity with neuraxial anaesthesia with the subsequent recommendation of more widespread use of neuraxial anaesthesia. Spinal anaesthesia is the preferred anesthetic method for sub-umbilical surgery, particularly in elderly patients and parturients. Peripheral nerve blocks and local anaesthesia have very few cardiovascular or pulmonary side effects. In experienced hands, it seems likely that peripheral nerve block would be safer than general anaesthesia due primarily to the avoidance of airway management.^[6]

Evidence for reduced incidence of major complications when regional anesthesia is compared with general anesthesia is mixed. Initial functional gain with improved acute pain management but no long-term functional difference appears to be a typical pattern.^[7] we analyzed the nature of cases, type of anesthesia, in emergency surgeries and tried to find any particular associations or patterns in their course perioperatively and admission to ICU, hemodynamic support and their final outcome.

MATERIALS AND METHODS

This retrospective observational study was carried out in the Govt. medical college Hospital, Thrissur, a 1500 bedded tertiary care teaching hospital during the period of one year (1st January 2016 to 31st December 2016). We reviewed the medical records of emergency operations performed and the ICU registers during the study period. All patients except gynecological and obstetric emergencies were included. We analyzed Postoperative ICU admissions from the emergency operating room, their hemodynamic and ventilator support initially and during their stay in hospital and followed up the outcome. Only the first admission was considered for the analysis.

We collected demographic data, type of surgery, and outcome of surgery as the patients needed ICU admission based on patient's ASA PS status, type of anaesthesia, need for mechanical ventilation and need for inotropic support. Data was collected by all the investigators and compiled by the chief investigator. statistical analysis was performed for the data after entering in the entered in Microsoft excel sheet.

RESULTS

During the study period, A total of 2026 emergency surgeries were done in our hospital. Among them 1560(77%) were males and 466(23%) were females. Age

wise distribution shows maximum incidence at age group 41-50 with 500(24.7%) followed by age group 31-40 with 373 (18.4%). Most common surgical procedure done in emergency operating room were orthopedic surgeries which constituted 792(39.1%). This was followed by 438 patients(21.6%) who underwent laparotomy under various reasons.

Of the 2026 patients 677 (33.4%) patients belonged to ASA-PS class I and 703 (34.7%) patients belonged to ASA-PS II. 292 (14.4%) patients were classified as ASA PS III and 354 (17.5%) were included in ASA-PS class IV. Only 70 (2.5%) of ASA-PS I patients needed ICU admission. The incidence of ICU admission in ASA-PS II category were 43 (6.1%) and ASA-PS III category were 63 (21.6%). It was observed that 260 (73.4%) of ASA-PS IV needed ICU admission.

846(41.8%) patients among 2026 underwent surgical procedure under general anesthesia and 1180 (58.2%) underwent surgery under regional anaesthesia. 363 (42.9%) patients following general anaesthetic technique were admitted in the ICU postoperatively where as only 20(1.7%) patients needed ICU admission following regional anesthesia. Only 69 (3.4%) patients among 2026 needed inotropic support during the study period of which 66 (95.7%) needed ICU admission postoperatively.

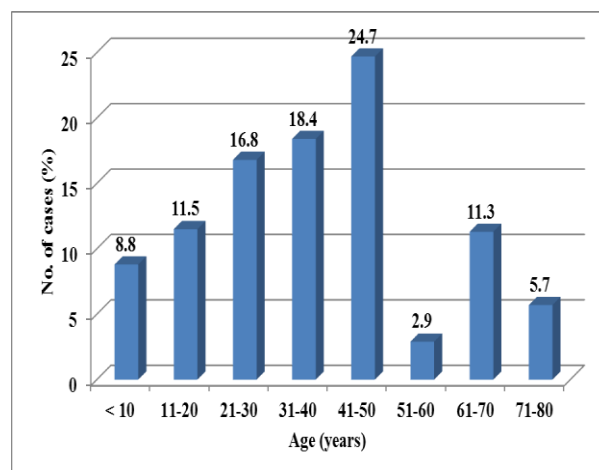


Figure: 1 Age wise distribution

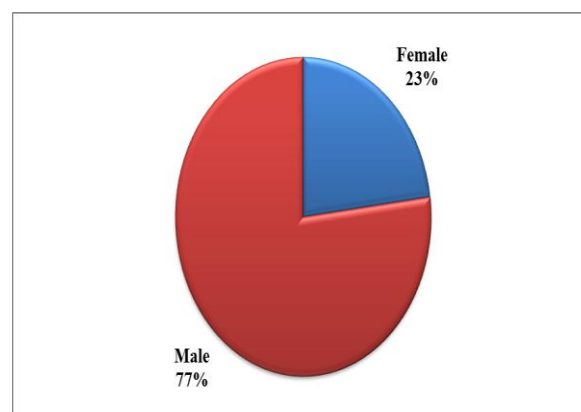
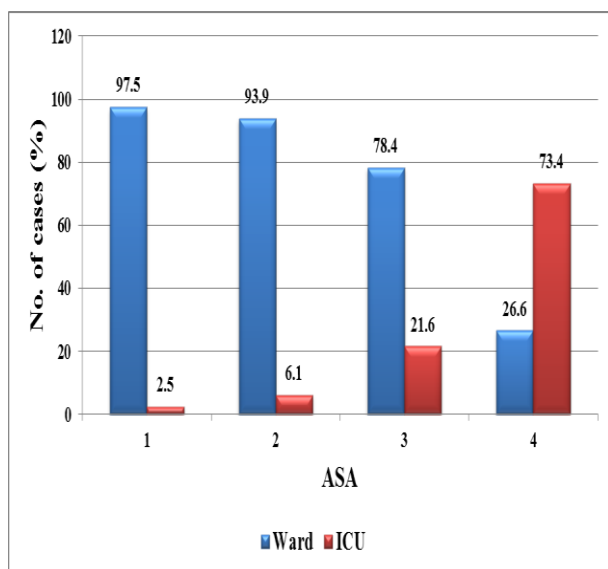
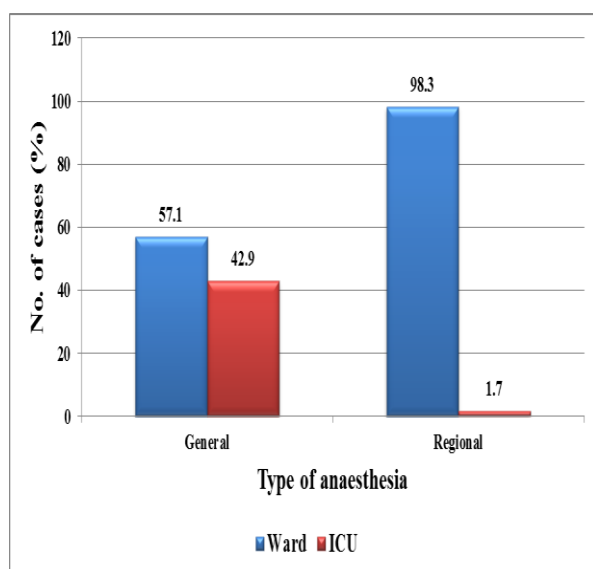
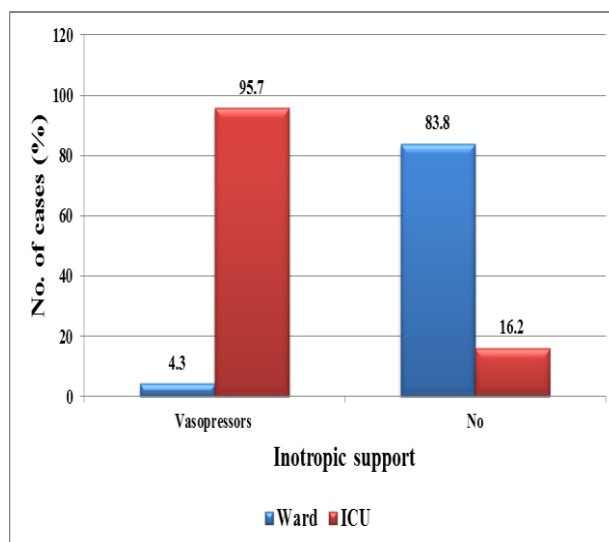


Figure: 2. Gender wise distribution

Table: 1. Type of surgery

Type	Frequency	Percent
General Surgical		
Laparotomy	438	21.6
Blunt Injury	16	0.8
Obstruction	94	4.6
Perforation	82	4.0
Stab injury	12	0.6
Neurosurgical	220	10.9
Orthopedics	792	39.1
ENT	75	3.7
Pediatrics Surgical	287	14.2
Ophthalmological	10	0.5
Total	2026	100.0

**Figure: 3 Outcome at different level of ASA****Figure: 4 Outcome according to Type of anaesthesia****Figure: 5. Outcome according to inotropic support**

DISCUSSION

Statistical analysis of demography revealed a peak incidence of 24.7% contributing from the age group of 41-50 followed by 18.4% from the age group 31-40 and 16.8% from the age group of 21-30. This shows that majority (59.9 %) of patients belonged to productive age group of 21-50 on whom the other family members are dependent. Males constituted 77%, pointing out that emergency procedure are more prevalent in an active sector of a typical Indian society in an urban area.

Analyzing type of surgeries, it was observed that the orthopedic surgeries top the list with 39.1%. From the history of cause, we observed that, trauma, assault and accidents, which are preventable, contributed to these injuries. In combination of neurosurgical emergencies mainly intra cranial bleeding evacuation and laparotomies from blunt injury constituted another 12.3%. In short 51.4% of total emergency surgeries are due to either trauma or accidents which would have been prevented with strict adherence to civic and traffic rules, use of personal protective devices at work place or travel and proper health education.

In this study we found out statistically significant association between increasing ASA PS status, type of anaesthesia, use of inotropes and postoperative course. The American Society of Anesthesiologists Physical Status (ASA PS), is assigned to patients prior to surgeries or procedures. ASA PS has been shown to correlate with anesthetic morbidity and perioperative outcomes.^[8,9] The current ASA PS classification was proposed by Dripps et al in 1961 and adopted by the ASA in 1962. In 1980, ASA PS class 6 was added to take into account the brain-stem-dead organ donor.^[10,11] The ASA PS score is a subjective assessment of a patient's overall health that is based on five classes.

Table: 2 ASA PS status classification^[12]

ASA PS	Patient's physical status
I	Patient is a completely healthy fit patient
II	Patient has mild systemic disease
III	Patient has severe systemic disease that is not incapacitating
IV	Patient has incapacitating disease that is a constant threat to life
V	A moribund patient who is not expected to live 24 hour with or without surgery
E	Emergency surgery, E is placed after the Roman numeral

It also correlates with the development of post-operative complications. Vacanti *et al.* and Marx *et al.* were the first who made an assignment of ASA class concerning operative lethality.^[13] The rate of postoperative complications was found to be closely related to the ASA class and with emergency surgeries.^[12,13] A. Sankar and colleagues, suggested moderate inter-rater reliability and supported its use as a measure of preoperative health status.^[14] This trend was observed for patients undergoing both elective and emergency procedures.^[8] from our observations also, a similar trend was noted, where patients accepted with higher grade of ASA-PS performed poor in ICU and needed higher incidence of inotropic support. This suggest that the best way to have a favourable outcome in any trauma or emergent procedure is to reduce the detrimental impact of initial injury, emphasizing more on the preventive and early interventional aspect of patient care.

Regarding type of anaesthesia on complications of surgery, studies favor both sides. In some circumstances general anaesthesia is associated with a reduced incidence of some complications, or conversely, the risk of complications of regional anaesthesia exceeds that of the risks of general anesthesia. The anaesthetist's ability to manage regional anaesthesia as well as general anaesthesia could also be an important factor In 1987, Yeager and colleagues showed a dramatically reduced mortality by epidural analgesia in high-risk surgical patients. In 2000, Rodgers and colleagues published an extensive meta-analysis showing a reduction in postoperative mortality and morbidity with neuraxial anaesthesia with the subsequent recommendation of more widespread use of neuraxial anaesthesia.^[7] Joanne Guay and colleagues found out neuraxial anaesthesia may reduce the mortality for patients undergoing a surgery.^[15]

Patient, surgical procedure and outcome are interdependent. One cannot extrapolate from one study of a certain outcome, in a defined or mixed patient population, undergoing a specific surgical procedure, Although deep vein thrombosis may be less frequent in regional anaesthesia patients undergoing lower extremity surgery, there is probably no difference for healthy patients undergoing upper body surgery.^[16] An authoritative review concluded that the ability of epidural analgesia to alter clinical outcome was unproven.^[17] We observed that, those who received regional Anaesthesia had better outcome than general Anaesthesia due to the following reasons. Patients who are undergoing general

anaesthesia presented to emergency department in a worse physical status (higher ASA grade) than those who received the regional anaesthesia and had to receive multiple drugs, with cardiac or respiratory implications.

Of the total 2026 patients 1643 patients went to ward and 383 admitted in ICU. Among the 1643 cases who received regional anaesthesia 95.7% patients does not require inotropes supporting the previous observation regional anesthesia have least complications. While those patients who needed inotropic support 95.7% were ICU cases. In our observation, those patients who are admitted in the emergency operating room with poor health and higher ASAPS status needed inotropic support and ICU care more often.

There were some limitations to our study, as our institute has separate casualty for gynecological and obstetric patients, our observations may not have the contributory data from that point. Similarly, we presented only a year's data, which may not be the exact cross-section of history and future.

CONCLUSION

Patients with higher ASA PS with General anesthetic techniques and intraoperative inotropic support led to higher incidence of post-operative ICU admissions. Our study confirmed the association between increasing ASA PS designation, inotropic support to maintain normal haemodynamics, need for initial ventilation to poorer post-operative outcome, all highlighting the need and emphasis of prevention and avoidance of risk factors.

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