INTENSIVE CARE UNIT SPECIALITY SPECIFIC UTILISATION PATTERN AND OUTCOME AT A TERTIARY CARE HOSPITAL: A RETROSPECTIVE OBSERVATIONAL STUDY

Anaesthesiology

Arpit Garg	MD Anesthesiology, Assistant Professor, Department of Anesthesiology and Critical Care, Command Hospital Lucknow.
Ajit Bhardwaj*	MD Anesthesiology, DM Neuroanesthesiology, Assistant Professor, Department of Anesthesiology and Critical Care, Command Hospital Lucknow. *Corresponding Author
Badal Parikh	MD Anesthesia, Assistant Professor, Department of Anesthesia and Critical Care, Army Hospital Research & Referral, New Delhi.
GC Satapathy	MD Anesthesiology, PDC Neuroanesthesia, Professor & Head, Department of Anesthesiology & Critical Care, Command Hospital Lucknow.

ABSTRACT

Introduction: The patterns for ICU admissions have been evolving and are quite diverse. Our study is aimed at contributing to the pool of data available about Indian ICU admission patterns.

Methodology: This study was conducted as a retrospective analysis of all patients admitted to our ICU during a 6 months duration. Data was collected from ICU admission and discharge register and analysed with MS Excel.

Result: A total of 1312 patients were admitted to our ICU during study period of 6 months. Overall mortality during ICU stay was 211/1312 (16.08%).

Conclusion: There is wide variation among number of ICU admissions, mortality and speciality wise utilization in different ICUs. Reasons for the same are multifactorial like patient pattern, availability of other care areas, appreciation of need of ICU services by different specialities etc.

KEYWORDS

ICU Admission, Bed utilization, Mortality outcome.

INTRODUCTION

Critical Care as a speciality is relatively young, with history of being born in 1952/1953, when Bjorn Isben, an anaesthesiologist at Copenhagen, Denmark, moved out of Operation Theatre and used his skills during Polio Epidemic to save lives. (1) The first ICU at India was established at Army Hospital Delhi, in 1963, with Brigadier Rama Rao leading the change. (2) Intensive Care Unit (ICU) is a place where most critically ill patients are admitted providing them the benefit of best organised monitoring, interventions and skills, consolidated at a single place. Typically, best possible resources of any hospital, in the form of equipment and staffing are concentrated at ICU to extract maximum benefit for the most ill patients. Since the starting of ICUs in India, the standards and expectations have changed continuously, with more and more patients expecting and demanding ICU admissions, in hope of better outcomes. The numbers of ICUs and ICU beds have steadily progressed in the country, making it more and more accessible to the critically ill patients.

Today, with the rising numbers of ICU beds, more and more patients are being admitted to ICUs in India. The patterns for ICU admissions have been evolving and are quite diverse. (3,4) ICUs are grouped with different nomenclatures like Medical/Surgical ICU, Cardiac surgery/Coronary care units, Stroke/Neuro ICUs or other specific ICUs for different treating specialities. The admission patterns for such differing classes of ICUs are bound to be varying. Data is available for some such ICUs (3,4) but is scant in nature. Under the aegis of Indian Society Of Critical Care Medicine (ISCCM), a point prevalence study, involving large number of ICUs has been published to determine admission patterns of Indian ICUs. (5) Under this study, case mix of 124 ICUs, on a pre-determined day in each quarter of a year have been studied. Our study is aimed at contributing to the pool of data available about Indian ICU admission patterns to assist in planning and better understanding of ICU utilization in a developing country.

This study has been carried out at an 800 bedded tertiary care hospital in eastern Uttar Pradesh. Hospital has a 30 bedded adult ICU for medical as well as surgical patients. ICU is equipped with invasive and non-invasive ventilators, hemodynamic monitoring and support along with portable USG, digital Xray and other facilities. ICU is manned by Department of Anesthesiology and Critical Care and headed by Intensivist. Anesthesia residents are available round the clock with support from Medicine and Surgery residents. Admissions to ICU are done as per requirement by concerned specialists and managed by them with support by ICU staff.

MATERIAL AND METHODS

This study was conducted as a retrospective analysis of all patients admitted to our ICU during a 6 months duration from 01 Jun 2019 to 30 Nov 2019. Data was collected from ICU admission and discharge register and recorded on a MS Excel format designed for this study. Data in form of demographic stats, diagnosis on discharge/shift out, whether admission was directly to ICU or shifted from wards, primary treating speciality, length of stay, co-morbid conditions, and outcome was recorded.

RESULT

A total of 1312 patients were admitted to our ICU during study period of 6 months. Overall mortality during ICU stay was 211/1312 (16.08%). Out of 1312 patients admitted to ICU, 830(63.3%) were males, and 482(36.7%) were females. Mortality among male patients was 125/830(15.06%) and among female patients was 86/482 (17.84%). No of patients with age group upto 60 years was 718 (54.7%) and above 60 years was 594 (45.3%). Mortality among patients upto 60 years of age was 78/718(10.86%), and in patients above 60 years of age was 133/594(22.39%).

Distribution of patients as per primary treating speciality was analysed. (Figure 1) Patients treated by multiple specialities were considered under final treating speciality. Out of all patients admitted, 78% were primarily treated under medical specialities and 22% were treated under surgical specialities, with respective mortalities being 15 and 20%. Majority of patients were admitted under Cardiology (35%), followed by General Medicine (14%), Neuro surgery and Respiratory medicine (10% each), Nephrology (9%) and Neurology (7%). General surgery, Onco surgery and Gastroenterology contributed roughly 3% each to the total no of patients admitted. Gastrointestinal Surgery and Urosurgery both had approximately 2% share each in the total admissions.

Fig 1: Admission Share vs Bed Days Utilization
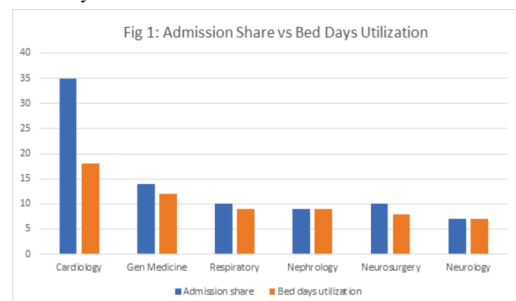
ICU bed days utilized by different specialities were assessed to better indicate utilization of ICU by different specialities. (Figure 1) Out of total bed days available in six months, cardiology utilized 18% of bed days, followed by General medicine (12%), Respiratory medicine and Nephrology (9% each), Neurosurgery (8%), Neurology (7%), General Surgery (3%), Onco surgery and Gastroenterology(2% each), and GI surgery utilized 1.6% of total ICU bed days available. Rest of the specialities utilized less than 1% of total ICU bed days available.

The average length of stay (ALOS) was assessed as per the treating speciality. Neurology, Nephrology, Respiratory medicine and General Surgery had ALOS between 4.1 to 4.4 days. General medicine, Gastroenterology, GI Surgery and Neuro surgery had ALOS between 3.2 to 3.5 days. Oncosurgery patients had ALOS of 2.6 days, and cardiology 2.2 days. Rest of the specialities had few number of patients to assess ALOS reliably.

Mortality analysis as per treating speciality was assessed and revealed wide variation in statistics which can be multifactorial. Neurology patients had high mortality at 32% amongst ICU patients, followed by GI surgery at 31%, General Medicine, General Surgery and Respiratory medicine at 26% each, and closely followed by Neurosurgery at 24% of admitted patients under there speciality. Oncosurgery had mortality of 15% patients, while Oncology patients had mortality of 36% patients among the nominal patients (total 11 patients) admitted under them. ENT and Gastroenterology had mortality of 11% each. Nephrology and Cardiology had mortality of 8% and 6% respectively. Urology and Gynaecology had no mortality amongst the 32 patients admitted under their speciality during the study period.

DISCUSSION
The demand for ICU care has been increasing tremendously and local statistical data is required for planning for the same. (6) Limited data is available from developing countries, and even lesser for Indian ICUs. (3,4,5,7, 8, 9) Different studies published from Indian hospitals have reported differing rates, varying from 1624 admissions on 13 beds in approximately two years to 241 admissions on 10 beds in six months duration.(3, 8) Our ICU handled 1312 admissions on 30 beds in six months duration, which is a huge number, and depicts the high number of beds availability and even higher turnover. It is pertinent to mention that utilization of Intensive Care Unit resources by different specialities and the outcome is dependent on multiple factors. Availability of ICU beds, ease of admission, workload pattern, referral hierarchy of hospital, capabilities of wards or step down areas and individual concepts and understanding of treating doctors, all play a role in admission pattern of any ICU.

Reported mortality among individual ICUs in developing countries differs from 27% to 61%. (3, 9) Our study shows mortality at 16%, which may indicate differing admission patterns. At our ICU, 6 beds are earmarked for Cardiology patients for observation after coronary angiography, with exceptionally good mortality outcome as compared to other ICU admissions. Data analysed after excluding all patients admitted under Cardiology, increased the mortality percentage from 16% to 21.7%, which is more comparable to other published data. Further, the severity of illness amongst patients admitted to different ICUs may be different, causing differences in mortality statistics.

Male preponderance (63%) in ICU admission was noted in our study, which is similar to a tertiary care hospital in North India (63%) and another at Nanded, Maharashtra (59%). (3, 7) The reasons for male preponderance at Indian ICUs may be debated. Age wise distribution of ICU admissions reported in our study is in confirmation with study by CK Jakhmola et al in 2019 which showed 53% of the admissions were under 60 years of age and 47% were above 60 years of age. (7) Teena Rajput etal , reported 65% patients under 60 years of age group while Poluyi EO et al reported 84% patients under 60 years of age from a West African tertiary care hospital ICU. (8,9) It appears that higher number of elderly patients are utilizing ICU services in our country as compared to other developed countries. It may be related to higher bed availability or social expectations and acceptance, among many other possible factors.

The distribution of patients between medical and surgical specialities in our study was 78% and 22% respectively, similar to patterns reported from North Indian ICU at 67% and 33% respectively. (7) Though the same is in stark contrast to only 18% patients admitted

under medicine from a West African ICU. (9) This may indicate different practise patterns and appreciation of need of ICU care by differing set of hospitals. Lower number of surgical patients in ICU may also be related to availability of separate post op care units or the kind of facilities available at wards. (7)

In our study, we calculated total no of bed days utilized by specific specialities to assess speciality wise utilization of ICU. A speciality with significantly higher ALOS at ICU would have occupied more stay at ICU, even with lesser percentage of admissions. In our study 35% admissions were under cardiology but the ICU bed days distribution for such patients was only 18%, indicating lesser occupancy of ICU beds by Cardiology patients as would have been apparent by higher number of admissions. This also indicates much faster turnover of cardiology patient at out ICU. This indicator may be better suited to assess utilization of ICU services, and may be included in further studies.

CONCLUSION
There is wide variation among number of ICU admissions, mortality and speciality wise utilization in different ICUs. Reasons for the same are multifactorial like patient pattern, availability of other care areas, appreciation of need of ICU services by different specialities and availability of beds, among others. Specialities like Cardiology and Neurology/Neuro surgery have higher utilization of ICU services followed by General medicine, nephrology and respiratory medicine. It may be considered to cater for or earmark higher number of beds for such specialities while organizing ICU setup. Utilisation of ICU bed days may be a better marker than admission percentage to assess ICU utilization. More and more similar studies are required to draw generalized inferences which may be possible with large amount of data.

REFERENCES
1. Reisner-Senelar L. 2011. The birth of intensive care medicine: Bjorn Ibsen's records. Intensive Care Med.
2. Miller's text book of anesthesia. 8th edition.
3. Dongre Ashwini, Inamdar IF. 2016. Morbidity pattern and outcome of patients admitted at Intensive care centre of a tertiary care hospital. IOSR Journal of Dental and Medical Sciences. Volume 15, Issue 10, Ver XII. Oct 2016.
4. B Maharani, A Lourdu Jafrin. 2017. Prescription pattern of patients admitted in the intensive care unit of a tertiary care hospital in Puducherry , India: A cross sectional study. International Journal of Basic and Clinical Pharmacology. Dec 2016. Volume 6, Issue 12, Pg 2822.
5. Jigeeshu V Divatia, Pravin R Amin. 2016. Intensive Care in India: The Indian intensive care case mix and Practise Patterns study. Indian Journal Of Critical Care Medicine. 2016 Apr: 20(4): 216-225.
6. Hinds CJ, Watson D. 1996. Planning , organisation and management of Intensive Care. In: A concise textbook. @nd Ed. WB Saunders Company Limited, London.
7. CK Jakhmola, Vishal Chaudhary. 2019. Intensive care unit admissions and outcome trends at a tertiary care hospital- A retrospective review. International Journal of scientific research. Volume 8 Issue 9. Sept 2019.
8. Teena Rajput, Fasiha Sohail. 2018. Admission Patterns and outcome in an adult intensive care unit in medical patients in Karachi. Journal of Anesthesia and Intensive care Medicine. Volume 7 Issue 2. August 2018.
9. Poluyi EO, Fadiran OO. 2016. Profile of Intensive Care Unit Admissions and Outcomes in atertiary care centre of a developing country in West Africa: A 5 year analysis. Journal of Intensive and Critical Care. Volume 2 No 3: 29. July 2016.