

Clinical profile and outcome in a paediatric intensive care unit in tertiary level centre of Bihar

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Abstract

Aim: To study was to analyze demographic profile and outcome in a tertiary care hospital Pediatric Intensive care (PICU) in Indira Gandhi Institute of Medical Sciences, Bihar.

Materials and Methods: This Retrospective study was carried out in Indira Gandhi Institute of Medical Sciences, Bihar from August 2018 to July 2019.

Results: A total of 384 patients were admitted during the period. Out of total admissions 246(64%) were male and 138(36%) were girls. Mechanical ventilation rate was 67(17.4%). 57 patients died in PICU given a mortality rate of 13.8%. The mean age was 5.2 years (ranging from 1 day to 14 years). Average length of Hospital stay was 8.26±6.6 days. Diagnoses included neurological (18.02%), respiratory (17.1%), renal (14.6%), infectious (9.8%), haematological (6.7%), cardiac (6.3%) other surgical (14.6%). Patients who died had statistically worse severity scores. Significant mortality risk factors were high inotropic score and PRISM III>10.

Conclusions: Demographic profile of our PICU patients showed similar characteristics as those of reported in different relevant studies with minor differences in few aspects. The overall results of this study are encouraging and development of new PICUs in our state is the need of the day.

Keywords: Pediatric intensive care unit, Pediatric risk of mortality PRISM III, Mortality.

Introduction

A paediatric intensive care unit (also paediatric), usually abbreviated to PICU, is an area within a hospital specializing in the care of critically ill infants, children, and teenagers.¹ There are studies documenting outcomes of Pediatric intensive care units (PICU) from other state of India² but no such studies are available from the Bihar. Parikh et al outlined significant issues in quality, cost and outcomes from an adult Intensive care unit (ICU) in India³ Pollack et al showed a better outcome of PICU patients in units where there was a paediatric intensivist and/or a paediatric intensive care fellowship programme.⁴ Numerous conditions that were previously fatal are now treatable. Moreover, there are references that support better outcome of PICU patients in tertiary centers, which led to the

development of a centralized system of PICUs worldwide.⁵⁻⁷

Aim of this retrospective study was to study the clinical profile of children admitted to the pediatric intensive care unit of Indira Gandhi institute of medical science and hospital, to find the disease distribution and the age distribution and the mortality rates.

Material and Methods

This retrospective study was carried out in Indira Gandhi institute of medical science and hospital, Bihar which is tertiary care centre of Bihar and Pediatric intensive care was started on august 2018. So we retrospectively analysed our PICU record from August 2018 to July 2019. A total of 384 patients were admitted during the period. Data collected on patients included: age, gender, admission and discharge

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diagnosis classified by system and etiology of the disease, elective or emergency status, admission source (same hospital, referral hospital, home), critical care management during the PICU stay, average length of the PICU stay, and duration of mechanical ventilation, as applicable. All patients underwent PRISM-III scoring.

Results

Among 384 patients admitted in the above time period, 246(64%) were male and 138(36%) were girls. The mean age was 5.24 years (ranging from 1 day to 14 years). Patient characteristics is shown in Table 1.

Table 1: Showing patients characteristics

Variables	Numbers
Admissions	384
Mean age (years)	8.26±6.6
Males (%)	246(64%)
Females (%)	138(36%)
Mean PRISM111 Score	16.5
PICU length of stay(days) average	8.26±6.6
Mortality (%)	13.8%

Of the total cases 330(86%) were medical cases and 54(14%) were surgical cases. Mechanical ventilation rate was 67(17.4%). The mean PRISM III score was 16.5 (6-34). The average length of PICU stay was 8.26±6.6 (ranging from 1 to 36) days. 57 patients died in PICU given a mortality rate of 13.8%. Patients admitted from hospital pediatric wards as internal patients had higher mortality rate compared to the patients taken from emergency department and operation theatre. 12 patients did not complete the treatment and got discharged against medical advice due to personal circumstances, were therefore, excluded from the study. 67(17.4%) patients were put on ventilator for various reason. Duration of mechanical ventilation was 7.62 ±2.6 days. Concerning the mode of death, the majority died from brain death due neurological problems (35.07%) including head trauma (4), central nervous system (CNS) infection (12), status epilepticus (4). 14 patients (24%) died from septicemia and multiple organ failure syndrome

(MOFS); 4 patients (7.01%) died due to LRTI. 8 patients (4%) died from intractable cardiac arrest and failed cardiopulmonary resuscitation (CPR) due to cardiac causes including acute myocarditis, complex congenital heart disease and dilated cardiomyopathy. 8 patients (14%) died due to acute kidney injury and related complications. 6 patients(10%) died due to Hepatic encephalopathy. Infancy, source of admission, diagnosis at admission, co morbidities, presence of syndrome, prior hospital or NICU admission, gastric ulcer prophylaxis, corticosteroid use, weren't found to be significant risk factors. Only the severity of the disease (PRISM III-24 score) and high inotropic score were found to be important independent predictors of mortality. The major diagnostic categories of medical patients were neurological 70(18.02%), respiratory 66(17.1%) and cardiac 24(6.3%), renal 54(14.6%), infectious 38(9.8%), hematological 26(6.7%), gastrointestinal 52(13%), others including surgical and trauma cases 54(14.6%). Various disease categories encountered are shown in Table 2. The bed occupancy rate was 84%. While 56% received vasoactive drugs.

Table 2: Disease categories requiring PICU admission

Disease Categories	Number of Patients
Neurological	70(18.02%)
Respiratory	66(17.1%)
Renal	54(14.6%)
Gastrointestinal	52(13%)
Infectious	38(9.8%)
Haematological	26(6.7%)
Cardiac	24(6.3%)
Others (surgical, trauma)	54(14.6%)

Discussion

The concept of pediatric critical care is relatively new in Bihar. Indira Gandhi Institute of Medical Sciences is a apex centre for medical care in Bihar. Here superspecialty department is running and doing well since 15 year. Pediatric is a nascent department here and we recently started our well equipped pediatric intensive care 1 year before. It is referral centre from all over the Bihar. Recently, there has been increase in health awareness which lead to the establishment of

PICU due to epidemics of acute encephalic syndrome in Bihar. Government is very much curious to start PICU in every district of Bihar due to rise of this epidemic. Our institute is a role model for all medical colleges of Bihar. A incidious and gradual rise in incidence of modern epidemiological diseases; improving socioeconomic status and increasing awareness of health related issues among urban population have led to increasing demand for pediatric critical care in India.

Our study shows preponderance of male sex (64%) and female (36%). This value was closer to the male sex value of 66% reported by Haque et al and Kapil et al.^{8,9} The majority of admissions were medical emergencies (86%), and 14% were surgical emergencies. Matrinot et al,¹⁰ it showed 92.3% medical emergency cases and only 7.7% surgical postoperative cases which matches with our study.

Neurological causes was found to be the most common cause of admission (18%), this is because acute encephalitis syndrome is common in this region leading to large number of death. Khurshid et al¹¹ of Pakistan also showed mortality due to neurological illness are more common. Overall mortality was 13.8%, with age related mortality being highest (32.1%) in 1-5 years in AIIMS study.⁹ Mortality due to fulminant hepatic failure was 10% in our study compared to the Khilani et al² (10.8%) which was very much similar. PICU's main goal is the reduction in mortality, yet special consideration should be given to mortality studies; reports on mortality rates alone, without risk adjustment, could make their results misinterpreted¹² Based on our study, it appears that Pediatric Intensive Care in our center is somewhat similar to the western world in terms of severity of illness and prediction of mortality, PRISMIII adjusted mortality, average days of ventilation required and length of PICU stay. Most of our data falls within the range of data of Pediatric critical care study group.¹³ Our overall mortality rate appears to be less than that of other developing countries.¹⁴ In the present study 38 children (9.8%) were admitted for infectious diseases and significant number of which were due to enteric fever and its complications. Other important tropical infectious diseases that required admission included cerebral malaria, pulmonary tuberculosis and

tubercular meningitis, dengue hemorrhagic fever. Almost same finding found by Garner et al.¹⁵ Inotropic support started only after full fluids resuscitation and was performed under international guidelines 33. Mechanical ventilation is a unique PICU therapy and together or not with inotropic use, in some studies, is considered too as an index of PICU efficiency. Different studies have proved that full-time trained critical care specialists in both adult and paediatric ICUs improve the quality of care and are associated with lower mortality and morbidity rates.¹⁶⁻²¹ Our study also shows similar findings. There was marked reduction in mortality, shorter length of stay and increase efficiency of our PICU since implementation of full-time trained paediatric intensivist. In Bihar, the process of establishment of new PICU, s in very slow and more so the number of trained Paediatric Intensivists is also very short. Most of the PICUs still have no intensivist in Bihar. The age and gender characteristics of these patients were similar to that noted in the studies done in other PICUs in this region. Majority of the patients were medical emergencies as compared to western PICU, where majority of admission is from operating room. limitation of this study is that study duration is only one year and total number of patients were also less but this is only due to newly functioning PICU but as the time passes and care will increase more number of patient get admitted here. This study was a reflection of public sector which represents a more realistic picture.

Conclusion

Demographic profile of our PICU patients showed similar characteristics as those of reported in different relevant studies with minor differences in few aspects. The overall results of this study are encouraging and development of new PI in our state (Bihar) is the need of the day.

Source of Funding

None.

Conflict of Interest

None.

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