Original Research Article

A study on clinical profile and outcome of patients in PICU (paediatric intensive care unit) at tertiary care unit

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ABSTRACT

Background: This study was carried out with the objectives to study the clinical profile and to find the outcome of children admitted to pediatric intensive care unit (PICU) of Kurnool medical college and hospital, Andhra Pradesh.

Methods: A retrospective study was carried in children aged more than 28 days to 12 years admitted in PICU from 1st January 2016 to 31st December 2016 when a total of 600 patients were admitted.

Results: Out of these, 400 (66.66%) cases were males and 200 (33.33%) cases were females. Maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 325 (54.16%) cases. This was followed by 1 year to less than 5 years age group which constituted 150 (i.e. 25%) cases. Under 5 years aged children constituted 500 (83.33%) cases. Next most common age group admitted was 5 years to 10 years with 85 (i.e. 14.16%) cases and 10 to 12 years age group constituted 40 (6.66%) cases. In this study, central nervous system was the commonest system involved (n=195, 32.5%). Other systems involved were: respiratory system (n=122, 20.33%), cardiovascular system (n=65, 10.83%), gastro-intestinal system (n=32, 5.33%), hematological (n=35, 5.83%) and renal system (n=23, 3.83%). Other causes include infections (n=97, 16.16%), metabolic (n=17, 2.83%), down syndrome (n=7, 1.16%) and poisoning (n=7, 1.16%) etc.

Conclusions: Out of the 600 patients admitted to PICU, 168 (28%) patients died. 315 (52.5%) cases improved. 117 (19.5%) cases constituted those who were shifted to higher centre or another department or were taken against medical advice.

Keywords: Cardiovascular, Metabolic, PICU, Respiratory

INTRODUCTION

The pediatric critical and emergency medicine has been evolved as a sub specialty in pediatrics over the years and the care and researches in this field dramatically reduced the mortality in so many diseases like dengue.¹ Admission criteria for PICU admissions are institution dependent, based on the available facilities, bed strength. The trend is continuously changing from period to period. Infectious diseases contributing majority admissions in

the past especially in developing countries like India. But now non-communicable diseases are also in rise. Mortality is proportional to the underlying nature of the disease, physiological status on arrival and the quality of care of course. In this study, authors aimed to identify the indication for PICU admission and outcome and to correlate the cause for poor outcome. Immediate outcome like death and intact neurological survival are measured. If the pattern of PICU cases and outcome is known, it will be easy for us to strengthen the facilities to manage

those type of patients. In future we can reduce the mortality and improve the quality of care rendered to the public.²⁻⁴

Pediatric patients who are critically ill and those who need advanced airway, respiratory and hemodynamic support are admitted in PICU so that the outcome is improved. The principal objective of pediatric critical care is not only to decrease the mortality but also to restore the child who is suffering from a life-threatening condition to health with a minimum pain anxiety and complications and to provide comfort and guidance to the child's family.¹ Under five mortality according to the data provided by UNICEF is 41 deaths per 1000 live birth in 2016.² The number of children dying before the age of five is 5-6 million in 2016. Fifteen hundred were under five children die every day.³ The knowledge of the clinical profile and outcome of critically ill children helps in planning health policies. The clinical profile and outcome of PICU differ in different studies. There is a dearth of study of PICU from this region of the country and hence this study is undertaken.

The aim of the present study was to identify the clinical profile and outcome of children admitted in PICU.

METHODS

A retrospective study conducted at the PICU of Kurnool medical college and hospital, Kurnool, Andhra Pradesh. Approval from the institutional ethical committee was taken.

The records of patients aged more than 28 days to 12 years admitted to PICU, Kurnool Medical College and Hospital, Kurnool, Assam from 1st January 2016 to 31st December 2016 was analyzed.

RESULTS

During the year 2016, from 1st January to 31st December, total of 600 patients were admitted in PICU. Out of these 600 patients, 400 (66.66%) were males and remaining 200 (33.33%) were females. Male to female ratio was 2.03:1.

Table 1: Age distribution of children admitted in PICU.

Age	Number of cases (Percentage)
>28 days-1 year	325 (54.16)
1-5 years	150 (25)
5-10 years	85 (14.16)
>10 years	40 (6.66)
Total	600 (100)

Table 1 shows maximum numbers of patients were in the age group of more than 28 days to 1 year which constituted 325 (54.16%) cases. This was followed by 1 year to less than 5 years age group which constituted 150

(i.e. 25%) cases. Under 5 years aged children constituted 500 (83.33%) cases. Next most common age group admitted was 5 years to 10 years with 85 (i.e. 14.16%) cases and 10 to 12 years age group constituted 40 (6.66%) cases.

Table 2: Distribution in relation to the system involved.

System involved/causes	Number of cases (percentage)
Central nervous system	195 (32.5)
Respiratory system	122 (20.33)
Infection/sepsis	97 (16.16)
Cardio vascular system	65 (10.83)
Gastro intestinal system	32 (5.33)
Haematological system	35 (5.83)
Renal system	23 (3.83)
Metabolic	17 (2.83)
Down syndrome	7 (1.16)
Poisoning	7 (1.16)

Table 2 shows the system wise cause of admission of patients to PICU. Central nervous system was the commonest system involved (n=195,32.5%). Next system commonly involved was respiratory system (n=122, 20.33%). Other common causes were infections (n=97, 16.16%), cardiovascular (n= 65, 10.83%), gastro intestinal (n=32, 5.33%), haematological (n=35,5.83%) and renal (n=23,3.83%) system causes. This was followed by metabolic causes (n=17, 2.83%), Down syndrome (n = 7, 1.16%) and poisoning in 7 (1.16%) cases.

Table 3: Outcome of patients in PICU.

Outcome	No of cases (percentages)
Expired	168 (28)
Survived	315 (52.5)
Others	117 (19.5)

Out of the 600 patients admitted to PICU, 168 (28%) patients died. 315 (52.5%) cases improved and were shifted to general ward and later discharged. 117 (19.5%) cases constituted of those who were shifted to higher centre or another department or were taken against medical advice.

DISCUSSION

In this study, authors found that total of 600 children in the age group of more than 28 days to 12 years were admitted in the Pediatric Intensive care unit of Kurnool Medical college and hospital from 1st January 2016 to 31st December 2016. A 325 (54.16%) cases belonged to age group between 28 days and 1 year. Under 5 years aged children constituted 500 (83.33%) cases. This is comparable to a study published by El Halal MG et al, from Brazil where it was reported that majority of

patients (78.3%) was under 5 years of age.⁴ A study conducted by Abhulimhen-Iyoha BI et al, 5 revealed that 72.4% patients were aged less than 5 years. In the same study, 50.7% constituted infants which is comparable to this study where 52.53% constituted children aged between 29 days to 1 year. In a study published in journal of college of physicians and surgeons Pakistan by Haque A et al, most children (62.5%) were under 5 years of age.⁶ This study revealed the male to female sex ratio to be 2.03:1. Abhulimhen-Iyoha BI et al, found male: female ratio of 1.49:1.⁵ Haque A et al, also found that majority (60.9%) of patients were male.⁶ Another study from Nepal by Shah GS et al, found the male to female ratio to be 1.7:1.⁷ In this study, most of the cases admitted in PICU belonged to central nervous system disorders which constituted 195 (32.5%) cases, followed by respiratory system in 122 (20.33%) cases, infections in 97 (16.16%) and cardiovascular system in 65 (10.83%) cases. This was comparable to a study carried out by Haque A et al, which showed that the most common cause was neurological (28%) followed by respiratory in 24.4%, sepsis in 13.7% and cardiovascular in 10.9% cases.⁶ This was in contrast to a study published in British journal of medical research by Shah GS et al, which found that respiratory diseases contributed to the maximum number of cases i.e. 33%, followed central nervous system diseases (18.6%), infectious diseases (11.3%), surgical causes (7.8%), gastrointestinal diseases (7.4%), cardiovascular diseases (6.5%) and poisoning (4.8%).⁷ A study done in south india by Earan SK et al, found that respiratory system was the commonest system (40.2%) affected in their study.⁸ A study by I. Abhulimhen-Iyoha BI et al, found that in their centre, the commonest cause was cardiovascular (41.1%) followed by neurological (12%), respiratory (10%), infectious (8.5%) and hematological causes (5-6%).⁵ In our study, out of 600 patients admitted in PICU, 168 patients died bringing the mortality to 28%. In a study from Brazil, El Halal MG et al, found the mortality in their centre to be 10.3%.⁵ Abhulimhen-Iyoha BI et al, found that mortality in their centre was as low as 2.1%.⁶ In a study from Pakistan by Haque A et al, it was found that the mortality of their PICU cases was 11.9%.⁶ Shah GS et al, found that in their centre the mortality was 12.6%.⁷ Some other studies have reported mortality similar to our study. Kapil D et al and Bagga A et al, found a mortality of 23.5% in their centre in 1993.⁹ Another study from Pakistan by Haque A et al and Bano S et al, reported a mortality of 35% in their institute.¹⁰ A study from Africa by Jeena PM et al reported an overall mortality of 35.44%.¹¹⁻¹⁴ The high mortality in our PICU may be contributed by several factors. Firstly, it is the only government run PICU in the tribal areas of Andhra Pradesh. Another contributory factor might be that in our study central nervous system was responsible for 32.5% of admissions in PICU and many of these cases were cases of acute encephalitic syndrome. Again, viral Meningo encephalitis constituted most of the AES cases which included Japanese encephalitis. Japanese encephalitis is common in this part of the country which has high mortality. Another cause of

high mortality is that lot of patients requiring PICU admissions have to be treated in the ward due to paucity of beds in PICU.¹⁵⁻¹⁶ Our PICU caters to seriously ill pediatric patients from other departments also, including paediatric surgery, hematology, neurology, neurosurgery etc. In 2016, 3500 patients were admitted in the Indoor department of Pediatrics.

The mortality rate compared to developing countries somewhat less, thanks to the advanced ventilators and protocols available here. People working in PICU in developing countries face many problems like lack of resources, knowledge and the support system. A trained pediatric intensivist may help by working closely with general pediatricians, training residents and nurses in advanced procedures, developing and updating unit protocols taking into consideration the existing human, logistic and financial resources. The intensivist may also be helpful for training peripheral units on stabilization and transportation of sick children. Nightingale provided the definition of nursing as "helping the patient to live" and thus the role of Nurses in PICU cannot be overemphasized.

CONCLUSION

This study is one of the first study in this part of the region on PICU patients. Under 5 years children constituted the major load of the patients in our PICU. There was male preponderance of PICU admission. Central nervous system disorders were the commonest cause of admission in the PICU, followed by respiratory, infectious and cardiovascular causes. Our mortality stood at 27.34%. Several factors like being the only government run PICU in this part of the region, catering to paediatric patients of other specialties and super specialties in this tertiary hospital and predominance of admission of central nervous system disorders have contributed to the mortality. There were many cases of meningoencephalitis which were admitted, and they have high mortality.

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