InnoVationInfo

International
Journal of clinical and medical science

Int J Med Clin Sci 2018
Volume 1.1

Mortality Profile of Children Admitted to Intensive Care Unit of a Tertiary Care Hospital in Kerala, South India

Rashma RP[1]
Remya S[2*]
Jayakumar C[3]
Shanavas M[4]
Manu R[5]
Remya R[2]
Sonu KS[6]

[1]*Department of Paediatrics, Paediatric resident, Amrita institute of medical sciences, India*

[2]*Clinical Epidemiologist, Department of Medical research, Amrita Institute of Medical Sciences, Kochi, Kerala, India*

[3]*Department of Paediatrics, Amrita institute of medical sciences, India*

[4]*Specialist in emergency medicine, HMC Qatar*

[5]*Department of Paediatrics & Paediatric cardiology, Amrita institute of medical sciences, India*

[6]*Department of Public health research, Amrita institute of medical sciences, India*

Abstract

Introduction: The mortality in a Paediatric intensive care unit (PICU) can reflect a hospital's health care quality and efficiency on handling with critical ill patients, and reduce the mortality in PICU will be the key to reduce the overall mortality in a children's hospital. The existing gap in determining the factors associated with mortality rate among children admitted in PICU has to be addressed.

Aim: To study the Mortality Rate and Mortality profile of children admitted to the PICU of a tertiary care centre of Kerala.

Methodology: The clinical audit was carried out in a tertiary care centre PICU for a period of 3 months. Retrospective data were collected from 100 children aged 1 month to 18 years who expired while under care in PICU of the study institution during 42 months (March 2013-September 2016). The data were collected from the Health Information System (HIS) of the study institution. The study variables included were age, sex, and details of diagnosis including primary disease, co morbidities and cause of death. The data collected in Microsoft Excel was analyzed using IBM Statistical Package for Social Science (SPSS version 21). The summary statistics for categorical variables are reported using frequency and percentage and continuous variables as mean (SD).

Results: A total of 100 deaths were documented during the study period from the total 945 admissions. The Mortality rate of children admitted in PICU was 10.58%. The mortality pattern was cardiopulmonary arrest 29%, sepsis 19%, Pneumonia 16%, MODS 14%, Liver disease 7%, inborn error of metabolism 6%, ARDS 6%, ARF 3%. The mean age of children who died at PICU for a period of 42 months was 3.40+4.16years. Among the 100 children died 52% were males. The Frequency of co morbid condition identified for the mortality pattern were cardiovascular abnormality 6.0%, chromosomal anomaly with infection 2% CNS abnormality 17%, dermatology with infection 1%, GIT abnormality 18%, haematological abnormality 15%, inborn error of metabolism 7.0%, infection 15.0%, nephrology conditions 6%, oncology condition 3%, Respiratory condition 8%, Trauma 2%. The highest mortality was represented by patients admitted from the Emergency room (44%). The mortality from other ICU was 10.0%, from outside hospitals was 4.0%, and children transferred from wards was 42.0%. Among the 100 deaths only 26% of the children were mechanically ventilated.

Conclusion: Infections have a higher predilection for higher

Article Information

Article Type: Research
Article Number: IJCMS104
Received Date: 05th-April-2018
Accepted Date: 10th-April-2018
Published Date: 12th-April-2018

***Corresponding author:** Dr. Remya Sudevan MBBS, MPH, PhD Scholar, PGDDN, Dip diabetology, CCRA (Canada). Clinical Epidemiologist, Department of Medical research, Amrita Institute of Medical Sciences, Kochi, Kerala, India. Tel: +011918301993172; Email: remyasudevan@aims.amrita.edu

Citation: Rashma RP, Remya S, Jayakumar C, Shanavas M, Manu R, et al. (2018) Mortality Profile of Children Admitted to Intensive Care Unit of a Tertiary Care Hospital in Kerala, South India. Int J Med Clin Sci 1:1. (13-16).

mortality rate in PICU. So the source of infection either hospital acquired or community acquired should be identified and managed aggressively. Increased mortality rate was seen with co morbid conditions mainly associated with gastrointestinal abnormalities. So better care and management has to be given for those children admitted to PICU with GIT abnormalities.

Introduction

A paediatric intensive care unit (PICU) is a special area in the hospital that designed to care for the severely ill children [1]. Given the acuity of the patient's conditions, the ratio of professionals to patients is usually higher and the equipments are more advanced in PICU than in other areas of the hospital. With progresses in medical knowledge of paediatric anaesthesia, medicine and surgery, understanding of life-threatening pathophysiology processes, and development of scientific and technical methods to monitor, the paediatric critical care medicine developed rapidly [2,3]. In 1985, the Paediatric Critical Care was recognized by the American Board of Paediatrics as a new subspecialty of medicine, and the criteria for subspecialty certification were established [4]. In 1993 Committee on Hospital Care of the American Academy of Paediatrics and Paediatric Section of the Society of Critical Care Medicine issued the-Guidelines and Levels of Care for Paediatric Intensive Care Units [2]. Along with the development of paediatric intensive care, they revised the guideline in 2004 [4]. Now the paediatric intensive care practice is quite mature in the United States, and there are two levels of PICU: Level I and Level II. These two types of PICUs have different capability to care for the critically ill patients. The level I PICUs were usually established in major medical centres, and facilitated with more specially trained and experienced staff including paediatricians, respiratory therapists, medical and surgical subspecialists. These units have more beds and advance technology and equipments, and can provide multidisciplinary definitive care to the most severely ill children [4]. Level II PICUs are usually smaller than level I PICU and not required to have a full spectrum of subspecialists. These units are able to care for the patients with moderate severity of disease or provide stabilization of critically ill children before transfer to upper level centre. The establishment of PICU tremendously improved the success rate in saving critical patients. In a hospital containing a PICU, critically ill children or those have potential to deteriorate into critical conditions will be sent to PICU for intensive treatment and monitor, so most of the dead cases in a hospital actually happen in the PICU [5]. The mortality in a PICU can reflect a hospital's health care quality and efficiency on handling with critical ill patients, and reduce the mortality in PICU will be the key to reduce the overall mortality in a children's hospital [6]. The studies that investigate mortality and risk factors for death can give information to improve the clinical practices and provide public health strategies to improve the outcomes of ICU care. The outcome measures of PICU include mortality, length of stay (LOS), long-term result such as health status, disability and morbidity. Studies carried out in different countries show that source of patient admission is associated with death in Intensive Care Units (ICU). Patients transferred from wards within the same hospital show a greater ICU mortality when compared with those coming from other sources. There is deficiency in literature regarding the causes of mortality among children admitted at intensive care of Kerala. This study will add to the knowledge of mortality of the children admitted at PICU of state of Kerala. Latest National Family Health Survey 4commented on under 5 mortality as 7 per 1000 live birth [7]. But causes were not described. The study aims to assess the Mortality Rate and mortality profile of children admitted to PICU of a tertiary care centre of Kerala.

Methodology

This is a clinical audit conducted by the department of Paediatrics in a tertiary care centre PICU for a period of 3 months. The audit was approved by the institutional ethics committee. Retrospective data were collected from 100 children aged 1 month to 18 years who expired while under care in PICU of the study institution during 42 months (March 2013-September 2016). The data were collected from the Health Information System (HIS) of the study institution. The study variables included were age, sex, and details of diagnosis including primary disease, co morbidities and cause of death. The data collected in Microsoft Excel was analyzed using IBM Statistical Package for Social Science (SPSS version 21). The summary statistics for categorical variables are reported using frequency and percentage and continuous variables as mean (SD).

Results

A total of 100 deaths were documented during the study period from the total 945 admissions. The Mortality rate of children admitted in PICU was 10.58 % for the study period. The mortality pattern was Cardio pulmonary arrest 29%, sepsis 19%, Pneumonia 16%, MODS 14%, Liver disease 7%, Inborn error of metabolism 6%, ARDS 6%, ARF 3%. The mean age of children who died at PICU for a period of 42 months was 3.40+4.16 years. Among the 100 children died 52% were males (Figure 1). The most common co morbid condition leading to paediatric death was GIT abnormalities accounted for 18% followed by CNS anomalies 17%, haematological anomalies 15% and infection 15%. The distribution of co morbid conditions identified for the mortality pattern was (a) cardiovascular abnormality 6% (pure cardio vascular abnormality 3%, cardiovascular abnormalities with chromosomal anomaly 1%, cardiovascular abnormalities with chromosomal abnormality with infection 1%, cardiovascular abnormality with endocrinology 1%) (b) Chromosomal anomaly with infection 2%, (c) CNS abnormality 17% (pure CNS abnormality 14%, CNS abnormality with infection 3%), (d) dermatology with infection 1%, (e) GIT abnormality 18% (pure GIT abnormality 15%, GIT with infection 3%), (f) Haematological abnormality 15%, (pure haematology abnormality 14%, haematology with respiratory condition 1%), (g) Inborn error of metabolism 7.0% (Pure inborn error of metabolism 5%, inborn error of metabolism with infection 2%), (h) Infection 15.0%, (i) Nephrological conditions 6% (pure nephrological abnormalities 3%, nephrology with chromosomal anomaly 2% , nephrology with infection 1%), (j) oncology condition 3%, (k) Respiratory condition 8%

(pure Respiratory condition 6% , respiratory condition with infection 1% ,respiratory condition with cardiovascular abnormality 1%), (l) Trauma 2 %. The distribution of Co morbid conditions and the frequency of type of infections are shown in (Tables 1,2).

Graphical representation of the distribution of death according to mode of admission is represented in Figure 2. The highest mortality was represented by patients admitted from the emergency room 44%, from other ICU 10.0%, from outside hospitals 4.0%, and children transferred from wards 42.0%. Among the 100 deaths only 26% of the children were mechanically ventilated.

Discussion

Most of the study investigated the PICU outcome using mortality (the Incidence proportion of death). Generally, the PICUs in developed countries have lower mortality than those in the developing countries, and mortality decreased with years. Our study had a mortality rate of 10.58% which is in agreement with several studies published from low and middle-income countries [8-10]. Our study results regarding the spectrum of co morbidities were consistent with that of Wilkinson JD, Pollack MM et al. [11]. A study by Epstein reported a higher risk for death for children less than 1 month and older than 12 years in PICU [12]. A study done in a Brazilian PICU found that mortality increased significantly with increasing age [13]. The dead cases in the study conducted by Ala S et al. had a 60% proportion of male [14]. Our study also showed a male preponderance. Some studies showed that SES was associated with health outcomes in monotonic pattern, i.e. each decrease of SES level was related to a decrease of health status [15,16]. SES could affect the health from various aspects in all age groups [17]. Shukla et al. reported that the infectious disease was still one of the commonest causes of PICU admission and mortality [18]. Our study also had the same results. A study in the United States divided admission sources into emergency department, operating rooms, wards, and inter-hospital transfer from non-PICU and PICU settings, and found that patients from the wards and inter-PICU transfer had higher odds ration of mortality than patients from emergency department [19]. In our study emergency department shifted maximum PICU patients and their mortality rate was high. Goh et al. reported that PICU with 24h intensivist care had lower mortality odds ratio than PICU without 24h specialist care [20]. A study conducted in the United States by Goldstein et al collected 63,285 consecutive PICU admissions from January 2004 to December 2005 in the Virtual Paediatric Intensive Care Unit Performance System database and found that patients with day 1 MODS had higher risk to die (10.0% vs 1.2%), longer length of stay in PICU (3.6 vs 1.3 days) and worse performance at discharge [21]. Our study also had the similar results. Odetola et al did a survey about co morbid illnesses among critically ill children in 2006 in the United States, and found that 41% of the patients had co morbidity and patients with Co morbid illnesses had significantly higher mortality, longer hospital stay and higher cost [22]. The same results were seen in our study also. A study by Epstein D in the United States reported that infectious disease or oncologic

Table 1: Distribution of Co morbid conditions.

S. No.	Co morbid Conditions	Frequency	Percent
1	Cardiovascular	6	6.0
2	Chromosomal anomaly with infection	2	2.0
3	CNS	17	17.0
4	Dermatology with infection	1	1.0
5	GIT	18	18.0
6	Haematology	15	15.0
7	Inborn error of metabolism	7	7.0
8	Infection	15	15.0
9	Nephrology	6	6.0
10	Oncology condition	3	3.0
11	Respiratory condition	8	8.0
12	Trauma	2	2.0
	Total	100	100.0

Table 2: Frequency of type of infection.

Type of Infection	Frequency
Infection	15
Cardiovascular abnormalities with chromosomal abnormality with infection	1
Chromosomal anomaly with infection	2
CNS with infection	3
GIT with infection	3
Inborn error of metabolism with infection	2
Nephrology with infection	1
Respiratory condition with infection	1

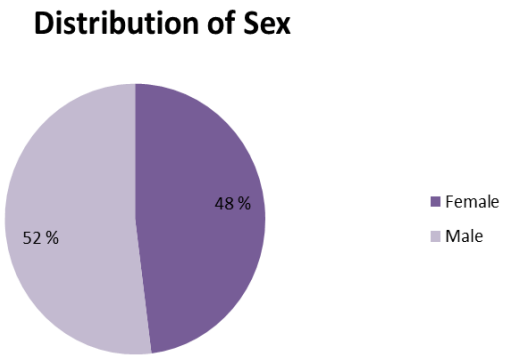

Figure 1: Distribution of sex in the mortality profile.

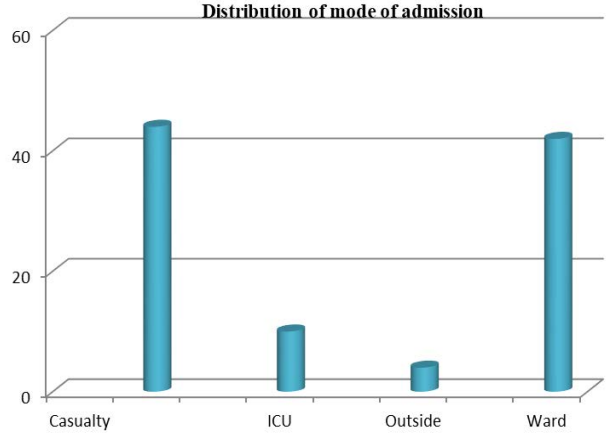

Figure 2: Pattern of mode of admission to PICU.

disease had higher risk for death [12]. Our study also had the same pattern of risk for death.

Conclusion

Our study had comprehensively investigated the mortality profile in PICU of a tertiary hospital in South India. Our study found that the mortality of the PICU was 10.5% during study period. A higher mortality was associated with more severe conditions of disease and presence of co morbidities. So better care and management should be given for those children admitted to PICU with severe co morbidities. Infections have a higher predilection for higher mortality rate in PICU. So the source of infection either hospital acquired or community acquired should be identified and managed aggressively.

References

1. Downes JJ (1992) The historical evolution, current status, and prospective development of paediatric critical care. Critical Care Clinics 8: 1-22.
2. Committee on Hospital Care and Pediatric Section of the Society of Critical Care Medicine. Guidelines and Levels of Care for Paediatric Intensive Care Units. Paediatrics 92: 166-175.
3. Bennett Nr (1999) Paediatric intensive care. British Journal of Anaesthesia 83: 139-156.
4. David IR, Moss MM (2004) Guidelines and Levels of Care for Paediatric Intensive Care Units. Paediatrics 114: 1114-1125.
5. Namachivayam P, Shann F (2010) Three decades of paediatric intensive care: Who was admitted, what happened in intensive care, and what happened afterward. Paediatric critical care medicine 11: 549-555.
6. Polic B, Mestrovic J (2013) Long-term quality of life of patients treated in paediatric intensive care unit. European Journal of Paediatrics 172: 85-90.
7. Khilnani P, Sarma D, Singh R (2004) Demographic profile and outcome analysis of a tertiary level paediatric intensive care unit. Indian Journal of Paediatrics 71: 587-591.
8. Garros D, Rosychuk RJ, Cox PN (2003) Circumstances surrounding end of life in a paediatric intensive care unit. Pediatrics 112: e371-e379.
9. Sands R, Manning JC (2009) Characteristics of deaths in paediatric intensive care: a 10-year study. Nurs Crit Care 14: 235-240.
10. Mink RB, Pollack MM (1992) Resuscitation and withdrawal of therapy in paediatric intensive care. Paediatrics 89: 961-963.
11. Zawistowski CA, DeVita MA (2004) A descriptive study of children dying in the paediatric intensive care unit after withdrawal of life-sustaining treatment. Paediatric Critical Care Medicine 5: 216-223.
12. Epstein D, Wong CF (2011) Race/Ethnicity is not associated with mortality in the PICU. Paediatrics 127: e588-597.
13. El Halal M, Evandro B (2012) Admission source and mortality in a paediatric intensive care unit. Indian Journal of Critical Care Medicine 16: 81-86.
14. Ala S, Pakravan N, Ahmadi M (2012) Mortality rate and outcome among patients admitted to general intensive care unit during "morning-hour" compared with "off-hour". International Journal of Clinical Medicine 3: 171.
15. Backlund E, Sorlie PD (1996) The shape of the relationship between income and mortality in the United States: Evidence from the National Longitudinal Mortality Study. Annals of Epidemiology 6: 12-20.
16. Ecob R, Davey G (1999) Income and health: What is the nature of the relationship? Social Science and Medicine 48: 693-705.
17. Chen E, Matthews KA (2002) Socio economic differences in children's health: How and why do these relationships change with age? Psychological Bulletin 128: 295-329.
18. Shukla VV, Nimbalkar SM (2014) Critical Analysis of PIM2 Score Applicability in a Tertiary Care PICU in Western India. International journal of paediatrics 703942.
19. Odetola FO, Rosenberg AL, et al. (2008) Do outcomes vary according to the source of admission to the paediatric intensive care unit? PediatrCrit Care Med 9: 20-25.
20. Goh AY, Abdel-Latif Mel A, Lum LC, Abu-Bakar MN (2003) Outcome of children with different accessibility to tertiary paediatric intensive care in a developing country: a prospective cohort study. Intensive Care Med 29: 97-102.
21. Goldstein B, Giroir B, Randolph A (2005) The International Consensus Conference on Paediatric Sepsis International pediatric sepsis consensus conference: definitions for sepsis and organ dysfunction in paediatrics. Pediatr Crit Care Med 6: 2-8.
22. Odetola FO, Gebremariam A (2010) Comorbid illnesses among critically ill hospitalized children: Impact on hospital resource use and mortality, 1997-2006. Pediatric critical care medicine 11: 457-463.

Citation: Rashma RP, Remya S, Jayakumar C, Shanavas M, Manu R, et al. (2018) Mortality Profile of Children Admitted to Intensive Care Unit of a Tertiary Care Hospital in Kerala, South India. Int J Med Clin Sci 1:1. (13-16).