JMSCR Vol||05||Issue||12||Page 31470-31474||December 2017

www.jmscr.igmpublication.org
Impact Factor 5.84
Index Copernicus Value: 71.58
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossref DOI: https://dx.doi.org/10.18535/jmscr/v5i12.40

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Original Article

Clinical, Demographic Profile and Outcome of Children Admitted in PICU with A Diagnosis of Severe Sepsis and Septic Shock

Authors
Ghimire Jagat Jeevan[1], Gami Fakir Chandra[2], Thapa Surya Bahadur[3]
[1]Kanti children Hospital, Kathmandu
[2,3]Department of Pediatrics, Tribhuvan University Teaching Hospital, Kathmandu
Corresponding Author
Ghimire Jagat Jeevan
Kanti children Hospital, Kathmandu
Email: *jagat_ghimire@yahoo.com*

Abstract
Background: *To determine profile and outcome of children with severe sepsis and/or septic shock.*
Material and Methodology: *The prospective observational study was done in 47 children with severe sepsis and septic shock admitted in PICU. Demographic data, clinical finding, lactate at admission and lactate clearance and PRISMIII score were recorded. The patients were followed daily, maximum up to 5 days or till death or discharge from PICU. PRISM III was correlated with in-hospital mortality and morbidity.*
Results: *Out of 234 patients admitted 57(24%) had the diagnosis of sepsis.47 patients were included in the study. Male female ratio was 1.76:1.Mean age of patients was 88.79 months. Mean duration of illness was 7.13 days. Pneumonia was the most common diagnosis. Mean length of PICU stay was 160 hours and mortality was 25%.Nonsurvivors didn't differ from survivors in terms of age, duration of illness, platelet count, lactate at admission and lactate clearance. Survivors differed from non-survivors in terms of PRISM III score (19.77 vs 36.33) with p-value of .003. PRISMIII had excellent accuracy of death prediction of death with AUC of 0 .852(95% CI 0.702-0.900)*
Conclusion: *Sepsis remain as leading cause of mortality in PICU.PRISMIII had the excellent prediction of death.*
Keywords: *PRISMIII, Severe Sepsis, Septic shock, PICU.*

Introduction

Severe sepsis and septic shock remain the leading cause of child mortality.(1) Children with severe sepsis remain as challenges to clinicians despite advances in prevention and treatment.(2) 80% of childhood mortality can be classified as sepsis-related death.(3) Early diagnosis and management are important measures to reduce sepsis-related mortality.(4) Simple measures as IV bolus, inotropes, antibiotics and supportive care are important measures to reduce sepsis-related mortality.(5) Even though sepsis remains the leading cause of mortality in hospitalized patients the data in developing countries are limited. (6) This study was done with the objective of studying the profile of patients admitted in a PICU

of tertiary care hospital with the diagnosis of severe sepsis and/or septic shock and outcome of patients admitted.

Methodology

This is a prospective observational study conducted in Pediatric Intensive Care Unit (PICU) of Tertiary level Teaching Hospital. All patients from age of 1 month to 16 years admitted to PICU from November 2013 to September 2014 meeting the inclusion criteria are included in the study. The 2005 International Pediatric Sepsis Consensus Conference (IPCC) criteria are used to diagnose sepsis, severe sepsis, and septic shock.[4] The study is approved by an institutional review board (IRB) for ethical clearance. Informed consent is obtained from parents. The exclusion criteria are Inability to obtain informed consent, patients with DNR order and withdrawal of life support, patients with pre-existing heart failure, postoperative cases and children with burn and hepatic encephalopathy. Detailed history is taken and duration of illness, presenting complaints, age, gender, admission portal are noted and clinical examination is done. Total leukocyte count, electrolytes, PT, APTT Serum lactate are recorded along with the variable of PRISMIII. All findings of history, physical examination and investigation are recorded in pro forma. Patients are managed with the standard protocol.[7] After managing patient as per treatment protocol repeat ABG is done in 6 hours to see the lactate level. Patients are followed up daily for 5 days at PICU for primary outcomes and secondary outcomes. Survival or non-survival is the primary outcome. Use of inotropes need of mechanical ventilation and duration, evidence of kidney injury and duration of PICU stay are noted. SPSS software version 20 is used for data entry and analysis. Means of categorical values analyzed by chi-square test, Man Whitney U test is applied to continuous variables. Receiving operating curve (ROC) for PRISM III is used for death prediction. A p-value < 0.05 was considered significant.

Results

Fifty-seven out of 234(24%) children admitted in PICU during the study period had severe sepsis or septic shock. Ten patients were excluded from the study for different reasons. Total of 47 patients from age of 1-192 months was included with a mean age of 88.79 months (SD 71 months) and M: F ratio of 1.7:1. Out of 47 patients, the majority of admissions were through pediatric Emergency which comprised of 59.6 % of total admissions. Mean duration of illness was 7.13 days. Pneumonia was most common primary diagnosis.22 out of 47(46.8%) had pneumonia as the primary diagnosis. Mean lactate of 1.8743 and mean lactate clearance was 31.47872%. The mean PRISMIII was 9.4255 with SD of 4.90228. Forty-two out of 47(89.4%) needed inotropes during the course of PICU stay. Thirty out of 47(63.8%) required mechanical ventilation during the course of stay. The mean duration of mechanical ventilation was 79 hours. Eighteen out of 47(38.3%) patients had evidence of acute kidney injury. Minimum duration of PICU stay was 10 hours and maximum duration was 720 hours with the mean duration of 160 hours. Twelve out of 47 expired thus mortality contributed 25.53 %. Survivors didn't differ from non-survivors in terms of age, duration of symptoms, portal of admission, mean hemoglobin, PH, lactate at admission, lactate clearance at six hours, platelet count and total leukocyte count. Survivors differed from non-survivors in terms of PRISM III score (19.77 vs 36.33,) with a p-value of .003. (Table1)

Table 1: Baseline characteristics among survivors and non-survivors

Variable		Survivor (n=35)	Non survivor (n=12)	P value
Age(months)		23.54	25.33	.815
Gender	Male(n=30)	22	8	.813
Admission portal	Pediatric ER N=28	22	6	.434
Duration of symptoms		6.54	8.83	.408
Hemoglobin		10.31	9.45	.595
Total leucocyte count		13653	11908	.456
Platelet count		263514	191416	.414
PRISMIII		19.77	36.33	.003
Lactate 0 hrs		1.87	2.32	.191
Lactate clearance at 6 hours (%)		26.07	17.96	.077

The receiver operating characteristic curve for PRISM III >30 scores showed accuracy of death prediction with AUC of .852(95% confidence interval (.702-0.900) (figure1)

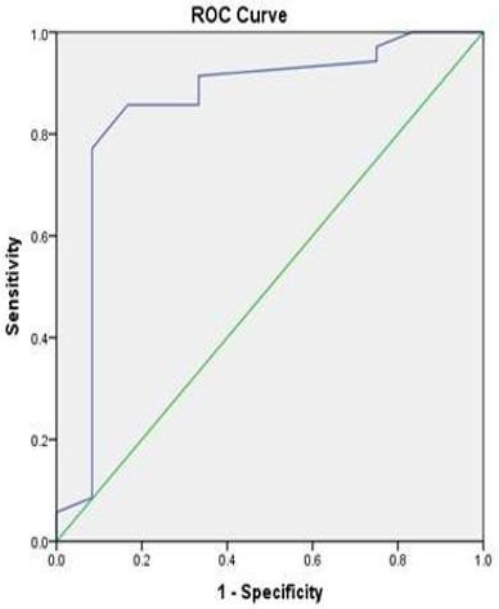

Figure 1: ROC for PRISMIII

Discussion

In our study total, 57 of 234 children admitted to PICU during the study period had the diagnosis of severe sepsis and septic shock which contributed to 24.37%. This was comparable to studies done by Jaramillo-Bustamante JC et al and Watson et al which had the prevalence of 24% and 25% respectively.[8,9] This finding differed from the study done by Khan et al, de Souza DC, Kutko MC et al and Shime N et al which had the prevalence of 17.3 %,42%, 6.3% and 1.4% respectively[6,10-12]. This can be explained by the higher incidence of infectious disease in developing countries compared to developed countries. Males outnumbered Females in our study with M: F ratio of 1.76:1.This finding was comparable to different studies done by Khan et al, Jaramillo-Bustamante JC and Watson et al [6, 8, 9]. The mean age of patients enrolled was 88 months which differed from the studies [13,14]. The difference in age probably resulted from lack of pneumococcal vaccination of younger children in a developing country like Nepal. Twenty-two out of 47(46.8%) had pneumonia as the primary diagnosis which was comparable to different studies.[8,9,15] Our study had the mortality of 25.53% which is comparable to results in different studies by with mortality of 26.2%, 26.6% and 34.8 % respectively [13,15,16]. However, the mortality rates differed to that of studies done by Jaramillo-Bustamante JC et al, Kutko et al and Shime et al with mortality of 18.3%, 13.5%, and 18.9% respectively. [8,10,11] The higher mortality in our study may have been related to the lack of appropriate management before being admitted to PICU and delay in transfer to PICU due to lack of PICU bed. Survivors didn't differ from non-survivors in terms of age, gender, total leukocyte count, platelet count, PH, lactate and lactate clearance which was comparable to study done by et Kaur et al.[17] The result on Initial lactate and lactate clearance differed from different studies. [13,16] This probably resulted from duration of illness before admission in our PICU and non-uniformity of lactate measurement method in these studies.

Different predictors have been studied for prognostication of children in pediatric intensive care. However there have been non-uniformity of the results and moreover, the data in pediatric sepsis have been limited in developing country. Mean PRISMIII was 19.77 for survivors and 36.33for non-survivors with a P value of .003. The mean PRISMIII was comparable in the study done by Munde et al with PRISMIII score of 21.3 and 42.6 with survivors and non-survivors respectively.[13] However PRISMIII differed from different studies done by Jat et al and Kim et al.[15,16] The receiver operating characteristic curve for PRISM III score shows that PRISM III had accuracy of death prediction with an area under curve of .852(95% confidence interval (.702-.900) which was comparable to the results of studies done by Kim et al and Jat et al.[15, 16]

Conclusion

Sepsis has been an important cause of mortality in children admitted in PICU. The high PRISMIII score has been linked to higher mortality in our children.

Source of funding: none

References

1. Carcillo JA. Reducing the global burden of sepsis in infants and children: a clinical practice research agenda. Pediatr Crit Care Med. 2005 May 6 ,S157-64.
2. Deborah Farrel and Simon Nadel .What's New in Paediatric Sepsis? Curr Pediatr Rep. 2016(4) 1–5.
3. Bryce J, Cynthia Boschi Pinto, Shibuya K ,Black RE. WHO estimates of the causes of death in children.Lancet. 2005 Mar 26-Apr 1;365(9465):1147-52.
4. Goldstein B, Giroir B ,Randolph A. International pediatric sepsis consensus conference: definitions for sepsis and organ dysfunction in pediatrics.Pediatr Crit Care Med. 2005 Jan;6(1):2-8
5. Dellinger RP, Levy Mm - Rhodes A, Rhodes A - Annane D, Annane D - Gerlach H et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock: 2012.Crit Care Med. 2013 Feb;41(2):580-637.
6. Khan MR, Maheshwari PK ,Masood K , Qamar FN,Haque AU. Epidemiology and outcome of sepsis in a tertiary care PICU of Pakistan.Indian J Pediatr. 2012 Nov;79(11):1454-8
7. Khilnani P, Singhi S Lodha R, Lodha R - Santhanam I, Santhanam I,Sachdev A ,Chugh K, Jaishree M, et al. Pediatric Sepsis Guidelines: Summary for resource-limited countries.Indian J Crit Care Med. 2010 Jan;14(1):41-52
8. Jaramillo-Bustamante JC, Marin-Agudelo A,Fernandez-Laverde M, Fernandez-Laverde M Bareno-Silva J, Bareno-Silva J. Epidemiology of sepsis in pediatric intensive care units: first Colombian multicenter study. Pediatr Crit Care Med. 2012 Sep;13(5):501-8.
9. Watson RS, Carcillo Ja ,Linde-Zwirble WT,Clermont G, Lidicker J, Angus DC. The epidemiology of severe sepsis in children in the United States.Am J Respir Crit Care Med. 2003 Mar 167(5):695-701
10. Kutko MC, Flaherty MB, Helmrich RF, Ushay HM, Pon S, Greenwald BM, et al. Mortality rates in pediatric septic shock with and without multiple organ system failure,Pediatr Crit Care Med. 2003 Jul;4(3):333-7
11. Shime N, Kawasaki T ,Saito O, Akamine Y, Toda Y, Takeuchi M, Sugimura H, et al. Incidence and risk factors for mortality in paediatric severe sepsis: results from the national paediatric intensive care registry in Japan.Intensive Care Med. 2012 Jul;38 (7):1191-7.
12. de Souza DC, Shieh H,Barreira ER, Ventura AMC, Bousso A, Troster EJ.Epidemiology of Sepsis in Children Admitted to PICUs in South America. Pediatr Crit Care Med. 2016 Aug;17(8) :727-34
13. Munde A, Kumar N, Beri RS, Puliyel JMLactate Clearance as a Marker of Mortality in PediatricIntensive Care Unit. Indian Pediatr. 2014 Jul;51(7):565-7
14. Khilnani P, Sarma D Singh R, Uttam R, Rajdev S, Makkar A, Kaur J, et al. Demographic profile and outcome analysis of a tertiary level pediatric intensive care unitIndian J Pediatr. 2004 Jul;71(7):587-91
15. Kana Ram Jat UJ, and Vinod K. Gupta. Serum lactate levels as the predictor of outcome in pediatric septic shock. Indian J Crit Care Med, 2011;15(2):102-7.
16. Kim YA, Ha Ej,Jhang WK, Jhang ,Park SJ. Early blood lactate area as a prognostic marker in pediatric septic shock.Intensive Care Med. 2013 Oct;39(10):1818-23
17. Gurpreet Kaur NV, Kundan Mittal, Jaya Shankar Kaushik, and Mohammad Aamir. Clinical outcome and predictors of mortality in children with sepsis, severe

sepsis, and septic shock from Rohtak, Haryana: A prospective observational study Indian J Crit Care Med. 2014 Jul;18(7):437-41