Original Resea	Volume - 10 Issue - 11 November - 2020 PRINT ISSN No. 2249 - 555X DOI : 10.36106/ijar Pediatrics STUDY OF NUTRITIONAL STATUS OF CHILDREN ADMITTED WITH SEPSIS AND SEPTIC SHOCK
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ABSTRACT Aim An	d Objectives: To study nutritional status in children with sepsis and septic shock.
Study I	Design: A prospective observational study.

Methodology: Patients were classified into sepsis and septic shock according to the organ dysfunction and underlying circulatory, cellular or metabolic disturbances. Shock was classified functionally into hypovolemic, cardiogenic, septic and distributive on the basis of history and physical examination.

The patients were managed according to the protocol adapted from Textbook of Pediatric Intensive Care and as per PALS guidelines. Appropriate antibiotics were started in all suspected cases of septic shock. Demographical data like age, sex, immunization and nutrition status, anthropometry collected along with lab parameters and treatment history recorded.

Results: Those patients with inadequate calorie intake were significantly associated with sepsis and septic shock. (p=0.042). In our study Sepsis and septic shock were more associated with rural population as compared to urban population. In our study there was no significant association found with other variables such as gender, prior immunization, co-morbidities.

Conclusion: We found caloric intake prior had definite impact on outcome of sepsis and septic shock. We found Sepsis and septic shock were more associated with rural population as compared to urban population.

KEYWORDS:

INTRODUCTION

The global impact of childhood malnutrition is staggering. The synergismbetween malnutrition and infection contributes substantially to childhood morbidityand mortality. Anthropometric indicators of malnutrition are associated withthe increased risk and severity of infections caused by many pathogens, includingviruses, bacteria, protozoa, and helminths[1,2,3,4].

Malnutrition, which encompasses under- and overnutrition, is responsible for an enormous morbidity and mortality burden globally. Malnutrition results from disordered nutrient assimilation but is also characterized by recurrent infections and chronic inflammation, implying an underlying immune defect which may leads to sepsis and septic shock[1,2,3,4].

Among children aged 1-59 months, 3.7 million children died due to lower respiratory infection, malaria, diarrheal disease and 321,000 children died as a result of injury. Although these etiologies may result in death via multiple mechanisms, they suggest that sepsis from communicable diseases and hypovolemia due to infectious gastroenteritis remain major causes of shock in developing countries[5].

Historically, shock has been defined as a state of acute energy failure that stems from a decrease in adenosine triphosphate production, and subsequent failure to meet the metabolic demands of the body leading to anaerobic metabolism and cytotoxic metabolite accumulation. However, the clinical definition of shock relies on a constellation of signs and symptoms that include tachycardia, poor capillary perfusion, decreased urinary output and altered mental status. The four major categories of shock include (i) Hypovolemic shock (ii) Obstructive shock, (iii) Cardiogenic shock and (iv) Distributive shock (caused by maldistribution of the circulating volume)[6].

Literature reports that when shock was unresolved, progression to multi-organ failure would be inevitable resulting in an overall mortality of 46% to 54%[7].

MATERIALSAND METHODS

All children between 1 month and 18 years of age admitted with the clinical evidence of sepsis in the pediatric emergency from March 2016 to June 2017 were included. Shock was identified by the presence of at least one of the following parameters i.e., tachycardia and/or hypotension along with signs of systemic hypoperfusion[8].Sample size was calculated by considering the previous data of hospital approximately 8% prevalance of shock .

Children<1 month and >18 years of age were excluded from this study.Patients not fulfilling criteria were excluded. The study protocol was reviewed and approved by the scientific & ethics committees; it was therefore performed in accordance with ethical standards. Written informed consent was taken from patient's parents /guardians prior to enrollment in the study. Data regarding Vitals, General Examination Nutritional status will be recorded.

In the emergency department, the patients were managed according to the protocol adapted from American College of Critical Care Medicine (ACAM)[9] and as per PALS guidelines[10] and Sepsis Survival Guidelines 2012[11]. Patients were classified into compensatedor decompensated shock according to the presence or absence of hypotension. [6,8]

After resuscitation in emergency department, child was admitted in PICU or pediatric ward depending on patients shock state and stage.

Shock was then classified functionally into Hypovolemic, Cardiogenic, Septic and other types such as anaphylactic neurogenic etc, on the basis of history and physical examination.

Appropriate antibiotic was started in all suspected cases of septic shock. Arterial blood gases, hemoglobin, total and differential blood count, platelet count, peripheral blood film, blood glucose, renal function tests, and chest X-ray were done in all cases. Other investigations were done in required cases and record was kept of the same.

Treatment record was kept in the form of no. of patients requiring antibiotic, iv fluids (crystalloids /colloids), blood products, inotropes, PICU, intubation, steroids, renal replacement therapy (peritoneal dialysis, hemodialysis, CRRT).

OBSERVATION AND RESULT

Table No.1: Showing Baseline Characteristics Of All Patients

	Sepsis	Septic Shock	All	Test value	P value
Ν	92	27	119		
Mean Age in months ±SD	40.1±38.3	61.4±54.1	45.0±43.1	t=1.908	0.065
Min – Max	1-166	1-180	1-180		

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Ge	nder					
•	Males	53	16	69	Chi=0.0	1.0
•	Females	39	11	50		
Lo	cation					
	Rural	54	14	68	Chi=	0.681
	Urban	38	13	51	0 169	0.001
	oroun	20	10	01	0.105	
Im	munizad					
	Complete	80	26	115	Chi-0.0	1.0
	Incomplete	3	1	115	CIII-0.0	1.0
-	meompiete	5	1	-		
G	1 . 1 . 1					
Ca	loric Intake					
pri	A de avente	20	0.5	4.4	C1.:	0.042
•	Adequate	59	05	44	Cni=	0.042
•	Inadequate	55	22	/5	4.132	Sig
Pro	tein Intake					
nri	or to illness					
•	Adequate	29	08	37	Chi=0.0	1.0
	Inadequate	63	19	82	e 0.0	
Tre	neport	05	15	02		
•	Self	51	12	63	Chi=	0.431
-	transported	51	12	05	0.610	0.451
	Ambulance	41	15	56	0.017	
D		71	15	50		
ĸe	Terred by	50	1.5	(7	C1 · 0.0	1.0
•	Pediatrician	52	15	6/	Cni=0.0	1.0
•	Non-	10	10	50		
	pediatrician	40	12	32		
Du	ration of	4.5±1.9	6.0 ± 2.1	4.9 ± 2.0	t=3.569	0.001
illn	less prior to					Sig
ref	erral					
Da	ys (Mean±					
SD)					
An	tibiotics					
Re	ceived prior					
to 1	referral					
•	Yes	41	16	57	Chi=	0.261
•	No	51	11	62	1.265	
Co	-morbidities					
Pre	esent	02	01	03	Fisher	0.541
No	t present	88	26	114	test	

Statistically significant association was found in sepsis and septic shock, between prior adequate and inadequate calorie intake. Those patients with inadequate calorie intake were significantly associated with sepsis and septic shock. (p=0.042). Even poor protein intake prior to illness were associated with sepsis or septic shock (poor outcome).

In our study Sepsis and septic shock were more associated with rural population as compared to urban population.

Late presentations to the tertiary care hospital (6-8days) were significantly associated with septic shock as compared to sepsis (4-5 days).

In our study there was no significant association found with other variables such as gender, prior immunization, co-morbidities[Table No.1].

Table No 2:	Showing Anthro	pometric Charac	teristics Of All Boys

Parameter	< 1 year	1-5 years	>5 years
	16	35	18
Weight SD score			
<- 3 SD	0	8	6
≥- 3 SD	16	27	12
Height SD score			
<- 3 SD	4	11	3
≥ -3 SD	12	24	15
BMI Mean	16.66	16.13	14.16
BMI Z score (Mean)	-2.11	-2.50	-6.91
Percentile (N %)	5	11	6
< 5 rd centile	0	7	5
5- 85 th centile	1	2	0
85-95 th centile	1	2	0
$> 95^{th}$ centile			

In Boys, the difference in BMI Z score not significant (ANOVA test, F=0.426, P=0.655)(Table No.2)

Table No 3:	ShowingA	nthropometric	Characteristics	Of All Girls
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	< 1 year	1-5 years	>5 years
	15	22	13
Weight SD score			
< 3 SD	1	4	3
\geq 3 SD	14	18	10
Height SD score			
< 3 SD	2	6	4
\geq 3 SD	13	16	9
BMI Mean	16.32	16.56	15.46
BMI Z score	-0.94	0.28	-2.67
(Mean)			
Percentile (N %)			
< 5 rd centile	3	1	5
5- 85 th centile	3	7	2
85-95 th centile	0	3	0
> 95 th centile	1	1	1

In girls, the difference inBMI z scorenot significant (ANOVA test, F=2.213, P=0.117)(Table No.3).

DISCUSSION

The prevalence of pediatric sepsis and septic shock were less studied in Indian subcontinent. Our study is prospective observational study conducted in a tertiary care hospital to study nutritional status in children with septic and septic shock. The study included a total of 119 patients out of which 92 had sepsis and 27 had septic shock. 4 patients out of 27 patients of septic shock were expired.

In our study based on caloric intake statistically significant association was found in sepsis and septic shock, between prior adequate and inadequate calorie intake. Those patients with inadequate calorie intake were significantly associated with sepsis and septic shock. (p=0.042). Bagri et al[12], ArturDelgado et al[13], chisti MJ et al[14] were similar studies showing importance of nutrition in patient of sepsis and septic shock. Even poor protein intake prior to illness was associated with sepsis or septic shock (poor outcome) but statistical significance was not found.

Sepsis and septic shock were more commonly associated with rural population as compared to urban population. Late presentations to the tertiary care hospital (6-8days) were significantly associated with septic shock as compared to sepsis (4-5 days).

Immunization status had no direct co-relation with sepsis and septic shock. Even completely immunized children had both sepsis and septic shock .There was no significant association found with other variables such as gender, co-morbidities.

SUMMARY

We studied 119 cases of sepsis and septic shock in children between ages of 1 month to 18 years over a period of 15 months. An attempt was done to to study nutritional status in children with sepsis and septic shock in these 119 patients. We found caloric intake prior had definite impact on outcome of sepsis and septic shock.

We found Sepsis and septic shock were more associated with rural population as compared to urban population. Late presentations to the tertiary care hospital(6-8days) were significantly associated with septic shock as compared to sepsis (4-5 days).

Most common focus of infection was of viral etiology in sepsis and respiratory etiology in case of septic shock.Most common system involved was respiratory system in both sepsis and septic shock followed by gastro intestinal/liver. Most common presentation being fever followed by Tachypnea and Tachycardia.

We found colloid and blood products play important role management of septic shock. Most of the patients managed with first line antibiotics in sepsis whereas two or more antibiotics required in septic shock.

In most of the cases single inotropic agent required in management of shock whereas two more inotropes required in septic shock. In Ventilation and Renal supports play significant role in management of sepsis and septic shock.

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