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PLATELET COUNTS AND OUTCOME IN PAEDIATRIC INTENSIVE CARE UNIT

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ABSTRACT

INTRODUCTION: Thrombocytopenia is defined as platelet count less than 150×10^9/L. Thrombocytopenia results from underproduction or overconsumption of platelets. **OBJECTIVE**: Objective of this study is to understand the clinical profile of Thrombocytopenia patients. To correlate the incidence related diseases with Thrombocytopenia and find the outcome. **METHODS**: This is a prospective case control study. Over a period of 3 months from March 2016 to May 2016. 120 Patients admitted in the PICU of department of Paediatrics are studied for platelets count and outcome. **RESULTS**: This study was designed as case control study having 60 subjects in both the groups. Mean platelet count on admission and on discharge of the cases group subjects were observed at 80728.33(±110285.55) while at discharge this was 167891.9(±43065.18) showed a significant change. ($P<0.05$). In control group the observations were as 213145.6(±40928.4) and 240073.3(±39682.6). In case group the mean baseline platelet of the cases who were died was 56605.5 (±13928.4) while among the cases who were discharged the baseline platelet was 91066.6 (±130603.6) and this was significantly higher ($p<0.05$). **CONCLUSION**: Mortality was significantly higher in patients having thrombocytopenia (30%), as compare to non thrombocytopenic patients (10%).

KEYWORDS: Thrombocytopenia, PICU, sepsis, meningitis.

INTRODUCTION

Thrombocytopenia which is defined as platelet count less than 150×10^9/L, has a greater incidence in ICUs compared to wards.

Thrombocytopenia results from underproduction or overconsumption of platelets. Some common causes that might affect both platelet production and consumption i.e. sepsis and malignancy. Increased platelet consumption is the most common cause of thrombocytopenia in PICU with Disseminated Intravascular Coagulation and Hemolytic Uremic Syndrome being the common diagnosis.[1] Prevalence of thrombocytopenia varies in various ICUs ranging from 13% to 58% depending on clinical features of patients .Nearly all studies analysing thrombocytopenia as a prognostic marker in ICU patients found an inverse correlation of the platelet count with the risks for a prolonged ICU stay and mortality (mortality rate 31%–46% in thrombocytopenic patients vs 16%–20% nonthrombocytopenic patients).[7]

Prolonged and sustained thrombocytopenia over more than 4 days after ICU admission or a drop in platelet count of >50% during ICU stay is related to a 4 to 6 fold increase in mortality. Platelet transfusions are done to increase the platelet counts but the response to transfusions varies from patient to patient and severity of disease.[8] Few studies have been done to know the prevalence of thrombocytopenia in ICU and the need for transfusion and response to this transfusion. There is not much data available from developing country like India.

This study was planned to know about the clinical propfile of thrombocytopenia and relationship with mortality in PICU. Various disease conditions which were associated with thrombocytopenia were studied and their outcome was correlated.

Material and Methods: Study design: This was a prospective case contol study. Study period was 3 months from March 2016 to May 2016. Study area: The study was carried out in the PICU pediatrics dept of NSCB medical college JBP. Study subjects: The patient getting admitted in the department of pediatrics with any disease but with thrombocytopenia [<1.5 lacs/cmm](cases) and without thrombocytopenia (controls)were included in the study. Sample size: 120

patients admitted in PICU in pediatrics department .Patients included in this study were Patients with platelet count <1.5 lacs /cmm, Age upto 14 years and Who are willing to participate in study with written consent. And patients excluded were Patients with platelet count >1.5 lacs /cmm, Age above 14 years and Who are not willing to participate in study. Before initiating the study, clearance will be obtained from institutional ethical committee. Study participants were selected according to inclusion and exclusion criteria. Prior written informed consent will was obtained from all prospective patients. A detailed history, clinical evaluation was done based on proforma, all relevant clinical and socio-demographic information was obtained from study participants and then all required investigations were conducted and data was entered into predesigned, validated and pretested proforma. Blood investigations: Blood investigations eg CBC, platelet count, Hb, Malaria, Dengue etc and Radiological investigations: X Ray, USG, CT Scan, MRI etc were done according to the diagnosis.

DATA COLLECTION: Data was collected from the patients with thrombocytopenia and entered in prevalidated and pretested proforma.

STATISTICAL ANALYSIS: All the variables from collected data will be entered into Microsoft excel sheet. Univariate analysis was done to calculate the frequency and percentage and bivariate analysis was done to find association and respective Odd's ratio and confidence interval. Chi square test/student t test was applied

RESULTS

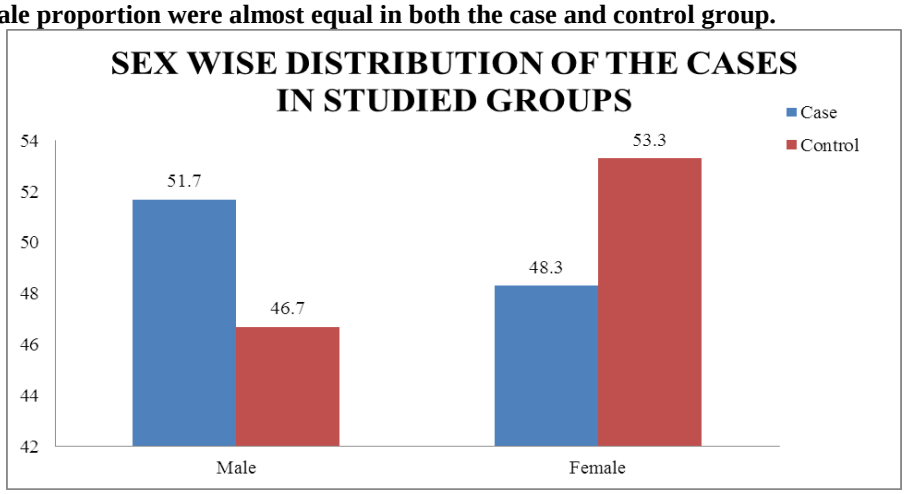
This study was designed as case control study having 60 subjects in both the groups.

1. Mean age of the studied subjects in case group was observed at 4.97(±4.36) while in control group it was 5.15(±3.96), statistically difference was insignificant. (P>0.05).

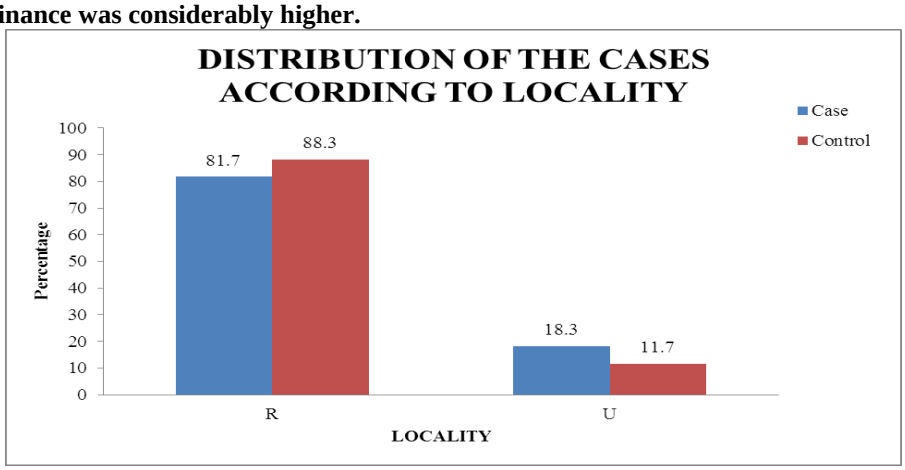
Age wise distribution of the cases in studied groups

Age	Total	Case	Control
<1	24 100.0%	13 54.2%	11 45.8%
1-5	38 100.0%	20 52.6%	18 47.4%
5-9	30 100.0%	12 40.0%	18 60.0%
10-14	28 100.0%	15 53.6%	13 46.4%
Total	120	60	60
Mean±SD		4.97(±4.36)	5.15(±3.96)

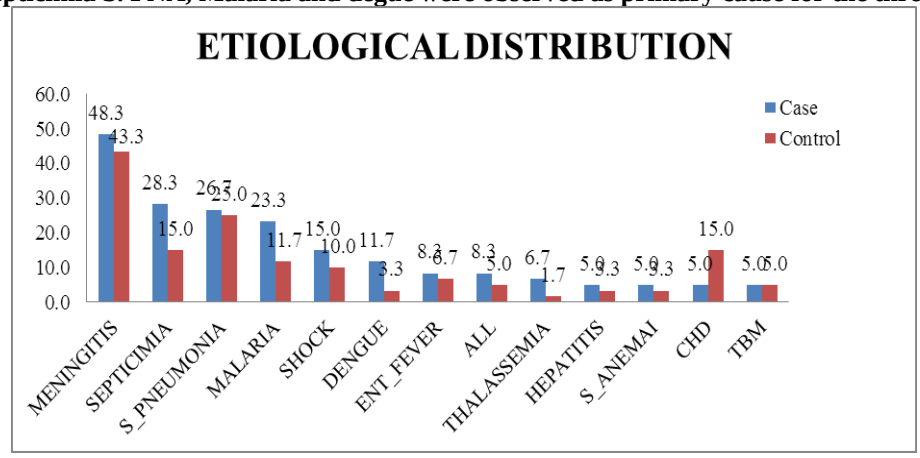
2. Male to female proportion were almost equal in both the case and control group.



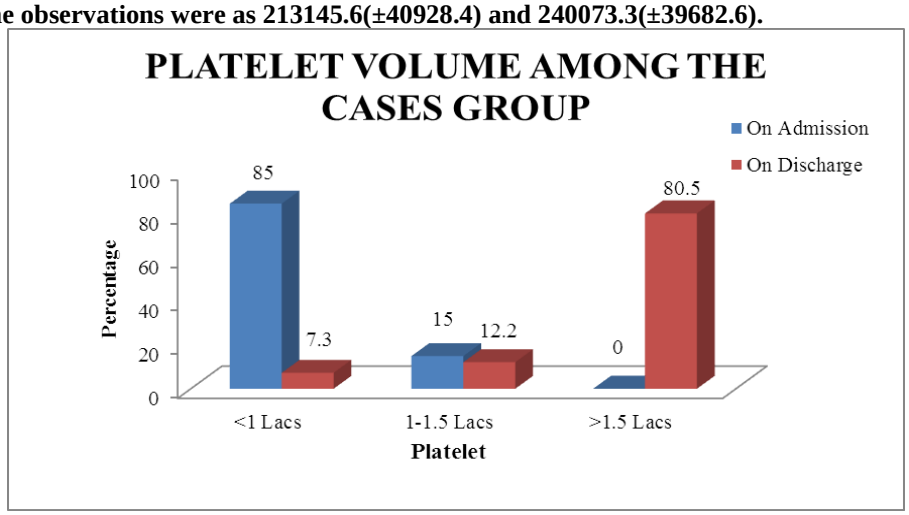
3-Rural predominance was considerably higher.



4-Meningitis, septicimia S. PNA, Malaria and degue were observed as primary cause for the thrombocytopenia.

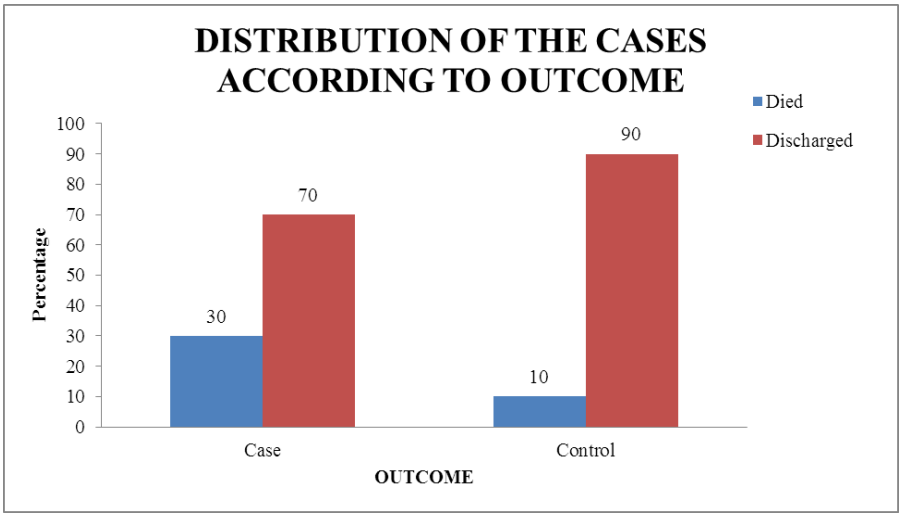


5. Mean platelet count on admission and on discharge of the cases group subjects were observed at 80728.33(±110285.55) while at discharge this was 167891.9(±43065.18) showed a significant change. (P<0.05). In control group the observations were as 213145.6(±40928.4) and 240073.3(±39682.6).



6. In case group the mean baseline platelet of the cases who were died was 56605.5 (±13928.4) while among the cases who were discharged the baseline platelet was 91066.6 (±130603.6) and this was significantly higher (p<0.05).

Group	Outcome		TLC	Hb (gm)	Platelet count on admission	Platelet count on discharge
Case	Died	Mean	15383.3333	8.5611	56605.56	
		Std. Deviation	11060.54195	2.57959	13928.408	
		N	18	18	18	
	Discharged	Mean	16945.0000	9.5119	91066.67	167891.95
		Std. Deviation	12837.12465	3.03099	130603.660	43065.187
		N	40	42	42	41
	Total	Mean	16460.3448	9.2267	80728.33	167891.95
		Std. Deviation	12238.03303	2.91454	110285.556	43065.187
		N	58	60	60	41
Control	Died	Mean	17650.0000	9.2167	206333.33	
		Std. Deviation	6688.42283	2.34130	39565.979	
		N	6	6	6	
	Discharged	Mean	10784.2593	10.0019	213902.59	240073.33
		Std. Deviation	5393.51448	2.07068	41367.309	39682.601
		N	54	54	54	54
	Total	Mean	11470.8333	9.9233	213145.67	240073.33
		Std. Deviation	5851.25259	2.09109	40928.461	39682.601
		N	60	60	60	54

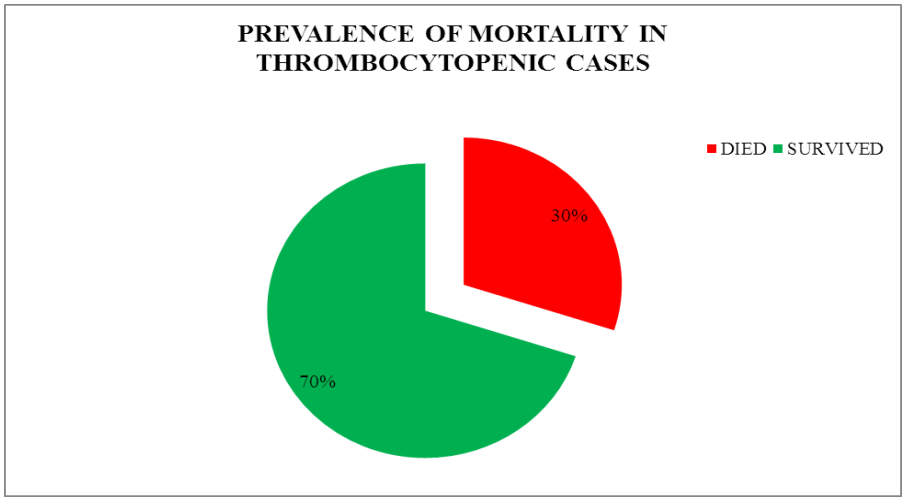


7. The proportion of mortality among the cases was 30.0% while among the control 10% cases were died and a significant difference was found. (p<0.05).

Outcome * Group Cross tabulation

			Group		Total
			Case	Control	
Outcome	Died	Count	18	6	24
		% within Group	30.0%	10.0%	20.0%
	Discharged	Count	42	54	96
		% within Group	70.0%	90.0%	80.0%
Total		Count	60	60	120
		% within Group	100.0%	100.0%	100.0%

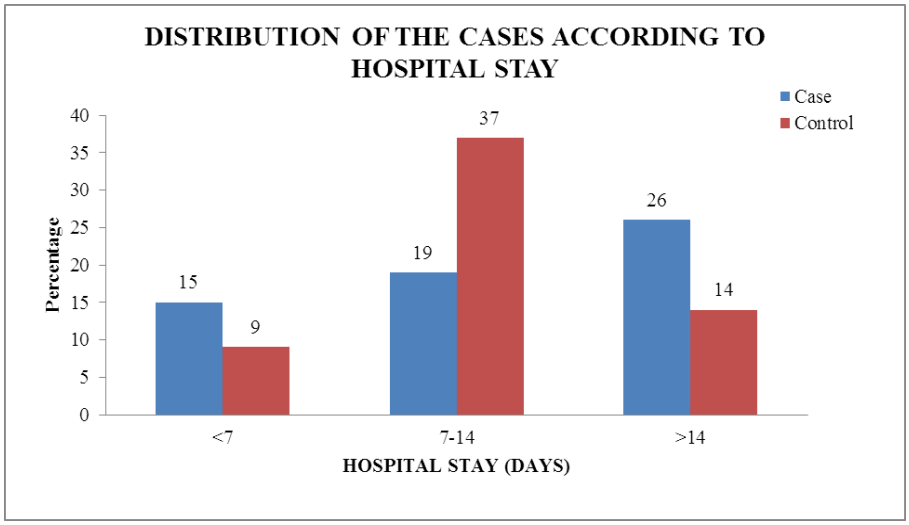
$\chi 2=7.50$; $p<0.05$.



8. Among the cases, 15(25%), 19(31.7%), and 26(43.3%) cases were stayed in hospital for <7, 7-14 and >14 days respectively.

Duration (Days)	Total	Case	Control
<7	24 100.0%	15 62.5%	9 37.5%
7-14	56 100.0%	19 33.9%	37 66.1%
>14	40 100.0%	26 65.0%	14 35.0%
Total	120	60	60
Mean±SD		13.28±3.05	12.58±3.97

T=1.083p>0.05.



DISCUSSION

- The clinical profile of Thrombocytopenia patients, its correlation with different related diseases and outcome of such cases - discharge, mortality and duration of hospital stay was analysed.
- In our study we found that meningitis (80.5%) was a major associated disease with thrombocytopenia as compared to the Russel F. Mussa et al study. In Russel F et al study thrombocytopenia was mostely associated with septicemia (60.34%).[2] But in our study we found that septicemia was the second most common (47.16%) associated factor .
- Sepsis was also found to have an association with thrombocytopenia 47.16% (28.3 of 60) as compared to 65 % of the patients with sepsis had thrombocytopenia (23 of 49) in Shruti Agrawal, Anil Sachdev et al study[11], which is comparable to other adult studies.[3,4,9]
- The source of admission was from Paediatric Emergency department 100%) in our study and which is comparable to the study by Agarwal et al., had main source of admission from Emergency Room 79.7%[1], while the study by Yilmaz et al., where admissions were mainly from hospital wards (70.2%)[6], Emergency Department (26.6%) and Operation room (3.2%).
- Mortality in thrombocytopaenic patients was higher in our study (30%) as compared to non thrombocytopenic patients (10%), which is comparable to Amarpreet Kaur et al (29.21% vs 15.05%) and statistically significant {OR 2.3288 (1.2673-4.2795), $\chi 2$ =7.65 p-value=0.0053} which is in consonance with other studies.[10]
- Invasive intravascular catheters (arterial or venous) and mechanical ventilation have been described in the literature as an independent risk factor for development of thrombocytopenia, though this may only reflect the disease severity and local ICU preferences.[11,12] In our study, there was no such association observed. This may be due to small patient number.
- Patients who stayed in the PICU for a longer period had a higher incidence of thrombocytopenia reflecting the disease severity necessitating prolonged stay and increased risk of intensive care acquired sepsis. The increased risk of thrombocytopenia with prolonged ICU stay is also seen in adult studies.[3,4,5,11]
- The present study had its own limitations. Besides small sample size, various confounding factors are present at any given point of time in critically ill children, which cannot be controlled. Many pre-existing conditions and drugs in use may influence the platelet counts, which were not studied in this cohort. The limited number of patients in certain groups does not allow great precision in the estimation of odds ratio and this may have missed some important risk factors. So the results need to be validated in a larger cohort. The study is not powered to actually work out the cause and effect and can only suggest an association between various factors.

CONCLUSION

Platelet counts <150.0/nL is at least as common in Paediatric ICU as in adult intensive care. Thrombocytopenic children have higher incidence of bleeding, longer ICU stay and a higher mortality.

Similar studies are required with larger number of patients in the paediatric age group to further consolidate the present study's findings.

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