Mean Platelet Volume in Neonatal Septicemia

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Overview

The aim of this study was to study mean platelet volume (MPV) in neonatal septicemia. In 40 cases of clinically suspected neonatal septicemia, 65% of cases had baseline MPV levels (≥ 10.35 fl) and 35% of cases had baseline levels (<10.35 fl). The sensitivity, specificity, positive and negative predictive values (PPV and NPV) of MPV (≥10.35 fl) in neonatal septicemia were 94.7%, 61.9%, 69.2% and 92.9% with the accuracy of 77.5%.
As for the outcomes of septicemia, significant relation was noted between normal outcomes and eleven babies (64.7%) having low baseline MPV levels (<10.35 fl) (P=0.001). Twelve babies (92.31%) who suffered from severe parenchymal lung diseases also had significantly higher MPV levels (≥10.35 fl) (P=0.031).

Introduction

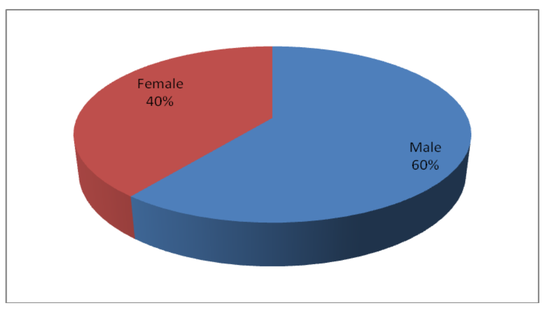
Neonatal septicemia is a global health problem due to its significant contribution to the morbidity and mortality throughout the world. But, the diagnosis of neonatal septicemia still remains a major challenge. MPV is considered the most accurate measure of platelet size, acts as a marker of platelet production & consumption, and may be related to bone marrow, hypoxia, perinatal inflammation and infections.
So, the determination of baseline MPV level can be used in addition to CRP at both diagnosis and response to anti-microbial treatment in neonatal septicemia although blood culture is a gold standard confirmatory test. It is a quick and reliable guide in the assessment of bone marrow response to septicemia.

Materials and Methods

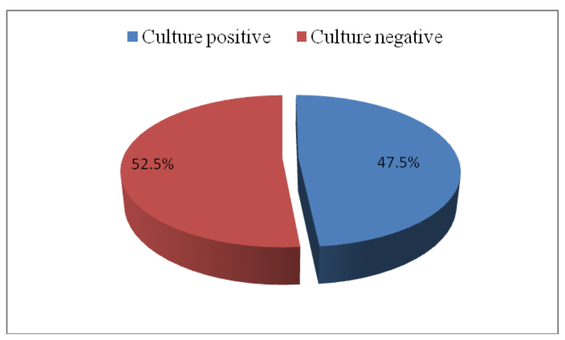
This was hospital-based cross-sectional analytic study. Forty cases of clinically suspected septicemia were carried out in the neonatal units of Mandalay Children Hospital. By using automated hematology analyzer (XN 1000, Sysmex), baseline MPV levels at the time of admission were noted and then, data obtained were analyzed. Peripheral blood film examination was also done together with my supervisor.

Results

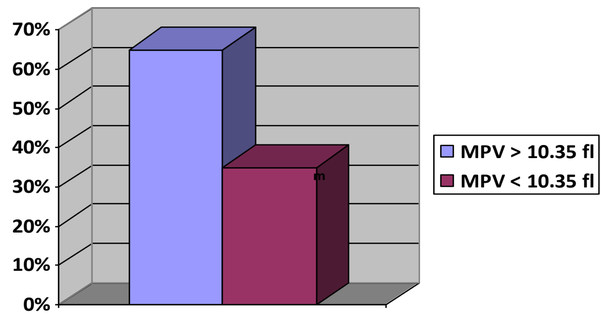
Among 40 cases of clinically suspected neonatal septicemia, the mean MPV was 10.5 fl (Standard deviation (SD) = 1.9). The minimal MPV value was 7 fl and the maximum 13.8 fl.



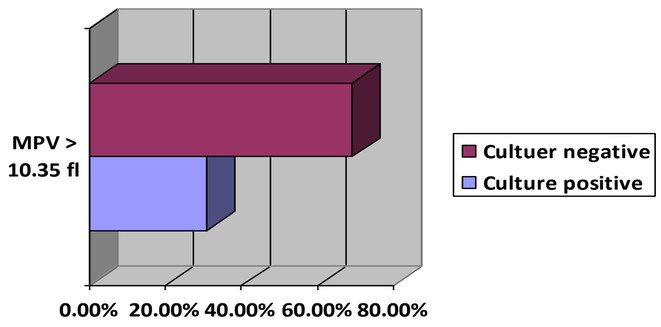
Distribution of neonatal septicemia in relation to sex



Distribution of neonatal septicemia in relation to blood culture



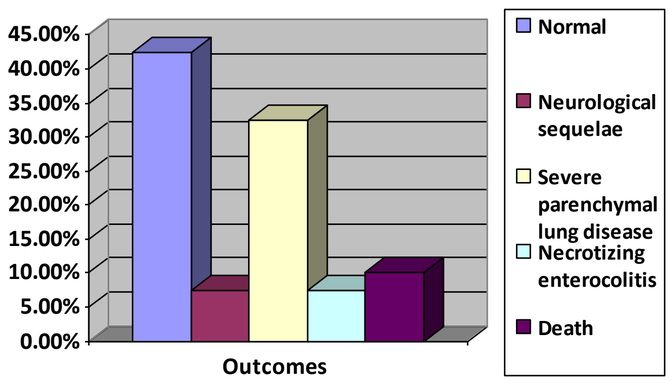
Distribution of baseline MPV level in clinically suspected neonatal septicemia



Distribution of high MPV level in blood culture positive and negative cases

MPV level	Sensitivity	Specificity	PPV	NPV	Accuracy
MPV ≥ 10.35 fl	94.7%	61.9%	69.2%	92.9%	77.5%

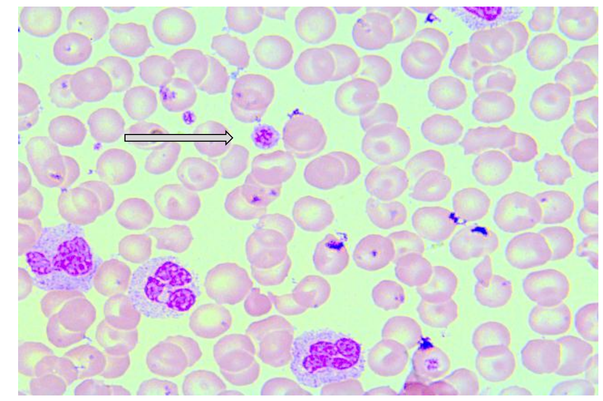
Distribution of accuracy of MPV in neonatal septicaemia



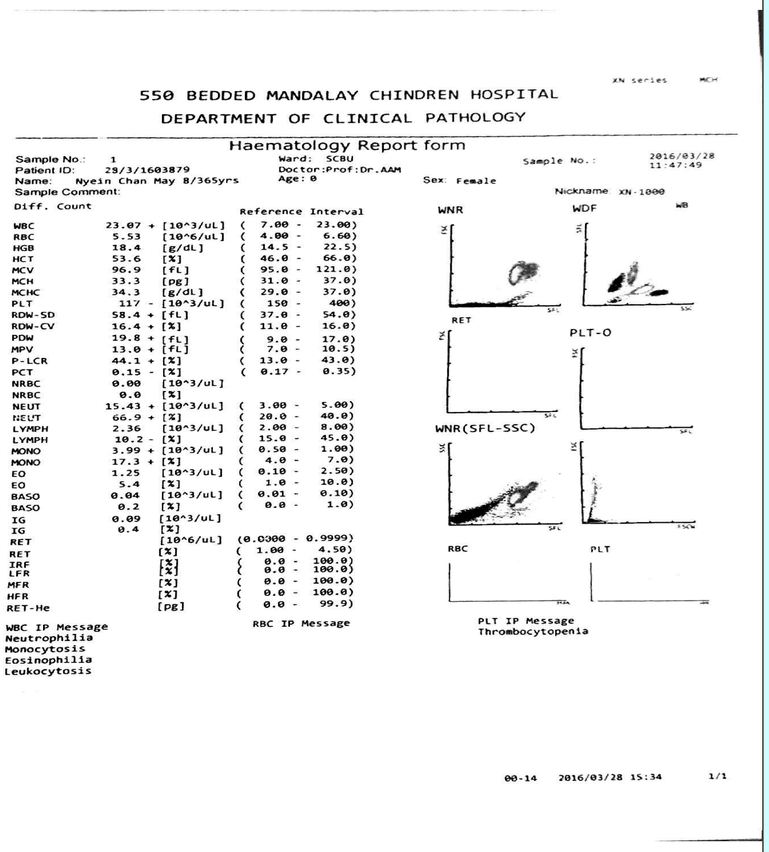
Distribution of outcomes of neonatal septicaemia

Outcomes	MPV (< 10.35 fl)	MPV (≥ 10.35 fl)	Total	Statistical significant (P value)
Normal	11 (64.7%)	6 (35.3%)	17 (100%)	0.001
Neurological sequelae	2 (66.67%)	1 (33.33%)	3 (100%)	0.57
Severe parenchymal lung disease	1 (7.69%)	12 (92.31%)	13 (100%)	0.031
Necrotizing enterocolitis	0 (0.0%)	3 (100%)	3 (100%)	0.5
Death	0 (0.0%)	4 (100%)	4 (100%)	0.3

Distribution of outcomes of neonatal septicaemia in relation to MPV levels



Peripheral blood film showing giant platelets (arrow head) (Leishman x100)



550 BEDDED MANDALAY CHINDREN HOSPITAL
DEPARTMENT OF CLINICAL PATHOLOGY

Haematology Report form

Sample No.: 1
Patient ID: 29/3/1603879
Name: Nyein Chan May 8/365yrs
Sample Comment:
Ward: SCBU
Doctor:Prof:Dr.AAM
Age: 0
Sex: Female
Sample No.: 2016/03/28 11:47:49
Nickname XN-1000

Diff. Count			Reference Interval
WBC	23.07 +	[10^3/uL]	(7.00 - 23.00)
RBC	5.53	[10^6/uL]	(4.00 - 6.60)
HGB	18.4	[g/dL]	(14.5 - 22.5)
HCT	53.6	[%]	(46.0 - 66.0)
MCV	96.9	[fL]	(95.0 - 121.0)
MCH	33.3	[pg]	(31.0 - 37.0)
MCHC	34.3	[g/dL]	(29.0 - 37.0)
PLT	117 -	[10^3/uL]	(150 - 400)
RDW-SD	58.4 +	[fL]	(37.0 - 54.0)
RDW-CV	16.4 +	[%]	(11.0 - 16.0)
PDW	19.8 +	[fL]	(9.0 - 17.0)
MPV	13.0 +	[fL]	(7.0 - 10.5)
P-LCR	44.1 +	[%]	(13.0 - 43.0)
PCT	0.15 -	[%]	(0.17 - 0.35)
NRBC	0.00	[10^3/uL]	
NRBC	0.0	[%]	
NEUT	15.43 +	[10^3/uL]	(3.00 - 5.00)
NEUT	66.9 +	[%]	(20.0 - 40.0)
LYMPH	2.36	[10^3/uL]	(2.00 - 8.00)
LYMPH	10.2 -	[%]	(15.0 - 45.0)
MONO	3.99 +	[10^3/uL]	(0.50 - 1.00)
MONO	17.3 +	[%]	(4.0 - 7.0)
EO	1.25	[10^3/uL]	(0.10 - 2.50)
EO	5.4	[%]	(1.0 - 10.0)
BASO	0.04	[10^3/uL]	(0.01 - 0.10)
BASO	0.2	[%]	(0.0 - 1.0)
IG	0.09	[10^3/uL]	
IG	0.4	[%]	
RET		[10^6/uL]	(0.0300 - 0.9999)
RET		[%]	(1.00 - 4.50)
IRF		[%]	(0.0 - 100.0)
LFR		[%]	(0.0 - 100.0)
MFR		[%]	(0.0 - 100.0)
HFR		[%]	(0.0 - 100.0)
RET-He		[pg]	(0.0 - 99.9)

WBC IP Message
Neutrophilia
Monocytosis
Eosinophilia
Leukocytosis

RBC IP Message

WNR
WDF
RET
PLT-O
WNR(SFL-SSC)
RBC
PLT

PLT IP Message
Thrombocytopenia

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Haemogram result of one of neonatal septicemic cases

Conclusion

The baseline MPV level of ≥10.35 fl can be used as a screening and auxiliary test because this is simple, quick, cost effective and readily available tool with higher sensitivity, NPV and good accuracy in the diagnosis of neonatal septicemia.
Moreover, MPV can also be used as a predictor for some of the outcomes of septicemia. Higher MPV levels were found to be related to severe parenchymal lung disease and lower levels to normal outcomes.

Contact information

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