

**Platelets lymphocyte ratio, Raised red cell distribution width and platelets distribution width as a risk assessment prognostic tool for septicemia pediatric patients**

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**Abstract**

**Objectives & Aims:** The evaluation and identify new prognostic markers suggested in recent studies for *septicemia pediatric patients* raised red blood cell distribution width (RDW) & PDW has been found to be associated with poor prognosis after recent *septicemia pediatric patients*. Evaluate the relationship between raised RDW and PDW mortality morbidity after the initial attack of septicemia . Increased red blood cell distribution width (RDW) has been associated with adverse outcomes. We studied the association between raised RDW during hospital course with clinical outcomes survival index of patients with after septicemia.

**Material & Methods:** Blood was collected in a sterile EDTA containing tube and processed following our established iso certified hospital based laboratory protocol .A complete blood counting including HB%,PCV, Red cell indices ,platelet count, total white cell count and RDW was done by Automated blood cell counter.

**CONCLUSION-** we find significantly correlation in patients with septicemia along with high RDW & PDW. RDW & PDW is an inexpensive cost effective and easily available laboratory test,high RDW with high PDW for septicemia have poor out come of patients' it could be used for mortality with morbidity risk assessment and

follow up the patients after septicemia .we find that high RDW of raised PDW pt. shows poor prognosis.

**Keyword:** PDW, Red cell distribution width.

**Material & Methods:** Study area and design- This present study was conducted at the *CNBC hospital Indore mp*. The study was designed as a observational retrograde with prospective hospital based study over a period of time from 2016 to 2018 years.

**Ethical consideration:** Blood was collected in a sterile EDTA tube and plaint tube and processed following our established laboratory protocol then generate the report of each patient. Take informed consent was obtained from all study participant for use of your blood sample for medical research after doing physician request investigating and generate the report.

**Patient's selection criteria-**The study target all patients on the basis of clinical signs ,symptoms and , history by attainer. We include both emergency and IPD patients with all groups, male and female both gender for study. Sample size is 100 patients.

**Laboratory investigations** Blood was collected in a sterile EDTA containing tube and processed following our established laboratory protocol .A complete blood counting including HB%, PCV, Red cell indices, platelet count and total white cell count and differential was done

by Automated blood cell counter and peripheral blood smear examination . The all cell count indices including RBC, WBC count with differential along with morphological changes further confirmed by manual oil immersion smear study method. Peripheral smears study was done with field A and B stain and leishman stain.

**Red Cells Distribution Width and Peripheral Smear.**

**Materials:** Purple vacutainer tube or capillary collector (EDTA) ethylenediaminetetraacetate, Slides and blue capillary tube, Needle or lancet, Vacutainer holder, Alcohol swab, Cotton balls, Absorbent materials, Slide case and hematological cell counter. and second sample in clot activator tube for serum troponin I by automated bioanalyser.

**Procedure:** Specimen is collected into EDTA (purple) vacutainer. (5 or 7ml volume)

Then the run the sample in hematological cell counter and generate RDW data.

Red cell distribution width (RDW) is a red blood cell parameter that measures variability of red cell volume/size (anisocytosis). Depending on the types of hematology analyzer instruments, RDW can be reported statistically as coefficient of variation (CV) and/or standard deviation (SD), RDW-CV and/or RDW-SD, respectively.

RDW-SD (express in fL) is an actual measurement of the width of the RBC size distribution histogram and is measured by calculating the width (in fL) at the 18-20% height level of the RBC size distribution histogram .

RDW-CV (express in %) is calculated from standard deviation and MCV

RDW-CV (%) = 1 standard deviation of RBC volume/MCV x 100%.

- RDW-SD 39-46 fL[1]
- RDW-CV 11.6-14.6% in adult[2]

**Observation & Discussion**

Platelets lymphocyte ratio	P value	Prognosis
133.1	0.349	Mild
153.1	0.314	Moderate
164.4	0.950	Sever
190.2	0.006	Marked

Normal reference value Platelets lymphocyte ratio range, 75-199)

RDW-CV With PDW	Prognosis	Survival outcome of patients	Sample size N=100
>22 to <31 %	Mild	Good	60
>33 to <35%	Moderate	Average	30
>36 to <40 %	Sever	Poor	06
>40%	Marked	Worst	04

The PDW median was 13.3%, with a reference range of 10.0%-17.9% for the 5th-95th percentiles, with a confidence interval of 95%. Normal range 9-13fL.

Result- Univariate analysis showed that there were significant associations of high RDW & PDW values with, septicemia pts , mild to marked type changes these various morphological changes cause the raised red cell distribution width use as a prognostic tool for survival index outcome of patients . Kruskal-Wallis tests revealed an association of raised RDW values with severity survival index patients :  $p < 0.0001$ , survival prognostic index of patients with higher RDW values had poorer worst prognoses than those with normal RDW values

(Wilcoxon test:  $p=0.002$ ). multivariate analysis showed higher RDW is a significant prognostic factor ( $p=0.040$ ).

**Conclusion:** Our study is, to the best of our knowledge, the first to demonstrate an association between RDW & PDW and risk of incident septicemia in a general population. The association was consistent when RDW & PDW was modeled both as continuous and categorical variables, and the risk of septicemia by RDW & PDW correlation with septicemia pattern. The presence of anemia did not affect the risk estimates. Survival of patients is easily find with RDW& PDW and septicemia correlation .

There are only a few previous reports on the relation between RDW & PDW and septicemia patients from general populations. A strong association between higher RDW & PDW and clinical septicemia wi poor out come high mortality was found is our study.<sup>13-14</sup> The risk of septicemia death increased by 16% for a 1-SD increment of RDW (HR 1.22; 95% CI, 1.14 to 1.31)<sup>14</sup> and was more than 2-fold higher among participants in the highest quintile compared with the lowest.<sup>13</sup>, the risk of septicemia events increased 39% among patients with RDW of 16% to 17% (HR 1.39; 95% CI, 1.24 to 1.57) compared with patients with RDW with normal range%.<sup>19</sup> In contrast, RDW is associated with septicemia (HR 1.05; 95% CI, 0.65 to 1.68) or myocardial mortality (HR 1.09; 95% CI, 0.96 to 1.23) in this study. Greater power to detect a significant association between RDW and risk of septicemia in our study may be the main reason for the apparent discrepant relationship between RDW & PDW and septicemia.

The mechanism for the observed association between RDW & PDW and post septicemia morbidity and mortality now a day settled. Because RDW is a statistical concept, it can be assumed that RDW is a marker of other underlying biological mechanisms.

RDW is suggested to be a biomarker reflecting a proinflammatory condition. Oxidative stress and inflammation increase RDW by impairing iron metabolism, reducing red cell life span, and modulating the response to erythropoietin by the bone marrow.<sup>21-</sup>  
<sup>22</sup> The stronger association between RDW and serum troponin I for post septicemia in our study supports the suggestion that RDW reflects inflammation. Others have also speculated that the biological link between RDW & PDW and septicemia mortality may be mediated by systemic inflammation.

It has been reported that increased post septicemia mortality by RDW is confined to those with anemia.<sup>20</sup> To explore the impact of anemia on the relationship between RDW and risk of septicemia in our study, we included hemoglobin in our multivariable model and performed analyses in which anemic participants were excluded. The risk estimates for septicemia by RDW in our study were not affected by adjustment for hemoglobin or by excluding participants with anemia. This demonstrates that anemia does not explain the strong association between RDW and septicemia . Furthermore, results from association between extremely high RDW (>16.6%) and mortality was particularly strong in those with nonanemic macrocytosis (MCV >96 fL) or microcytosis (MCV <80 fL).<sup>35</sup> We found association between RDW and risk of MI in nonanemic participants with macrocytosis or microcytosis

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