DIAGNOSTIC VALUE OF PDW AND RDW in APPENDICITIS: A RETROSPECTIVE COMPARISON OF UNCOMPLICATED AND COMPLICATED CASES

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Purpose:

This study aimed to evaluate the diagnostic significance of platelet distribution width (PDW) and red blood cell distribution width (RDW) values in patients with acute appendicitis. Our objective was to determine whether these parameters, in conjunction with standard laboratory markers, could aid in distinguishing between uncomplicated and complicated appendicitis.

Methods:

A retrospective analysis was performed on 1,230 patients who underwent surgery for acute appendicitis between 2018 and 2023. Preoperative laboratory values, including white blood cell count (WBC), PDW, RDW-CV, RDW-SD, and C-reactive protein (CRP), were compared. Patients were classified into two groups: uncomplicated appendicitis and complicated appendicitis. Between-group comparisons were performed using t-test or Mann-Whitney U test depending on normality.

Results:

The data of 1,230 patients who underwent appendectomy in our clinic between 2018 and 2023 were retrospectively evaluated. Due to missing data, 705 patients were excluded from the study. The data of 525 patients were compared. Of the patients, 332 were male (63%) and 193 were female (37%). WBC, CRP, PDW, RDW-CV and RDW-SD values were similar in girls and boys statistically. 400 of them classified as non complicated and 125 are complicated appendicitis.

Variable	Group 1 (Mean ± SD)	Group 2 (Mean ± SD)	p-value
WBC	13.30 ± 5.74	14.85 ± 7.17	0.0563
PDW	11.17 ± 2.04	10.70 ± 1.69	0.0442*
RDW_CV	12.99 ± 0.96	13.27 ± 1.33	0.0233*
RDW_SD	38.16 ± 2.94	39.05 ± 3.93	0.0023*
AGE	10.52 ± 3.24	9.44 ± 3.64	0.0046*
CRP	34.20 ± 49.11	72.04 ± 80.63	0.0000*

Table 1. Mean and standard deviation (SD) values for both groups. As most variables did not show a normal distribution, non-parametric Mann–Whitney U test were used for group comparisons. Variables with $p < 0.05$ indicate a statistically significant difference between groups.

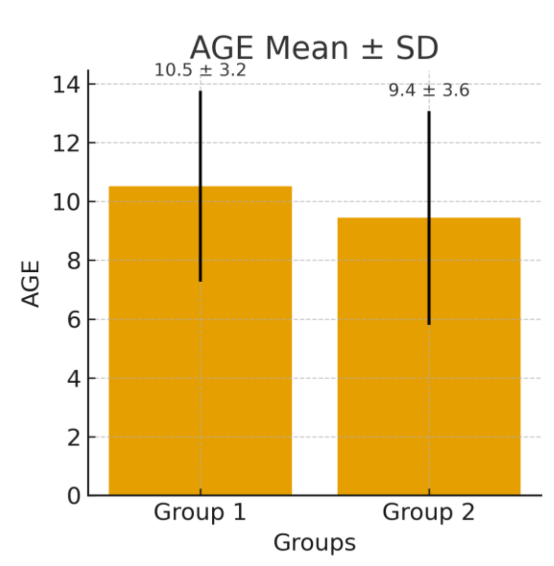

Figure 1:AGE mean ± SD values by group.

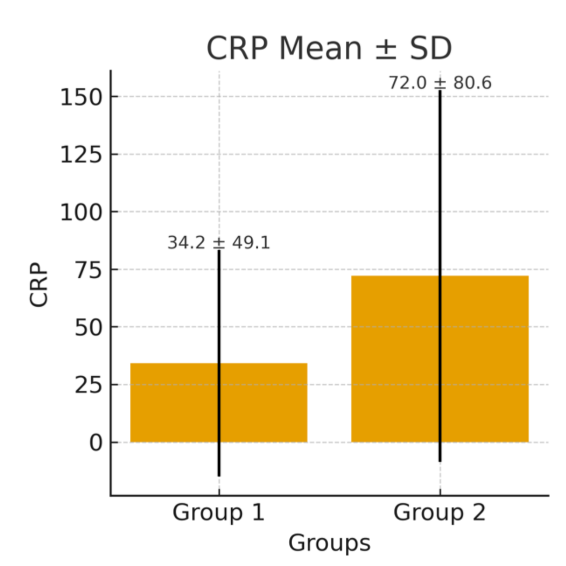

Figure 2: CRP mean ± SD values by group.

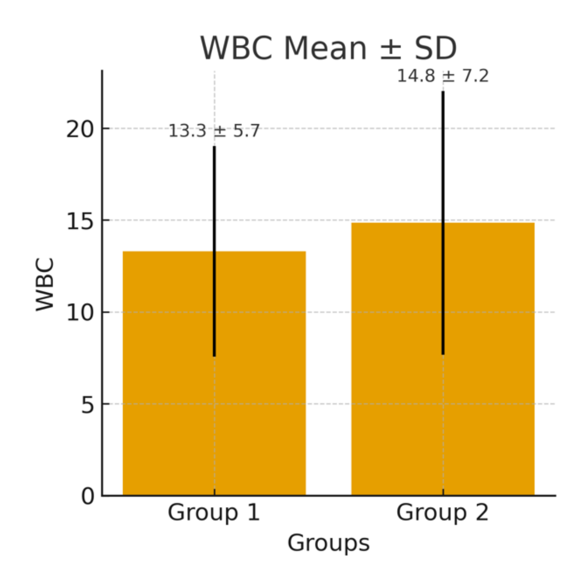

Figure 3: WBC mean ± SD values by group.

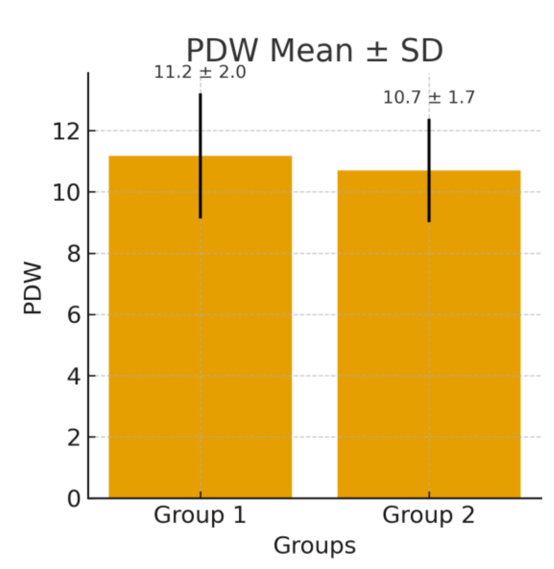

Figure 4: PDW mean ± SD values by group.

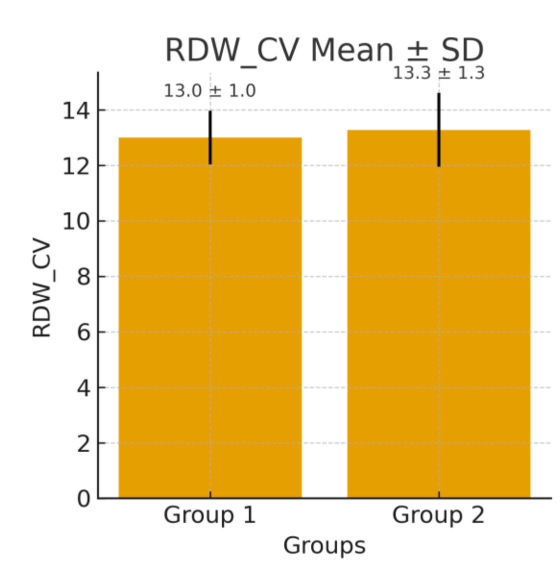

Figure 5: RDW-CV mean ± SD values by group.

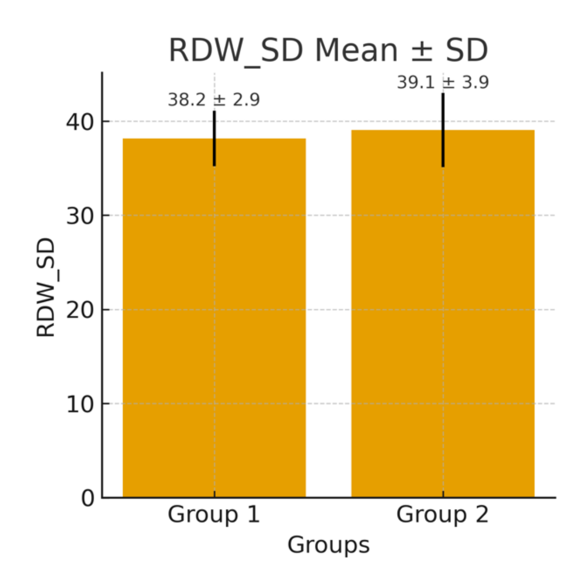

Figure 6: RDW- SD mean ± SD values by group.

Conclusion:

Elevated RDW is known to reflect underlying inflammation, impaired erythropoiesis, and oxidative stress. Inflammatory cytokines can disrupt erythrocyte maturation and increase heterogeneity in red cell volume, thereby elevating RDW levels. Similarly, increased PDW is associated with platelet activation and may represent an inflammatory response to tissue injury. With platelet swelling and shape variation occurring during systemic inflammation, PDW can serve as an indirect indicator of inflammatory severity.

In appendicitis, the diagnostic contribution of RDW and PDW has been evaluated in a limited number of studies, with inconsistent conclusions. Our study, which includes a relatively large pediatric cohort, demonstrates that both RDW and PDW provide additional diagnostic value beyond standard inflammatory markers. Specifically, RDW-CV and PDW levels were significantly elevated in complicated appendicitis compared to uncomplicated appendicitis suggesting their utility in recognizing children at increased risk for perforation or abscess formation.

These findings support the growing evidence that routine hematologic indices—beyond traditional leukocyte counts—can provide meaningful insight into the inflammatory burden in appendicitis. Incorporating RDW and PDW into clinical evaluation may help identify children who require urgent intervention or advanced imaging.

PDW, RDW-CV, and RDW-SD could be helpful in diagnosing acute appendicitis when used with common tests like WBC and CRP. These parameters also show potential in differentiating between uncomplicated and complicated cases. However, their diagnostic accuracy for severity assessment is limited, and further prospective studies are needed to establish their clinical utility.