

STUDY TO CORRELATE THE LEVEL OF RDW WITH THE SEVERITY OF ACUTE PANCREATITIS

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Received Date: 15/04/2024

Acceptance Date: 04/05/2024

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Abstract

Background: A low-cost scoring system suitable for the Indian population in determining the severity of acute pancreatitis and predicting the prognosis and clinical outcome in these patients is warranted. The course and severity of acute pancreatitis can fluctuate rapidly and unpredictably. Present study was aimed to correlate the level of RDW with the severity of Acute Pancreatitis. **Material and Methods:** Present study was single-center, prospective, observational study, conducted patients of age 20-80 years, admitted and diagnosed as acute pancreatitis of one year or more. RDW was recorded and observed in a case of acute pancreatitis. **Results:** Among 123 patients, number of people who are diagnosed acute pancreatitis are more in the age group 30-39 years (35.8 %), followed by 20 – 29 years (34.2 %). The distribution of acute pancreatitis is more in males (92.7 %) as compared to females (7.3 %). Among 123 patients (91.1%) of the acute pancreatitis who were enrolled in to the study was found to have alcoholic history. RDW is more in the acute pancreatitis group i.e.12.2 % (15 patients) of the individuals enrolled for the study had increased RDW, SD. RDW, SD is normal in remaining patients. RDW -CV is more in the acute pancreatitis group i.e. 37.4 % of the individuals enrolled for the study had increased RDW, CV. Among 123 patients 121 patients (98.4%) of the acute pancreatitis who were enrolled in to the study was found discharged and around 2 patients (1.6%) was found death .Among 123 patients around 45 patients (97.8%) of the acute pancreatitis were discharged who were enrolled in to the study was found to have increased RDW. **Conclusion:** RDW-SD can be used as prognostic parameter in those patients who are diagnosed as acute pancreatitis with elevated RDW levels helps in prognostic indicator at admission of acute pancreatitis patients.

Keywords: Red blood cell distribution width, Severe acute pancreatitis, Prognosis, Sequential Organ Failure Assessment score

Introduction

Acute pancreatitis (AP) is an inflammatory condition of the pancreas with a clinical course that varies from mild to severe, leading to activation of pancreatic enzyme and causing self-digestion of the pancreas. The mild acute pancreatitis is a self-limiting disease that ranges about 80–90% of patients with only minimal or transitional systemic manifestations, but about 20–30% of patients develop a severe disease that can progress to systemic inflammation and cause pancreatic necrosis, multi-organ failure, and potentially death.^{1,2,3}

The overall mortality rate of AP is 2–5%, but the mortality of severe acute pancreatitis (SAP) may range up to 20–30%. The early prediction of severity in acute pancreatitis is still one of the main challenges in clinical practice. Currently several clinical factors including age, obesity, alcohol consumption and smoking predisposing to a severe disease course have been identified.^{4,5}

There are variety of Score Systems such as Ranson's Criteria, Acute Physiology and Chronic Health Evaluation (APACHE) II and Computed Tomography Severity Index (CTSI). But these systems have their own distinct pros and cons.^{4,5} A low cost scoring system suitable for the Indian population in determining the severity of acute pancreatitis and predicting the prognosis and clinical outcome in these patients is warranted. The course and severity of acute pancreatitis can fluctuate rapidly and unpredictably.^{6,7} Present study was aimed to correlate the level of RDW with the severity of Acute Pancreatitis

Material And Methods

Present study was single-center, prospective, observational study, conducted in Department of General Surgery at Karnataka Institute of Medical Sciences, Hubballi, India. Study period was from November 2018 to December 2020. Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Patients of age 20-80 years, admitted and diagnosed as acute pancreatitis of one year or more, willing to participate in present study

Exclusion criteria

1. Patients aged less than 20 years & more than 80 years;
2. Patients with chronic pancreatitis and acute on chronic pancreatitis;
3. Patients with questionable diagnosis of other possible abdominal conditions

Study was explained to patients in local language & written consent was taken for participation & study. Patients were subjected to detailed history taking (age, gender, duration of symptoms, history of alcoholic or non-alcoholics and other medical conditions), clinical examination and relevant investigations. Routine blood investigations- complete blood count [TC/RBS /Hb/RDW /platelet] Blood urea, Serum calcium and Serum amylase were performed. USG Abdomen was done routinely to confirm the diagnosis, for evaluation of the biliary tract and for detecting any complications. Contrast enhanced CT Abdomen was undertaken when the diagnosis was doubtful, when USG was not confirmative and when patient failed to improve beyond 72 hours.

Blood samples were drawn and the complete blood count was determined by Beckman Coulter's Automated Haematology Analyzer. RDW was recorded and observed in a case of acute pancreatitis. The normal RDW range was taken between Standard Deviation (SD) - 37-

56fl (femtolitre) The normal RDW-CV range was taken between 11.5-14.5 (percentage.) All the data obtained were entered in the proforma (enclosed).

Data were analyzed using SPSS package and by chi-square tests. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

Results

Among 123 patients, number of people who are diagnosed acute pancreatitis are more in the age group 30-39 years (35.8 %), followed by 20 – 29 years (34.2 %). The distribution of acute pancreatitis is more in males (92.7 %) as compared to females (7.3 %). Among 123 patients (91.1%) of the acute pancreatitis who were enrolled in to the study was found to have alcoholic history.

Table 1: General characteristics

	No. of patients	Percentage
Age groups (in years)		
20-29	42	34.2
30-39	44	35.8
40-49	20	16.3
50 and above	17	13.8
Gender		
Male	114	92.7
Female	9	7.3
Comorbidities		
Alcoholic	112	91.1
Non-alcoholic	5	4.1

RDW is more in the acute pancreatitis group i.e.12.2 % (15 patients) of the individuals enrolled for the study had increased RDW, SD. RDW, SD is normal in remaining patients

Table 2: RDW SD distribution

RDW SD	N	%
Abnormal	15	12.2
Normal	108	87.8

Pearson Chi-Square=14.206** P=0.595

RDW -CV is more in the acute pancreatitis group i.e. 37.4 % of the individuals enrolled for the study had increased RDW, CV. RDW, CV is normal in remaining patients

Table 3: RDW CV distribution

RDW CV	N	%
Abnormal	46	37.4
Normal	77	62.6
Total	123	100

Among 123 patients 121 patients (98.4%) of the acute pancreatitis who were enrolled in to the study was found discharged and around 2 patients (1.6%) was found death.

Table 4: Outcome distribution

Outcome	N	%
Death	2	1.6
Discharged	121	98.4
Total	123	100

Pearson Chi-Square=14.206** P=0.001

Among 123 patients around 45 patients (97.8%) of the acute pancreatitis were discharged who were enrolled in to the study was found to have increased RDW. Around 2.2% patients had death who were enrolled in to the study was found to have increased RDW

Table 5: Association of RDW CV with outcome

RDW CV	Death	Discharged	P VALUE
Abnormal	1 (2.2)	45 (97.8)	0.710
Normal	1 (1.3)	76 (98.7)	

Pearson Chi-Square=14.206** P=0.710

Discussion

Several clinical signs and imaging procedures have emerged in an attempt at early identification of pancreatic necrosis, monitoring of its progression, and assessment of the response to therapy. The ideal prognostic biomarker in AP should be clinically available, inexpensive, insensitive to inter-individual differences, and accurately predict severe cases upon admission. The search for such a biomarker is ongoing for decades and numerous promising candidates have been proposed. However, still, no marker has been able to predict complicated diseases with sufficient precision.

The Ranson 's Criteria is relatively accurate at classifying the severity of AP, but the evaluation cannot be completed until 48 hours, which will miss the potential for early recognition of SAP, its aggressive treatment and hence increase mortality. Channeling the resources in identifying SAP in early stages is important so that intensive care can be started early and also less critical cases can be managed in the ward. The APACHE II system allows the determination of disease on the first day of admission and is more accurate than Ranson's Criteria but it is a little complicated.^{8,9}

Red cell distribution width (RDW) is a parameter of the complete blood count test which is routinely performed in almost all patients at the time of admission. Red cell distribution width is a parameter of red blood cell which measures the variation in red cell size or volume.^{10,11}

Red cell distribution width is an easy, inexpensive, routinely reported parameter as a part of the complete blood count test used in the assessment of the patient's disorder. Recent studies exhibit that RDW is a remarkable prognostic marker to determine the risk of mortality in a wide range of clinical manifestations such as community dwelling older adults with or without age-associated diseases, critically ill patients, intensive care unit patients, and those

with cardiovascular diseases (i.e., heart failure, coronary diseases) and even acute dyspnea and community-acquired pneumonia.^{3,4,5,6}

In study by Singh VB et al.,¹² 69% were male whereas 31% were female. The predominant etiology of AP in our study was cholelithiasis (64%). Mean RDW on the day of presentation and discharge was 14.10 ± 3.12 and 13.56 ± 1.34 , respectively. Among the total 38 patients of mild AP, 47.36% (18) had RDW <12.6 , 44.7% (17) had RDW ranging from 12.6 to 13.3, whereas only 7.89% (3) had RDW >13.3 . From the 62 patients of severe AP, 91.9% had RDW >13.3 and 8.1% had RDW ranging from 12.6% to 13.3%. The total mortality rate of our study was 4%. Similar findings were noted in present study.

The RDW is greater in the non-surviving SAP patients than in the surviving patients. RDW is significantly correlated with the APACHE II and SOFA scores. RDW has better prognostic value for SAP patients than the APACHE II and SOFA scores and could easily be used by clinicians for the treatment of SAP patients.¹³

RDW, as a part of complete blood count test, is used in the assessment of patient's disorder, and it is an easy, inexpensive, and routinely reported parameter. RDW is a significant prognostic marker for determining the risk of mortality in a range of clinical manifestations.¹⁴

Current evidence and findings support that high admission RDW can be used as a biomarker to identify the AP patients who are at high risk of mortality. However, due to the weaknesses of available studies, further well-designed studies with large sample size and various outcome endpoints are needed to rigorously evaluate the prognostic value of RDW in AP.¹⁵ Limitations of present study were small sample size & extended follow up of patients was not possible.

Conclusion

RDW-SD can be used as prognostic parameter in those patients who are diagnosed as acute pancreatitis with elevated RDW levels helps in prognostic indicator at admission of acute pancreatitis patients. RDW being a simple parameter which is easily available in a simple routine CBC thus, can be used as a novel predictor of acute pancreatitis. It is a cost-effective measure for predicting acute pancreatitis prognostic value.

Conflict of Interest: None to declare

Source of funding: Nil

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