THE PROGNOSTIC CONSEQUENCE OF RED CELL DISTRIBUTION WIDTH IN ACUTE PANCREATITIS

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ABSTRACT

INTRODUCTION

Acute pancreatitis is commonly a self-limiting disease but, about 25% of patients consequently develop a severe pancreatitis which leads to increase mortality. The available Scoring system is use to predicate severity of the Acute Pancreatitis, which is used for early diagnosis and management. Aim of this study is to assess the association of red blood cell distribution width (RDW) with severity and mortality in patients of acute pancreatitis.

MATERIAL AND METHODS

This retrospective study was carried out in Department of Surgery of National Medical College and Teaching Hospital. A total of 50 patients with diagnosis as acute pancreatitis over period of March 2020 to February 2022 was included. History and detailed clinical examination was performed as per the working proforma. Blood investigation was done. Data analysis was done using SPSS (Statistical Package for social sciences), version 25.

RESULTS

Mean age was 39.03 years. 68% cases were female. Acute Biliary was the most common cause. Mean RDW was 12.461, 14.50 and 15.309 in mild, moderate and severe Pancreatitis respectively with a p value of <0.001 showing significant association of RDW and severity of Pancreatitis. Mean RDW in alive was 13.046 and 16.625 in death with a p value of <0.001 showing significant association between RDW and outcome of acute Pancreatitis.

CONCLUSION

RDW is a predictor of severity in patients with severe acute pancreatitis.

KEYWORDS

Acute pancreatitis, RDW, Severity of acute pancreatitis

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INTRODUCTION

"Acute pancreatitis" is usually a self-limiting disease; presented with abdominal pain and is usually associated with raised pancreatic enzyme levels in blood or urine as a result of pancreatic inflammation[1]; however, severe form of the disease developed in 25 % of patients & it's mortality is about 50 %.[1]

There are many score to predicate the severity of Acute Pancreatitis but recently used for assessment is the "Acute Physiology and Chronic Health Evaluation" (APACHE II), is hard and is not widely for the assessment of patients as they are not fit for patients at the time of admission thereafter a simple tests use such as procalcitonin, interleukin-6, and interleukin-8 have been to be ability to predict the severity of AP, but these are too expensive, and not easily available.[2,3]

Red cell distribution width is an independent prognostic marker, it has been used in many pathological conditions, such as CVS diseases, respiratory diseases, RA and progressive inflammatory status. For patients with AP, RDW was shown to be absolutely related with AP severity, and is likely a useful predictive parameter.[4] However, it is not yet clear whether RDW is associated with the prognosis of Severe AP. RDW is the biochemical parameter which measures the variability in size of circulating erythrocytes. Higher values indicate greater variation in size of circulating erythrocytes.[5]

The aim of this study was to assess the association of red blood cell distribution width (RDW) with severity and mortality in patients of acute pancreatitis.

MATERIAL AND METHODS

The retrospective study was carried out in Department of Surgery, National Medical College and Teaching Hospital, Birgunj over period of 2 years from March 2020 to Feb 2022. Approval was taken by Institutional review committee [F-NMC/581/078-079].

A total 50 patients with acute pancreatitis were included in this study, Those patient with Traumatic or autoimmune pancreatitis, Cardiac, Liver and Renal disease, Diabetes mellitus, pancreatic injury were excluded from this study.

Acute pancreatitis was diagnosed on basis of two out three criteria i.e 1) Pain abdomen with clinical feature of acute pancreatitis. 2) Eleveated serum Amylase or Lipase at least three fold than normal range. 3) Characteristic finding on USG abdomen or CECT abdomen. Detail history and complete abdominal examination was done. Relevant investigations was like Complete hemogram, Blood urea, Serum calcium and Serum amylase.USG Abdomen were done. Contrast enhanced CT Abdomen was done when the diagnosis was doubtful or when USG was not confirmative and when patient failed to improve beyond 72 hours. The value of RDW was done in biochemistry department at National Medical College. Normal Value of RDW-CV was 10-15 % was taken for this study.

According to Revised Atlanta criteria Definition of Severity in Acute Pancreatitis; the patients were classified as having, 1) Mild acute pancreatitis is defined as an absence of organ failure and an absence of local or systemic complications. 2) Moderately acute pancreatitis is defined as no evidence of persistent organ failure, but the presence of local or systemic complications and/or organ failure that resolved within 48 hours. 3) Sever acute pancreatitis is defined as persistent organ failure (>48 hours).

Data were collected and statically analysed parameter were presented as mean ± standard deviatation. Categorical Value were mentioned in numbers and percentage. SPSS 25.0 was used for statistical analysis.

RESULTS

In our study, total 50 patients were included. Mean age was 39.08 years (Table 1). In our study a female predominance is seen in out 68% of the patients. In our study biliary stone was the main etiological factor accounting for 74% of the cases while 26% of patients had alcoholic pancreatitis. 66% of case was mild pancreatitis and 92% of patient was discharged.

An RDW with a cut-off value of 14.5 presented an area under the curve of 0.886 (95% CI: 0.725-1.0) in Receiver operating characteristic curves and predicted mortality in approximately 75% of the patients (sensitivity, 75%, 95% CI: 63 -87; specificity, 73.9%, 95% CI: 61.9 – 85.9). The findings are given in tables 2-3 and figure 1.

Table 1. Baseline characteristics of study population

Parameters	Frequency (n=50)	Percentage (%)
Gender		
Female	34	68.0
Male	16	32.0
Etiology		
Acute Biliary	37	74.0
Alcoholic	13	26.0
Severity		
Mild	33	66.0
Moderate	6	12.0
Severe	11	22.0
Outcome		
Alive	46	92.0
Death	4	8.0

Table 2. RDW and severity of Paracreatitis

Severity	Mean ± SD	*p* value
Mild	12.461±1.7909	<0.001
Moderate	14.500±0.5477	<0.001
Severe	15.309±2.9463	<0.001

Table 3. RDW and outcome

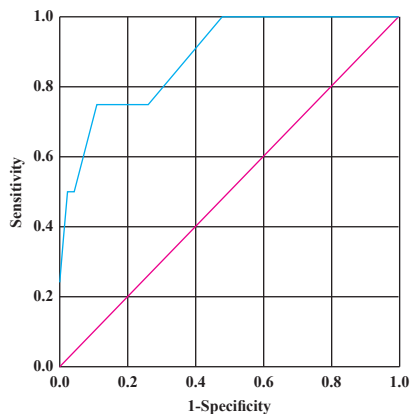| Outcome	Mean ± SD	*p* value
Alive	13.046±2.1466	<0.001
Death	16.625±2.0565	<0.001

Figure 1. ROC for RDW to predict mortality

DISCUSSION

Acute Pancreatitis is the most common pancreatic disease worldwide; although most episodes are mild and self-limiting were as severe acute pancreatitis has a very high mortality.[6] The frequency of mortality in severe acute pancreatitis may be as high as 25%.[7] Early diagnosis and management is important to prevent from multi organ dysfunction which leads to death. There are many scoring system such as Ranson, Glasgow and APACHE II are used for predicting the severity of the disease on clinical basis.[2,3]

Increase in RDW is related with the inflammation status of the disease, which may explain why patients with higher RDW values have a higher mortality rate. It has been seen that inflammation promotes deaths of RBCs or inhibits the maturation of RBCs, which is associated with an increase in RDW. Some inflammatory mediators influence bone marrow function and iron metabolism and suppress erythropoietin-induced maturation of RBCs. Therefore, RDW values reflect the inflammation status of acute pancreatitis and thus, may be used for predicting the severity of AP.[8-10]

In our study mean RDW in mild Pancreatitis was 12.461, moderate was 14.50 and 15.309 in severe Pancreatitis with a p value of <0.001 showing significant association of RDW and severity of Pancreatitis. Mean RDW in alive was 13.046 and 16.625 in death with a p value of <0.001 showing significant association between RDW and outcome of acute Pancreatitis. Mortality was higher in patients with higher values of RDW. In above study an RDW with a cutoff value of 14.5 presented an area under the curve of 0.886 (95%CI: 0.725-1.0) in Receiver operating characteristic curves and predicted mortality in approximately 75% of the patients (sensitivity, 75%, 95% CI: 63 -87; specificity, 73.9%, 95%CI: 61.9 – 85.9).

Similar study was done by Aishwarya NS, et al[11] reveals that mean RDW in mild and sever pancreatitis was 12.220 and 14 respectively, and mean RDW in alive and death was 12.234 and 14.476 respectively with *p* values of <0.001. Mortality is higher in RDW with sensitivity, 88%, 95% CI: 81.1 -92.6 and specificity, 73.1%, 95%CI: 68.1 – 80.1.

Similarly study done by other authors Fang-Xiao Zhang et al,[12] Thapa P et al,[13] Tao Cheng et al,[14] Singh VB et al,[15] Goyal H et al[16] reveals that increase in values of RDW increase the severity of acute pancreatitis.

CONCLUSION

In this study we evaluate that value of RDW predicate the consequence of acute pancreatitis and its shows that RDW is important prognostic marker in acute pancreatitis patients. Increased RDW can be used as a new indicator of mortality in patients with acute pancreatitis.

CONFLICT OF INTEREST

None

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