

EWS in Predicting Severity of Acute Pancreatitis - An Early Guide for Clinician Working in Limited Facilities

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ABSTRACT

Introduction: Acute pancreatitis is fairly common and lethal condition, often associated with one or more complications in varying degree; demanding high index of suspicion, early diagnosis and aggressive individualized management, if morbidity and mortality has to be lowered. The purpose of this retrospective observational study was to quantify the SIRS response of the body in the form of Emergency Warning Score (EWS) and correlating it with the severity of Acute Pancreatitis (AP).

Material and Methods: This retrospective study of 120 consecutive patients of diagnosed AP has been carried out in a hospital attached to a medical college. Patients admitted with first episode of acute pancreatitis, diagnosed as per Revised Atlanta Classification, 2012 are included. Recorded clinical data (respiratory rate, temperature, blood pressure, pulse rate, CNS status, urine output) within the first 24 hours of admission of each patient were used to calculate EWS on hourly bases. Then it was correlated individually with each patient's disease severity they developed during the course of admission; to find if it has any role in predicting the disease severity. It was also correlated with the clinical progression of the disease in terms of favourable or unfavourable outcome.

Results: It was observed that 60 patients with EWS ≥ 4 on the first day later developed moderate to severe AP. Of them 40 (66.67%) patients had unfavourable outcome with mortality in 16 (26.67%) patients. These patients had long duration (median 19 days) of hospital stay.

Conclusion: EWS score ≥ 4 on first day of admission can predict the disease severity and thus unfavourable outcome. No need of investigations (to predict the disease severity) and easy application makes EWS system a useful guide for clinician to anticipate progress of disease.

Keywords: Acute Pancreatitis, EWS, Severity.

INTRODUCTION

Acute pancreatitis (AP) entails a wide spectrum of disease from mild self limiting symptom complex to severe form, often associated with one or more complications in varying degree. Managing these patients demand high index of suspicion, early diagnosis and aggressive individualized management, if morbidity and mortality has to be lowered.¹⁻³ Acute pancreatitis includes a wide spectrum of disease with most experience relatively mild episodes of disease characterized by mild parenchymal edema while a third patient with acute pancreatitis develop complications which can be local, regional and systemic resulting in severe acute pancreatitis and quarter of these will die from it. These severe episodes consisting 10-30% of total patient involve a progression to extensive pancreatic necrosis, development

of MODS, multiple organ failure, rapid clinical deterioration and death causing mortality rate of 2-10%.¹⁻³

The need of highly individualized treatment for the patients of acute pancreatitis and the possibility of rapid deterioration makes it imperative to find out at the earliest which patient is most prone for the development of possible morbidity and mortality. The proper severity scoring system can assess severity of the disease early and help for deciding the treatment strategy and the need for transfer to a specialist unit.¹⁻³

To identify and predict the prognosis beforehand numerous severity grading systems, several predictors of severity including early prognostic signs, serum markers, laboratory investigations and CT scans are commonly used for the purpose worldwide.¹⁻³

Ranson's score, imrie's score, glasgow's score, and APACHE 2 score are the most widely used score but, they all require certain laboratory parameters. Such laboratory parameters are not possible everywhere.^{3,4}

Recently, in the United Kingdom and some part of the world, the Early Warning Score (EWS) are commonly used in the assessment of the ill hospital patients. It is calculated from six simple physiological parameters- blood pressure, urine output, respiratory rate, pulse rate, temperature and CNS status.⁵

EWS was found the best predictor of adverse outcome in the first 24 hours of admission. The EWS of 4 or more within 24 hours of admission was significantly related with an increased risk of developing a complication. The most accurate predictor of mortality overall was EWS of 3 or more on day three of admission.⁵ EWS does not measure the pancreas specific variable, but is an accurate measure of SIRS response and can guide for further management and assess prognosis.⁵ The purpose of this retrospective observational study was to quantify the SIRS response of the body in the form of Emergency Warning Score (EWS) and correlating it with the severity of Acute Pancreatitis (AP).

MATERIAL AND METHODS

This retrospective observational study of consecutive 120

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patients of AP admitted between 1/6/2012 to 31/10/2015 has been carried out in our unit in government hospital attached to a Medical College.

Patients of all age group and both the sexes with first episode of acute pancreatitis were included in this study. Known or previously admitted patients of acute pancreatitis coming with relapse or recurrence or acute on chronic disease were excluded from the study.

Symptomatic patients with classical abdominal pain±nausea/vomiting etc. past 1-2 days and diagnosed as an acute pancreatitis as per Revised Atlanta Criteria, 2012 were included in this study.¹ Epidemiological data, clinical exam records, investigations, procedure records, preoperative and postoperative notes and management data of all these patients were recorded and these parameters were then used individually to calculate EWS as per below mentioned chart. The patient's severity was defined over the time as disease progresses according to Revised Atlanta Classification 2012. The measured EWS of the first 24 hours of the admission of individual patient then correlated with the disease severity to assess whether the initial presenting EWS have any impact on development of disease severity later. It was also used to assess the impact of EWS on clinical outcome; either favourable or unfavourable. In this study, patients who had survived without the need of ICU management or interventional procedure were designated to have favourable outcome; unfavourable outcome is designated to all deceased ones, those who underwent surgery/endoscopic intervention for local complications and had ICU admission. All the criteria were correlated with the median duration of hospital stay.

STATISTICAL ANALYSIS

Descriptive statistics like mean and percentages were used for the analysis.

RESULTS

Clinical course of all 120 patients was observed carefully. After applying Revised Atlanta Criteria for assessment of severity, to the admitted patients; 51 (42.5%) patients had mild AP, 31 (25.8%) had moderate AP, 38 (31.67%) patients had severe AP.

During the course of hospital stay, 108 patients were managed conservatively (i.v fluids± antibiotics) and 12 had intervention. Of the intervened patients, 6 patients underwent surgery for complications of acute pancreatitis while 2 patients underwent lap cholecystectomy for mild biliary AP. Four patients underwent urgent endoscopic drainage procedures for the development of complications of choledocholithiasis during the course of treatment. Total 40 (30%) patients were shifted to SICU. Cause of shifting to SICU was respiratory distress in 28 (70%) patients; respiratory distress and severe hypotension in 12 (30%) patients. Total 16 (40%) patients died during the admission course. Among 16 deceased patients, 2 patients died within 48 hours of admission due to MODS and severe co morbidities. The four patients died postoperatively in due course, while 10 patients died during

treatment within 15 days of admission due to systemic complications of the disease leading to MODS. In our study 80 (66.67%) patients had favourable and 40 (33.33%) had unfavourable outcome.

In the studied patients; peri pancreatic fluid collection (n=55, 45.83%) was the most common local complication while pleural effusion (n=52, 43%) was the most common systemic complication.

Among all admitted patients, on the first day of admission from their recorded clinical parameter EWS was calculated and it was found that out of total 120 patients, 60 (50%) patients had EWS ≥4. Among these 60 patients, 38 (63.33%) patients later developed severe AP, 22 (36.67%) developed moderate AP. None was having mild AP. Among patients with EWS <4 on the first 24 hours of admission 51 (85%) patients had mild AP while 9 (15%) were having moderate AP (Table-1). Among these, two patients underwent laparoscopic cholecystectomy during the hospital stay with their consent.

It was found that among patients admitted with EWS ≥4 on day 1, 50 (83.33%) patients were managed conservatively and 10 (16.67%) were intervened upon. Four patients underwent urgent endoscopic drainage procedure for cholangitis, two were operated for drainage of walled off necrosis, four patients underwent necrectomy for infected pancreatic necrosis. Sixteen patients (26.67%) expired. Among conservatively managed patients (n=50 with EWS ≥4); 32 (64%) were shifted to SICU during the admission course and 12 (24%) were managed in ward with low to medium flow oxygen and/or inotropic support as per their needs under close observation, 6 (12%) were observed carefully for the development of any complication who found later suffering from moderate pancreatitis. Among 10 patients who were intervened/operated upon, 8 (80%) patients were shifted to SICU for inotropic and/or ventilator support.

Out of 60 patients with EWS ≥4, 40 (66.67%) had unfavourable outcome. All 16 (100%) who died, had score more than 4 on the first day of admission. Patients with EWS ≥4 had median stay of 19 days.

The overall median duration of hospital stay for all patients was 12 days. The median duration of hospital stay for mild AP was 9 days, while for moderate AP it was 13 days and for severe disease it was 21 days. The median SICU stay was 5 days. The median duration of hospital stay in those who were shifted to SICU was 23 days. Patients with EWS score ≥4 had median hospital stay of 19 days which is comparatively higher (Table-2).

Out of the 40 patients who had unfavourable outcome, 38 (95%) patients had severe AP, 2 (5%) patients had moderate

Disease severity→	Mild AP	Moderate AP	Severe AP
EWS			
≥4 (n=60)	0	22 (40%)	38(60%)
<4 (n=60)	51 (85%)	9 (15%)	0
Disease severity based on the Revised Atlanta classification 2012. AP= Acute Pancreatitis.			
Table-1: EWS score and disease severity classification			

AP. All of them found to have EWS ≥ 4 on first 24 hours of admission.

DISCUSSION

Pancreatitis encompasses a group of disorders characterized by inflammation of the pancreas. The clinical manifestation can range in severity from a mild self limited disease to a life threatening acute inflammatory disease the duration of which can range from a transient attack to an irreversible loss of function.² International symposium on acute pancreatitis has defined acute pancreatitis as an acute inflammatory process of the pancreas with variable involvement of other regional tissues or remote organ system, and severe acute pancreatitis as a association of acute pancreatitis with organ failure and/or local complications, such as necrosis, abscess, or pseudocyst.¹⁻³

Acute pancreatitis affects up to 38 per 100,000 populations per year. For most patients pancreatitis is a mild self-limiting illness; however in around 20-30% cases severe life threatening complications may ensue with development of associated organ dysfunction.^{3,4} These severe episodes consisting 10-30% of total patient involve a progression to extensive pancreatic necrosis, development of SIRS, multiple organ failure, rapid clinical deterioration and death causing mortality rate of 2-10%.^{3,6-8}

As per Revised Atlanta Classification of Acute Pancreatitis 2012; AP is classified in mild, moderate and severe pancreatitis based on local/systemic complications and end organ damage.¹

The early diagnosis and precise staging of disease severity are important goals in the initial evaluation and management of AP.^{3,4} The assessment of the severity at the initial medical examination plays an important role in introducing adequate treatment and help transfer the patients to a medical facility that can cope with severe AP.⁶ Identification of patients in early stage of presentation with severe AP is therefore crucial so goal directed targeted therapy can be initiated.³

To identify and predict the prognosis beforehand numerous severity grading systems, several predictors of severity

including early prognostic signs, serum markers, laboratory investigations and CT scans are commonly used for the purpose worldwide.^{4,11,12}

Recently, in the United Kingdom and some part of the world, the Early Warning Score (EWS) is commonly used in the assessment of the unwell hospital patients. It is calculated from six simple physiological parameters- blood pressure, urine output, respiratory rate, pulse rate, temperature and CNS status.⁵

EWS was found the best predictor of adverse outcome in the first 24 hours of admission. The EWS of 4 or more within 24 hours of admission was significantly related with an increased risk of developing a complication. The most accurate predictor of mortality overall was EWS of 3 or more on day three of admission. EWS does not measure the pancreas specific variable, but is an accurate measure of SIRS response and can guide for further management and assess prognosis. Derangements in the parameters are assigned a number and the sum of these numbers is used to calculate an overall EWS.⁵

In present study after measurement of EWS on first 24 hours of admission, it was observed that among 60 patients with EWS ≥ 4 on the first day, 38 (60%) patients had severe AP and thus poor prognosis. None had mild AP. Among 60 patients with EWS ≥ 4 , 40 (66.67%) had unfavourable outcome, with mortality in 16 (26.67%) patients. These patients had lengthier (median 19 days) duration of hospital stay. These data were correlated with finding the mean EWS for individual disease severity and disease outcome and compared with that of Garcea et al (Table 3).⁵

In our study it is evident that EWS ≥ 4 is strongly associated with severe disease progression (none had mild disease severity) with more chances of unfavourable outcome. Simultaneously EWS < 4 is associated with overall good prognosis, favourable outcome and less hospital stay.

CONCLUSION

From above results it is cleared that during the early phase of disease pathology of AP, measurement of EWS can predict

	Mild AP (n=51)	Moderate AP (n=31)	Severe AP (n=38)	Median duration of hospital stay (in days)
EWS ≥ 4 on Day 1 (n=60)	0	22/31(70.9%)	38/38 (100%)	19
EWS < 4 on Day 1 (n=60)	51/51(100%)	9/31(29.1%)	0	9
Median duration of hospital stay (in days)	9	13	21	

Disease severity based on Revised Atlanta Classification 2012 AP= Acute Pancreatitis.

Table-2: Hospital stay duration

Study and Mean EWS on day 1	Disease severity		Outcome		Local complications		Systemic complication		SICU shift
	Mild AP	Severe AP	Favorable	Unfavorable	Present	Absent	Present	Absent	
Present study (n=120)	1	5	2	5	5	2	5	2	5
Garcea G et al, 2006 (n=110)	2	4	2	4	4	2	4	2	4

Garcea G, Jackson B, Pattenden CJ, Sutton CD, Neal CP, Dennison AR, Berry DP. Early Warning Scores Predict Outcome in Acute Pancreatitis. J gastrointest surg 2006; 10:1008-1015. AP= Acute Pancreatitis.

Table-3: Mean ews and disease severity and clinical outcome.

disease prognosis and outcome beforehand within 24 hours of admission. Close monitoring and anticipation of severity in the patients with EWS \geq 4 from admission can change the disease course; patient can be referred to speciality centres early so can targeted treatment can be initiated and thus morbidity and mortality can be limited. No need of laboratory/radiological investigations and easy application even on the day one of admission makes EWS system more preferable to use in patients with acute pancreatitis. Third world countries where limited medical facilities are available, calculation of this simple scoring system can effectively guide clinician about the disease progression. However for better correlation and statistical significance, EWS should be compared with the established scoring system (Ranson's score, APACHE 2 etc.) in prospective randomized manner.

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