



General surgery

ASSESSMENT OF SEVERITY OF ACUTE PANCREATITIS USING MODIFIED GLASGOW PROGNOSTIC SCORE: A CROSS SECTIONAL STUDY.

Dr. Subodh Patankar*	Junior resident in Department of Surgery, Dr. Panjabrao Deshmukh Memorial Medical College, Amravati. *Corresponding Author
Dr. Anil Darokar	Professor in Department of Surgery, Dr. Panjabrao Deshmukh Memorial Medical College, Amravati.
Dr. Zeba Officewala	Junior resident in Department of Surgery, Dr. Panjabrao Deshmukh Memorial Medical College, Amravati.

ABSTRACT **Background:** Acute pancreatitis (AP) is one of the leading causes of gastro-intestinal related hospitalization across the world. The diagnosis of the acute presentation of AP is easy, but the major challenge is predicting the progression of the disease course and the outcome. There is a paucity in the data using modified Glasgow prognostic score in AP. With this background, we conducted the present study to assess the severity of the AP in patients attending our emergency department. **Materials And Methods:** A cross sectional study was conducted among the cases with AP attending the department of surgery of Dr Panjabrao Deshmukh Memorial Medical College, Amravati, Maharashtra. A total of 50 cases in period of 6 months were included in the present study [January 2021 to June 2021]. All patients who presented within 48 hours of onset of the symptoms were included in the present study. Patients with chronic pancreatitis, associated with malignancy, on anticancer treatment, age less than 18 years and previous history of AP were excluded from the study. Revised Atlanta classification as used to diagnose AP in the present study and various variables of modified Glasgow prognostic score were calculated and the final score was generated. **Results:** The mean age of the cases was 44.56 years with male preponderance. About 40% cases were diabetic, 24% had hypertension and 8% had ischemic heart disease. Of the 50 cases studied, 7 (14%) cases had severe AP according to modified Glasgow prognostic score. There was a significant positive association between modified Glasgow prognostic score and the outcome of the patient at follow up. ($p < 0.001$) **Conclusions:** The most common age group noted for pancreatitis was 4th decade with male preponderance. About 14% patients had severe disease according to modified Glasgow prognostic score. There was a significant positive association between modified Glasgow prognostic score and the outcome of the patient at follow up.

KEYWORDS : Glasgow prognostic score; Acute pancreatitis; Severity

INTRODUCTION:

Acute pancreatitis (AP) is one of the leading causes of gastro-intestinal related hospitalization across the world.¹ The annual incidence of AP varies from 13 to 45/ lakh population in India.^{2,3} The health care related costs due to AP are expected to increase in the near future.^{2,4,5} In spite of recent advances in access to health care, imaging modalities and interventions, AP continues to have significant effect on morbidity and mortality.^{2,6} Three top most causes of AP are gall stone disease, alcohol related and idiopathic.⁷⁻⁹ The severity of the disease varies widely, from mild disease needing conservative treatment to severe and complicated disease with high morbidity and mortality. The diagnosis of the acute presentation is easy, but major challenge is the predicting the progression of the disease course and the outcome.^{8,9} This will help us plan the level of management for the patients with AP. Ranson's criteria¹⁰, bedside index for severity in acute pancreatitis^{11,12} (BISAP), Acute Physiology and Chronic Health Evaluation (APACHE-II)¹³, MOSS (multiple organ system score)¹⁴ and modified Glasgow prognostic score (GPS)¹⁵⁻¹⁷ are scoring systems which are used in predicting the prognosis of AP. There is paucity in the data using modified GPS score in AP. With this background, we conducted the present study with a goal to assess the severity of the AP in patients attending our emergency department.

MATERIALS AND METHODS:

A cross sectional study was conducted among the cases with AP attending the department of surgery of Dr Panjabrao Deshmukh Memorial Medical College, Amravati, Maharashtra. A total of 50 cases in period of 6 months were included in the present study [January 2021 to June 2021].

All patients who presented within 48 hours of onset of the symptoms were included in the present study. Patients with chronic pancreatitis, associated with malignancy, on anti cancer treatment, age less than 18 years and previous history of AP were excluded from the study.

The diagnosis of acute pancreatitis has been defined by the Revised Atlanta Classification¹⁸ and requires at least 2 of 3 criteria be met: 1) Abdominal pain characteristic of Acute Pancreatitis 2) Serum Amylase and Serum Lipase more than 3 times the upper limit of normal 3) Ultrasound or Computed tomography suggestive of acute pancreatitis. Demographic, radiographic, and laboratory data were collected from all these patients.

MODIFIED GLASGOW SCORE

- 1] Arterial Oxygen partial pressure < 60 mmHg (8.0 kPa)
- 2] Age > 55 years
- 3] WBC count > 15 x 10³/mm³
- 4] Serum calcium < 8.0 mg/dl (2.0 mmol/L)
- 5] Blood urea nitrogen > 45 mg/dl (16 mmol/L)
- 6] Blood glucose > 180mg/dl (10 mmol/L)
- 7] Serum Albumin < 3.2 g/dl (32 g/L)
- 8] Lactate dehydrogenase > (600 IU/L)

Each criteria had score of One. 0 to 2 score was considered Mild acute pancreatitis and >3 score was considered Severe acute pancreatitis.

STATISTICAL ANALYSIS:

The data was collected, compiled, and analysed using EPI info (version 7.2). The qualitative variables were expressed in terms of percentages. The quantitative variables were both categorized and expressed in terms of percentages or in terms of mean and standard deviations. The difference between the two proportions was analysed using chi-square or Fisher exact test. All analysis was 2 tailed and the significance level was set at 0.05.

RESULTS:

We have included 50 cases in the present study.

Table 1: Demographic particulars of the present sample

Demographic particulars	Frequency	Percentage
Age		
20 to 30	3	6%
30 to 40	10	20%
40 to 50	22	44%
50 to 60	10	20%
>60	5	10%
Gender		
Male	32	64%
Female	18	36%
Co-morbidity		
Diabetes	20	40%
Hypertension	12	24%
Ischemic heart disease	4	8%

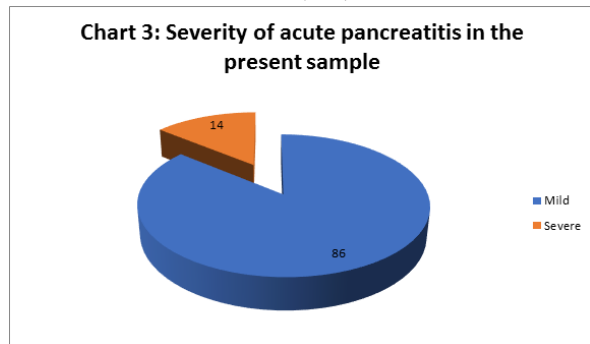
The mean age of the cases was 44.56 years with male preponderance. About 20 cases (40%) cases were diabetic, 12 cases (24%) had hypertension and 4 cases (8%) had Ischemic heart disease.

Table 2: Distribution based on the variables of modified Glasgow prognostic score

Modified Glasgow prognostic score	Frequency	Percentage
Oxygen partial pressure		
>60mmHg	43	86%
<60mmHg	7	14%
Age		
<55 year	37	74%
>55 years	13	26%
White cell count		
<15000/mm ³	45	90%
>15000/mm ³	5	10%
Serum calcium		
<8.0mg/dl	7	14%
>8.0mg/dl	43	86%
Blood urea nitrogen		
<45mg/dl	45	90%
>45mg/dl	5	10%
Blood glucose		
<180mg/dl	43	86%
>180mg/dl	7	14%
Serum albumin		
>3.2g/dl	43	86%
<3.2g/dl	7	14%
Lactate dehydrogenase levels		
<600 IU/L	44	88%
>600IU/L	6	12%

Following are the critical parameter of modified Glasgow prognostic score.

Partial pressure of oxygen was less than 60mmHg in 7 (14%) cases. Age was more than 55 years in 13 (26%) cases. White cell count more than 15000/mm³ in 5 (10%) cases. Blood urea nitrogen was more than 45mg/dl in 5 (10%) cases. Serum calcium was less than 8 in 7 (14%) cases. Blood glucose was more than 180mg/dl in 7(14%) cases. Serum albumin was less than 3.2g/dl in 7 (14%) cases. Lactate dehydrogenase levels were more than 600IU/L in 6(12%) cases.



Of the 50 cases studied, 7 (14%) cases had severe AP according to modified Glasgow prognostic score.

Table 4: Association of modified Glasgow prognostic score with outcome

Outcome	Mild		Severe		P value
	Number	%	Number	%	
Discharge	42	97.67	5	71.49	0.0061
Death	1	2.33	2	28.51	
Total	43	100.00	7	100.00	

There was a significant positive association between modified Glasgow prognostic score and the outcome of the patient at follow up. (p<0.001)

The cause of death in a case of mild pancreatitis was acute respiratory failure.

The cause of death in two cases of severe pancreatitis was multiorgan failure.

DISCUSSION:

Modified Glasgow prognostic score is one of the risk scoring systems used to assess the severity of the acute pancreatitis.¹⁷ Using this score, we categorised the patients into mild and severe cases and associated it with the outcome of the patients with AP.

In our study out of 50 cases 43 cases (86%) were mild and 7 cases (14%) were severe acute pancreatitis. Out of 50 cases 3 (6%) died.

A study conducted by Alvin Tan YH et al¹⁹ on 230 cases of acute pancreatitis out of which 194 (84.3%) had mild pancreatitis and 36 (15.7%) had severe pancreatitis and the overall mortality rate was 8 (4%).

A study conducted by Simoes M et al²⁰ on 126 cases of acute pancreatitis out of which 90 (71.4%) had mild pancreatitis and 36 (28.57%) had severe pancreatitis. The mortality rate was 6%.

The individual score of modified Glasgow scores in our study were Partial pressure of oxygen was less than < 60 mmhg in 14%, white cell count more than 15000/mm³ in 10%, serum calcium was < 8.0 mg/dl in 14%. A study conducted by Leese T et al²¹ reported the median values of arterial oxygen saturation among mild and severe cases was 79.50 mmhg and 57.37 mmhg respectively, the white cell count among mild and severe cases was 13500/mm³ and 18600/mm³ respectively, serum calcium (mmol/l) was 8.82 mg/dl and 8.42 mg/dl respectively among mild and severe cases.

In our study blood urea nitrogen was > 45 mg/dl in 90% cases, blood glucose was more than 180 mg/dl in 14%. A study conducted by Leese T et al²¹ reported the median values of serum urea levels among mild and severe cases 19.21 mg/dl and 59.45 mg/dl respectively, blood glucose levels were 127.8 mg/dl and 165.6 mg/dl among mild and severe cases respectively. In our study serum albumin was less than 3.2g/dl in 14% and Lactate dehydrogenase levels were more than 600IU/L in 12%. A study conducted by Leese T et al²¹ reported the median values of serum albumin (g/dl) were 3.7 and 3.5 among mild and severe cases, serum LDH (units/l) were 306 and 457 respectively among mild and severe cases. These findings were similar to our study. The present study had some limitations. One of the things that is to noted is smaller sample size and cross sectional study. Multi-centric studies with larger cohort have to be conducted to get exact effect size.

CONCLUSIONS:

The most common age group noted for pancreatitis was 4th decade with male preponderance. About 14% patients had severe disease according to modified Glasgow prognostic score. There was a significant positive association between modified Glasgow prognostic score and the outcome of the patient at follow up.

REFERENCES:

- Spanier BWM, Dijkgraaf MGW, Bruno MJ. Epidemiology, aetiology and outcome of acute and chronic pancreatitis: An update. *Best Pract Res Clin Gastroenterol.* 2008;22(1):45-63.
- Roberts SE, Akbari A, Thorne K, Atkinson M, Evans PA. The incidence of acute pancreatitis: impact of social deprivation, alcohol consumption, seasonal and demographic factors. *Aliment Pharmacol Ther.* 2013 Sep;38(5):539-48.
- Shen H-N, Lu C-L, Li C-Y. Epidemiology of first-attack acute pancreatitis in Taiwan from 2000 through 2009: a nationwide population-based study. *Pancreas.* 2012 Jul;41(5):696-702.
- Satoh K, Shimosegawa T, Masamune A, Hirota M, Kikuta K, Kihara Y, et al. Nationwide epidemiological survey of acute pancreatitis in Japan. *Pancreas.* 2011 May;40(4):503-7.
- Yadav D, Whitcomb DC. The role of alcohol and smoking in pancreatitis. *Nat Rev Gastroenterol Hepatol.* 2010 Mar;7(3):131-45.
- Chatila AT, Bilal M, Guturu P. Evaluation and management of acute pancreatitis. *World J Clin cases [Internet].* 2019 May 6;7(9):1006-20. Available from: <https://pubmed.ncbi.nlm.nih.gov/31123673>
- Quinlan JD. Acute pancreatitis. *Am Fam Physician.* 2014 Nov;90(9):632-9.
- Garber A, Frakes C, Arora Z, Chahal P. Mechanisms and Management of Acute Pancreatitis. *Gastroenterol Res Pract [Internet].* 2018 Mar 15;2018:6218798. Available from: <https://pubmed.ncbi.nlm.nih.gov/29736167>
- Shah AP, Mourad MM, Branham SR. Acute pancreatitis: current perspectives on diagnosis and management. *J Inflamm Res [Internet].* 2018 Mar 9;11:77-85. Available from: <https://pubmed.ncbi.nlm.nih.gov/29563826>
- Höckerstedt K. The Ranson criteria for acute pancreatitis. Vol. 152, *Acta chirurgica Scandinavica*. Sweden; 1986. p. 717.
- Park JY, Jeon TJ, Ha TH, Hwang JT, Sinn DH, Oh T-H, et al. Bedside index for severity in acute pancreatitis: comparison with other scoring systems in predicting severity and organ failure. *Hepatobiliary Pancreat Dis Int.* 2013 Dec;12(6):645-50.
- Chandra S, Murali A, Bansal R, Agarwal D, Holm A. The Bedside Index for Severity in Acute Pancreatitis: a systematic review of prospective studies to determine predictive performance. *J community Hosp Intern Med Perspect [Internet].* 2017 Sep 19;7(4):208-13. Available from: <https://pubmed.ncbi.nlm.nih.gov/29046745>
- Suvarna R, Pallipady A, Bhandary N, Hanumanthappa. The clinical prognostic indicators of acute pancreatitis by APACHE II scoring. *J Clin Diagnostic Res.* 2011;5(3):459-63.
- Marshall JC, Cook DJ, Christou N V, Bernard GR, Sprung CL, Sibbald WJ. Multiple organ dysfunction score: a reliable descriptor of a complex clinical outcome. *Crit Care*

- Med. 1995 Oct;23(10):1638–52.
15. Cho A, Arfsten H, Goliasch G, Bartko PE, Wurm R, Strunk G, et al. The inflammation-based modified Glasgow prognostic score is associated with survival in stable heart failure patients. *ESC Hear Fail.* 2020 Apr;7(2):654–62.
 16. Pantano N de P, Paiva BSR, Hui D, Paiva CE. Validation of the Modified Glasgow Prognostic Score in Advanced Cancer Patients Receiving Palliative Care. *J Pain Symptom Manage.* 2016 Feb;51(2):270–7.
 17. Hu X, Wang Y, Yang W-X, Dou W-C, Shao Y-X, Li X. Modified Glasgow prognostic score as a prognostic factor for renal cell carcinomas: a systematic review and meta-analysis. *Cancer Manag Res* [Internet]. 2019 Jul 4;11:6163–73. Available from: <https://pubmed.ncbi.nlm.nih.gov/31308752>
 18. Foster BR, Jensen KK, Bakis G, Shaaban AM, Coakley F V. Revised Atlanta Classification for Acute Pancreatitis: A Pictorial Essay. *Radiogr a Rev Publ Radiol Soc North Am Inc.* 2016;36(3):675–87.
 19. Tan YHA, Rafi S, Tyebally Fang M, Hwang S, Lim EW, Ngu J, et al. Validation of the modified Ranson versus Glasgow score for pancreatitis in a Singaporean population. *ANZ J Surg.* 2017 Sep;87(9):700–3.
 20. Simoes M, Alves P, Esperto H, Canha C, Meira E, Ferreira E, et al. Predicting Acute Pancreatitis Severity: Comparison of Prognostic Scores. *Gastroenterol Res* [Internet]. 2011/09/20. 2011 Oct;4(5):216–22. Available from: <https://pubmed.ncbi.nlm.nih.gov/27957018>.
 21. Leese T, Shaw D. Comparison of three Glasgow multifactor prognostic scoring systems in acute pancreatitis *Br J Surg.* 1988 May;75(5):460–2.