International Surgery Journal
Manjunath BD et al. Int Surg J. 2019 May;6(5):1596-1600
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20191876

Original Research Article

Comparison between Ransons score and modified CTSI in predicting the severity of acute pancreatitis based on modified Atlanta classification 2012

Manjunath B. D., Mohammed Arafath Ali*, Abdul Razack, Harindranath H. R., Avinash K., Kavya T., Lakshmi Vijayakumar

Department of General Surgery, Bangalore Medial College and Research Institute, Bangalore, Karnataka, India

Received: 24 November 2018
Revised: 02 April 2019
Accepted: 03 April 2019

***Correspondence:**
Dr. Mohammed Arafath Ali,
E-mail: arafathali0708@gmail.com

ABSTRACT

Background: Acute pancreatitis is an inflammatory process of the pancreas with possible peripancreatic tissue and multiorgan involvement inducing multiorgan dysfunction syndrome (MODS) with a high mortality rateand hence early identification of patients at risk for severe disease is of vital importance.
Methods: Data were collected from 50 patients who presented to the emergency department of hospitals attached to BMCRI, Bangalore, having acute pancreatitis.
Results: The study included 50 patients- 40 males and 10 females and median patient age was 54.5years.Out of the 50 patients, 40% had gall stones, 56% were alcoholic and 4% had idiopathic pancreatitis.56% were found to have a Ransons score of >3 and 44% had score < 3; 52%had a modified CTSI score of 0-2, 52%had a score of 4-6 and 22% had a score of 8-10. The incidence of severe acute pancreatitis in patients with Ransons score >3 has a p value <0.002. Also, the incidence of severe acute pancreatitis in patients with modified CTSI score >4 has a p value of <0.001.With respect to mortality, all 4 patients who died had a modified CTSI score of >4 (p=0.002) and 3 patients had Ransons score >3 (p=0.03) which is statistically significant.
Conclusions: In our country where facility for CECT is not available to a major proportion of population, early assessment of severe pancreatitis can be performed by Ransons scoring, which is found to be comparable to modified CTSI scoring.

Keywords: Acute pancreatitis, Modified CTSI, Mortality, Ranson's score

INTRODUCTION

Acute pancreatitis is an inflammatory process of the pancreas with possible peripancreatic tissue and multiorgan involvement inducing multiorgan dysfunction syndrome (MODS) with a high mortality rate.[1]

The incidence of acute pancreatitis per 100,000 population ranges from 5 to 80 cases per year with an overall mortality of 5–10%.[2]

To improve the prognosis and survival, early assessment of the severity and identification of patients at risk for severe disease is of vital importance.[3]

About 15% of patients present with severe acute pancreatitis and the mortality rate is alarmingly high-20%.Hence, prediction of severity is important for improving survival. Several scoring systems have been devised for predicting prognosis and severity of acute pancreatitis, which help in further management of the

patient. Ideal predicting criteria should be simple, easily available and accurate.

Many scoring systems have been developed for the early detection of severe AP which includes of Ranson, Glasgow, MOSS, SIRS, BISAP, APACHE-II, CTSI Scores etc.[4]

The above scoring systems have their limitations including the low sensitivity and specificity, difficulty of the scoring system as well as inability to obtain a final score until 48 hours after admission.

Contrast enhanced scans have brought about a major improvement in the grading system. Detection of pancreatic necrosis, parenchymal injury etc. can serve as predictors of severity. Contrast enhanced CT has shown an overall accuracy of 87% with a sensitivity of 100% for the detection of extended pancreatic necrosis. The sensitivity and specificity for diagnosing pancreatic necrosis increase with greater degrees of pancreatic non-enhancement, and complications have also been shown to correlate with the degree of non-enhancement. In 2004, modified CTSI was introduced to improve the staging of acute pancreatitis.[3,5]

This study is aimed at comparing one of the oldest scoring systems, i.e., Ranson's scoring system and one of the newer systems, i.e., modified CTSI for predicting the severity of acute pancreatitis, based on the revised Atlanta 2012 classification.[6]

METHODS

Demographic, radiographic, and laboratory data were collected from 50 patients (sample size calculated based on convenience sampling) who presented to the emergency department of hospitals attached to BMCRI, Bangalore, found to have acute pancreatitis, over a period of one year (June 2017 to June 2018) the diagnosis of which was based on the presence of atleast two out of the three criteria, i.e., : (1) abdominal pain characteristic of AP, (2) serum amylase and/or lipase ≥3 times the upper limit of normal, and (3) characteristic finding of AP on abdominal CT Scan or ultrasonography.[1]

Revised Atlanta Classification 2012 was used to classify acute pancreatitis as mild with no local or systemic complications or organ failure, moderately severe, i.e., organ failure that resolves within 48 hours or local or systemic complications without persistent organ failure or severe, i.e., persistent organ failure more than 48 hours.

The following prognostic markers were used to know the severity of the disease i.e., pancreatic necrosis, requirement of ICU admission and mortality.[7,8]

Ranson's score was calculated based on age, TC, LDH, AST, RBS at admission and haematocrit, BUN, Calcium, PO2, Base deficit and fluid sequestration at 48 hours. Modified CTSI score was calculated. CECT was performed in required cases on day 4 to look for pancreatic necrosis, local complications, and possible aetiology of AP. CTSI score was noted after CT scan.[9]

Patients were classified as mild, moderately severe and severe acute pancreatitis, based on the presence of organ failure for more than 48 hrs and local complications. Organ failure included shock (systolic blood pressure <90 mmHg), pulmonary insufficiency (arterial PO2 <60 mmHg at room air or the need for mechanical ventilation), or renal failure (serum creatinine level >2 mg/dl after rehydration or hemodialysis).[7,8]

Pancreatic necrosis was assessed by CECT; evidence of pancreatic necrosis on CT was defined as lack of enhancement of pancreatic parenchyma with contrast.

Table 1: Ranson's scoring.[10]

Parameter	Alcohol induced	Gallstone induced
On admission		
Age (years)	>55	>70
WBC (/ml)	>16,000	>18,000
Glucose (mg/dl)	>200	>220
LDH (IU/L)	>350	>400
AST (IU/L)	>250	>250
Within 48 hours		
HCT decreases (points)	>10	
BUN increases (mg/dl)	>5	>2
Calcium (mg/dl)	<8	<8
PaO2 (mmHg)	<60	
Base deficit (mEq/L)	>4	>5
Fluid (input-output)	>6	>4

Table 2: Modified ct severity index (2004).

Pancreatic inflammation	0- Normal pancreas 2-Intrinsic pancreatic abnormalities with or without inflammatory changes in peri pancreatic fat 4-Pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis
Pancreatic necrosis	0-None 2- <30% 4->30%
Extrapancreatic complications	One or more of the following- pleural effusion, ascites, vascular complications, parenchymal complications or gastrointestinal tract involvement.

Mild pancreatitis- Modified CTSI score 0-2
Moderate pancreatitis- Modified CTSI score- 4-6
Severe pancreatitis- Modified CTSI score- 8-10

Table 3: Revised Atlanta classification 2012.[11,12]

Table 2. Revised Atlanta Classification [4].

A. Mild acute pancreatitis:

(i) No organ failure

(ii) No local or systemic complications

B. Moderately severe acute pancreatitis:

(i) Organ failure that resolves within 48 h (transient organ failure) and/or

(ii) Local or systemic complications without persistent organ failure

C. Severe acute pancreatitis : Persistent organ failure (> 48 h)

(i) Single organ failure

(ii) Multiple organ failure

Management

Patients who presented to emergency, diagnosed as acute pancreatitis were managed by aggressive fluid resuscitation, analgesia, oxygen supplementation, monitoring of vitals and biochemical parameters, nasogastric drainage, antibiotics, and supportive therapy in case of organ failure.[13,14]

Statistics

All the data was subjected to statistical analysis to measure the objectives. SPSS version 24 was used for analysis and various descriptive statistics were used to calculate ratios, frequencies, percentages, median, means and standard deviation. Tables were used for data presentation, while the categorical data such as gender and comparison of modified CTSI with Ranson's score and patient outcome etc. was expressed as frequency and percentages using chi-square test. P<0.05 was taken as significant.

RESULTS

The study included 50 patients- 40 males and 10 females (Table 4).

Table 4: Patient characteristics.

Characteristics	Category	Number of patients
Sex	Male	40 (80%)
	Female	10 (20%)

The median patient age was 54.5 years (Figure 1). Patients were classified as per Atlanta 2012 classification as mild acute pancreatitis (40%), moderately severe acute pancreatitis (36%) and severe acute pancreatitis (24%).

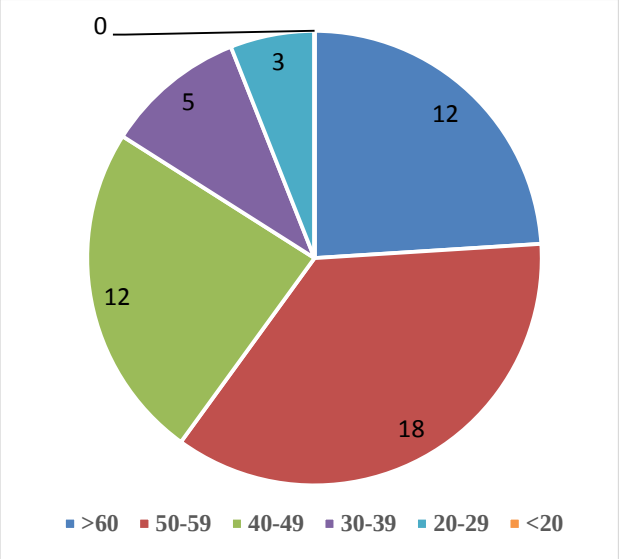

Figure 1: Age groups.

Etiology

Out of the 50 patients, 20 (40%) had gall stones, 28(56%) were alcoholic and 2(4%) had idiopathic pancreatitis (Table 5).

Table 5: Etiology.

	N (%)
Gall stone disease	20 (40)
Alcoholic	28 (56)
Idiopathic	2 (4)

Presentation

All the patients (50-100%) presented with pain abdomen, 15(30%) had peritonitis. 36(72%) presented with vomiting, 24(48%) had abdominal distension and 20(40%) presented with non passage of stools/flatus. (Table 6).

Table 6: Presentations.

Symptom	Number of patients	Percentage (%)
Pain abdomen	50	100
Peritonitis	15	30
Vomiting	36	72
Abdominal distension	24	48
Non passage of stools/flatus	20	40

Scoring systems

Out of the 50 patients, 28(56%) were found to have a ransons score of >3 and 22(44% had Ransons score < 3; 26(52%) had a modified CTSI score of 0-2, 26(52%) had a score of 4-6 and 11(22%) had a score of 8-10. Also, 16

% patients had mild acute pancreatitis according to Atlanta 2012 grading, 20(40%) were found to have moderately severe acute pancreatitis and 14(28%) had severe pancreatitis (Table 7).

Table 7: Scoring systems.

		N (%)
Ranson's score	>3	28 (56)
	<3	22 (44)
Modified CTSI	0-2	26 (52)
	4-6	26 (52)
	8-10	11 (22)
Atlanta 2012 grading	Mild	16 (32)
	Moderately severe	20 (40)
	Severe	14 (28)

Outcome

Out of the 50 patients, 40(80%) were discharged, 4(8%) died, 5 (10%) were discharged against medical advice and 12(24%) had to undergo ICU care (Figure 2).

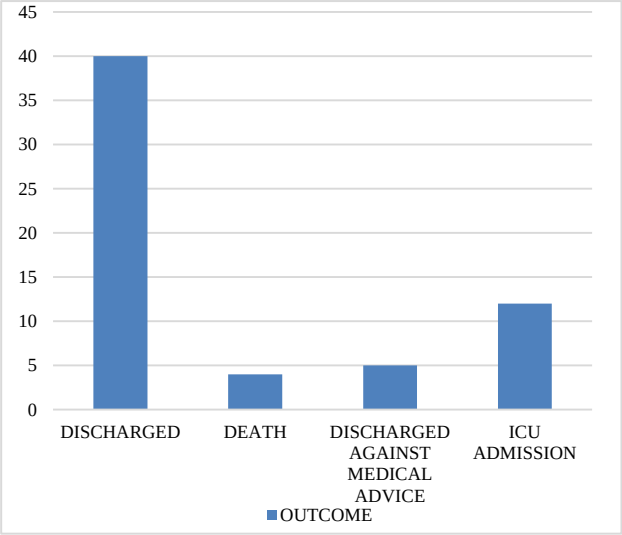

Figure 2: Outcome of the study.

CT findings

On CECT, 14(28%) patients were found to have pancreatic necrosis, 19(38%) were found to have peri pancreatic fluid collection, 26(52%) had ascites and 30(60%) had pleural effusion (Table 8).

Comparison between ranson's and modified CTSI

Ransons score and modified CTSI scores were compared based on mortality and incidence of severe acute pancreatitis. Out of the 4 deaths, 3(75%) had a Ransons score of >3, and 4(100%) had a modified CTSI score of >4. 12(85%) patients with acute severe pancreatitis had a Ransons score of >3, and 13(92%) had a modified CTSI score of >4. The incidence of severe acute pancreatitis in patients with Ransons score >3 has a p value <0.002 which is statistically significant. Also, the incidence of severe acute pancreatitis in patients with modified CTSI score >4 has a p value of <0.001 which is again statistically significant. With respect to mortality, all 4 patients who died had a modified CTSI score of >4 (p =0.002) and 3 patients had Ransons score >3 (p- 0.03) which is statistically significant (Table 9).

Table 8: CT findings.

Findings	Number of patients	Percentage
Pancreatic necrosis	14	28
Peripancreatic fluid collection	19	38
Ascites	26	52
Pleural effusion	30	60

Table 9: Comparison between Ransons Score and modified CTSI.

	Ransons score >3	Modified CTSI >4
	N (%)	N (%)
Mortality (n- 4)	3 (75)	4 (100)
Severe acute pancreatitis (n- 14)	12 (85)	13 (92)

DISCUSSION

Acute pancreatitis is a common disease presenting as an emergency, and early identification of severe acute pancreatitis is necessary for appropriate resuscitation and management of the patient.

The study included 50 patients- 40 males and 10 females as opposed to female preponderance in most of the studies conducted worldwide. The median patient age was 54.5 years which seconds the study conducted by Kaya et al. in Turkey.[14]

Patients were classified as per Atlanta 2012 classification as mild acute pancreatitis (40%), moderately severe acute pancreatitis (36%) and severe acute pancreatitis (24%).

Out of the 50 patients, 40(80%) were discharged, 4(8%) died, 5 (10%) were discharged against medical advice and 12(24%) had to undergo ICU care which was similar to the statistics of the study conducted by Kumar AH et al in Rohtak.[2]

In this study, the relationship between Ransons score and modified CTSI score in patients with severe acute pancreatitis has been compared. Also, the relationship between the mortality in patients having Ransons score >3 and modified CTSI score >4 has been evaluated. Out of the 50 patients, 28(56%) were found to have a Ransons

score of >3 and 22(44%) had Ransons score <3; 26(52%) had a modified CTSI score of 0-2, 26(52%) had a score of 4-6 and 11(22%) had a score of 8-10. Also, 16 % patients had mild acute pancreatitis according to Atlanta 2012 grading, 20(40%) were found to have moderately severe acute pancreatitis and 14(28%) had severe pancreatitis which was similar to a study conducted by Khanna AK et al in Uttar Pradesh, India.[4]

Out of the 4 deaths, 3(75%) had a Ransons score of >3, and 4(100%) had a modified CTSI score of >4 which is in concordance with the study conducted by Shabbir S et al in Pakistan.[15]

12(85%) patients with acute severe pancreatitis had a Ransons score of >3, and 13(92%) had a modified CTSI score of >4.

In our country where facility for CECT is not available to a major proportion of population, either due to financial constraints or inaccessibility, early assessment of severe pancreatitis can be performed by Ransons scoring, which is found to be comparable to modified CTSI scoring.

CONCLUSION

In this study, the relationship between Ransons score and modified CTSI score in patients with severe acute pancreatitis has been compared. Also, the relationship between the mortality in patients having Ransons score >3 and modified CTSI score >4 has been evaluated.

In our country where facility for CECT is not available to a major proportion of population, either due to financial constraints or inaccessibility, early assessment of severe pancreatitis can be performed by Ransons scoring, which is found to be comparable to modified CTSI scoring.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Al Mofleh IA. Severe acute pancreatitis: pathogenetic aspects and prognostic factors. World J Gastroenterol. 2008;14(5):675-84.
2. Kumar AH, Griwan MS. A comparison of APACHE II, BISAP, Ranson's score and modified CTSI in predicting the severity of acute pancreatitis based on the 2012 revised Atlanta Classification. Gastroenterol Rep (Oxf). 2018;6(2):127-31.
3. Bollen TL, Singh VK, Maurer R. Comparative evaluation of the modified CT severity index in assessing severity of acute pancreatitis. Am J Roentegenol. 2011;197:386-92.
4. Khanna AK, Meher S, Prakash S, Tiwary SK, Singh U, Srivastava A, et al. Comparison of Ranson, Glasgow, MOSS, SIRS, BISAP, APACHE-II, CTSI Scores, IL-6, CRP, and procalcitonin in predicting severity, organ failure, pancreatic necrosis, and mortality in acute pancreatitis. Hpb Surgery. 2013;2013.
5. Yadav J, Yadav SK, Kumar S. Predicting morbidity and mortality in acute pancreatitis in an Indian population: a comparative study of BISAP score, Ranson's Score and CT severity index. Gastroenterol Rep (Oxf). 2016;4:216-20.
6. Banday IA, Gattoo I, Khan AM. Modified computed tomography severity index for evaluation of acute pancreatitis and its correlation with clinical outcome: a tertiary care hospital based observational study. J Clin Diagn Res. 2015;9:TC01–5.
7. Banks PA. Epidemiology, natural history, and predictors of disease outcome in acute and chronic pancreatitis. Gastrointestinal Endoscopy. 2002;56(6):S226-S30.
8. Kong L, Santiago N, Han T-Q, Zhang S-D. Clinical characteristics and prognostic factors of severe acute pancreatitis. WJ Gastroenterol. 2004;10(22):3336-8.
9. Yang L, Liu J, Xing Y. Comparison of BISAP, Ranson, MCTSI and APACHE II in predicting severity and prognoses of hyperlipidemic acute pancreatitis in Chinese patients. Gastroenterol Res Pract. 2016;2016.
10. Aphinives P, Karunasumetta C, Bhudhisawasdi V, Saesaew OT. Acute pancreatitis: assessment severity with Ranson score and CT evaluation. J Med Assoc Thai. 2011;94(4):437-40.
11. Bradley EL. A clinically based classification system for acute pancreatitis. In: Summary of the International Symposium on Acute Pancreatitis, Atlanta, GA, 11–13 September 1992. Arch Surg. 1993;128:586-90.
12. Banks PA, Bollen TL, Dervenis C. Classification of acute pancreatitis-2012: revision of the Atlanta classification and definition by international consensus. Gut 2013;62:102-11.
13. Kivisaari L, Somer K, Standertskjold-Nordenstam CG. Early detection of acute fulminant pancreatitis by contrast-enhanced computed tomography. Scand J Gastroenterol. 1983;18:39-41.
14. Kaya E, Derviolu A, Polat C. Evaluation of diagnostic findings and scoring systems in outcome prediction in acute pancreatitis. World J Gastroenterol. 2007; 13:3090-4.
15. Shabbir S, Jamal S, Khaliq T, Khan ZM. Comparison of BISAP Score with Ranson'sScore in Determining the Severity of Acute Pancreatitis. J Coll Physicians Surg Pak. 2015;25(5):328-31.

Cite this article as: Manjunath BD, Ali MA, Razack A, Harindranath HR, Avinash K, Kavya T, et al. Comparison between Ransons score and Modified CTSI in predicting the severity of acute pancreatitis based on modified atlanta classification 2012. Int Surg J 2019;6:1596-600.