

Evaluation of Complication and Prognosis in Acute Pancreatitis by Modified CT Severity Index

Lipee Nath¹, Rajesh Kumar Dhanowar², Pradip Kumar Tiwari³

ABSTRACT

Introduction: Acute pancreatitis along with its complications is one of the most common causes of morbidity in hospitalized patients. Before the advent of modern cross sectional imaging modalities of gray scale ultrasound and computed tomography (CT), the pancreas was truly one of the “hidden” organs of abdomen being only analyzed by indirect methods of analyzing its neighbouring organs such as by barium meal. Present study was conducted to establish the ability of CT in patients of clinically suspected acute pancreatitis referred from various clinical departments in depicting and quantifying the pancreatic parenchymal injury, to detect pancreatic necrosis and complications.

Material and methods: The study was carried out on 60 cases suspected of or diagnosed as acute pancreatitis. All the cases were referred from various clinical Departments of Assam Medical College and Hospital, Dibrugarh. The patients comprised of in the age group ranging from 7 years to 74 years.

Results: In our study, out of 60 cases of acute pancreatitis 76.7% of cases showed Moderate (4-6) type, 13.3% of cases showed Mild (0 – 2) type and 10% of cases showed severe (8 – 10) type of acute pancreatitis.

Conclusion: On grading of acute pancreatitis by Modified CT Severity index 8 cases (13.3%) shows Mild Acute pancreatitis (0-2), 46 cases (76.7%) shows Moderate Acute pancreatitis (4 - 6) and 6 cases (10%) shows Severe Acute pancreatitis (8 - 10).

Keywords: Acute Pancreatitis, CT Severity Index

INTRODUCTION

Acute pancreatitis along with its complications is one of the most common causes of morbidity in hospitalized patients. Before the advent of modern cross sectional imaging modalities of gray scale ultrasound and computed tomography (CT), the pancreas was truly one of the “hidden” organs of abdomen being only analyzed by indirect methods of analyzing its neighbouring organs such as by barium meal. Godfrey Hounsfield, of EMI laboratories, England, invented CT in 1972. The clinical CT scanners were installed between 1974 and 1976, which were at first dedicated to imaging of the head only. Whole body system with larger patient openings became available widely by 1980. CT is the most versatile imaging technique for evaluation of patients with acute pancreatitis. While ultrasound is widely used as an initial screening and in reviewing of patients. Acute pancreatitis can be classified into different forms. Severe pancreatitis, also referred to as necrotizing pancreatitis, occurs in approximately 20% of patients and is associated with organ failure or local complications, including necrosis, infection, or pseudocyst formation. The CT severity index was used previously and we used a modified form to predict the outcome of the condition while maintaining or improving the interobserver agreement.¹ The modified CT severity index incorporates features reflecting

organ failure and extrapancreatic complications for predicting course. The modified index is found to have stronger prognostic correlation than the accepted index and could also predict the length of hospital stay and development of organs failure.² Aim of the study conducted was to establish the ability of CT in patients of clinically suspected acute pancreatitis referred from various clinical departments in depicting and quantifying the pancreatic parenchymal injury, to detect pancreatic necrosis and complications.

MATERIAL AND METHODS

Study group

60 cases were studied which were referred from different departments of Assam Medical College and Hospital, Dibrugarh. The patients comprised of in the age group ranging from 7 years to 74 years.

Sample size was based on inclusion and exclusion criteria.

Inclusion Criteria: Clinically suspected acute pancreatitis cases (irrespective of age and sex) supported by assessment of serum amylase and serum lipase activity.

Exclusion Criteria: Clinically suspected acute pancreatitis cases with normal reference interval of serum amylase and serum lipase is excluded from this study.

Place of study was the Department of Radiodiagnosis, Assam Medical College and Hospital, Dibrugarh. Period of study was one year (July 2011 to June 2012).

Equipment used:

1. Siemem's somatom spirit, dual slice CT.
2. Siemen's, acuson antares ultrasound imaging system
3. Siemen's autoanalyzer

A thorough evaluation of all cases for the study was carried out prior to the CT scan. A detailed case history, complete clinical examination, examination of routine blood parameters especially serum amylase and lipase were done.

As shown in table-1 Modified Severity Index = CT grade + percentage necrosis + extrapancreatic complications (points)

Mild : (0 – 2)

Moderate: (4 – 6)

Severe : (8 – 10)

¹Assistant Professor, Department of Radiodiagnosis, ²Assistant Professor, Department of Medicine, ³Resident, Department of Otolaryngology and Head and Neck Surgery, Assam Medical College, Dibrugarh, Assam, India

Corresponding author: Pradip Kumar Tiwari, Resident, Department of Otolaryngology and Head and Neck Surgery, Assam Medical College, Dibrugarh, Assam, India

How to cite this article: Lipee Nath, Rajesh Kumar Dhanowar, Pradip Kumar Tiwari. Evaluation of complication and prognosis in acute pancreatitis by modified CT severity index. International Journal of Contemporary Medical Research 2016;3(7):1888-1890.

CT Grade	(Points)	Percentage Necrosis	(Points)	Extrapancreatic Complications	(Points)	Modified Severity Index = CT grade + Percentage necrosis + extrapancreatic Complications (Points)
Normal Pancreas	0	0	0	Pleural effusion ascites, vascular complications, extrapancreatic parenchymal abnormalities, or gastrointestinal tract involvement	2	Mild (0-2)
Inflammations - Pancreas and / or Peripancreatic fat	2	≤ 30%	2			Moderate (4- 6)
Pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis	4	> 30 %	4			Severe (8 - 10)

Table-1: Modified CT severity index

CT Findings	No of Cases	Percentage
Normal Pancreas	2	3.3%
Inflammation-Pancreas and/or Peripancreatic fat	35	58.3%
Pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis	15	25%
Pleural effusion	20	33.3%
Ascites	11	18.3%
Vascular complication	6	10%
Extrapancreatic parenchymal abnormalities	5	8.3%
GIT involvement	3	5%

Table-2: Spectrum of CT findings in Acute Pancreatitis and its complications

Modified CT Severity Index	No of Cases	Percentage
Mild (0 - 2)	8	13.3%
Moderate (4 - 6)	46	76.7%
Severe (8 - 10)	6	10%

Table-3: Morphologic Severity of Pancreatitis (Grading of Acute Pancreatitis according to Modified CT severity index)

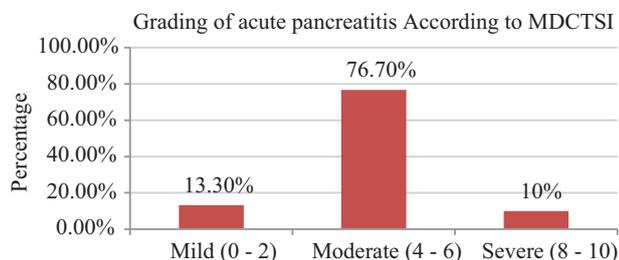


Figure-1: Grading of acute pancreatitis according to MDCTSI

STATISTICAL ANALYSIS

The tables were prepared using SPSS version 21. Descriptive statistics were used to generate results.

RESULTS

Out of 60 cases included in our study maximum cluster of cases were seen in the age range of 51 to 60 years (45%). Mean is 44.6 and Standard Deviation is 15.15 Out of 60 cases included in our study 54 (90%) were male and 6 (10%) were female, indicating that acute pancreatitis is prevalent in male in this part of the country. This is due to more susceptibility of the male patient for the etiological factors causing acute pancreatitis. This is attributed mainly to alcoholism in the present study. In our present study of 60 cases all the patients presented with pain abdomen (100%) followed by vomiting (25%) and nausea (20%). 6.7% of patients presented with fever. According to table-2 in our study of 60 cases of acute pancreatitis, inflammation of pancreas and / or peripancreatic fat was seen in

58.3% of cases, pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis was seen in 25% of cases and normal pancreas was seen in 3.3% of cases. Pleural effusion was seen in 33.3% of cases, ascites in 18.3% of cases, vascular complication in 10% of cases, extrapancreatic parenchymal abnormalities in 8.3% of cases and GIT involvement in 5% of cases of acute pancreatitis

According to table-3 and figure-1 in our study, out of 60 cases of acute pancreatitis 76.7% of cases showed Moderate (4-6) type, 13.3% of cases showed Mild (0 – 2) type and 10% of cases showed severe (8 – 10) type of acute pancreatitis.

DISCUSSION

In a study of 12 months conducted in the department of Radiodiagnosis, Assam Medical College and Hospital, we have analyzed the mortality, organ failure, pancreatic infection, days of hospital stay, requirement of intervention, and clinical severity of pancreatitis by Modified CT Severity Index. Considering the clinical presentation in our study, abdominal pain was the commonest symptom as seen in 60 cases (100%) followed by vomiting in 15 cases (25%) which correlates with the study by Mortelet al,¹ BU Wu et al³, BC KOO et al⁴, O’Connor et al⁵ and Bollen et al.⁶ In our study of 60 cases of acute pancreatitis normal pancreas is found in 2 cases (3.3%), inflammation of pancreas and or peripancreatic fat in 35 cases (58.3%) and pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis in 15 cases (25%). In our study of 60 cases of acute pancreatitis Mild AP was found in 8 cases (13.3 %), Moderate AP found in 46 cases (76.7%) and Severe AP in 6 cases (10%). Our study regarding Severe AP correlates with Mortelet al,¹ where in a study of 66 patients 10 cases (15.1%) were found and 18% in a study by Bollen et al.⁶ In our study it was found that 76.7% of cases are of Moderate type (4 – 6) and 13.3% of cases are of Mild type (0 – 2) which does not correlate with Mortelet al, and Bollen et al⁶ study, this is due to the fact that in our

institution maximum number of patients are first referred from various clinical departments for Ultrasonography of pancreas in cases of mild type of acute pancreatitis. Patients are referred for C.T. scan study only after preliminary ultrasonography study. In our study of 60 cases 52 cases (86.7%) got conservative treatment and 8 cases (13.3%) had to undergo intervention. Significant association between morphologic severity of pancreatitis and MDCTSI done at diagnosis and review which correlates with study done by Bollen et al.⁶ In our study of 60 cases 55 cases (91.7%) Improved, 4 cases (6.7%) Detoriated and death is of 1 case (1.7%). The introduction of the CT severity index in 1994 was a significant advance in the assessment of patients with acute pancreatitis.¹ There were limitations of this index. First, the presence of organ failure, extrapancreatic parenchymal complications, and peripancreatic vascular complications does not significantly correlate with the score obtained with this index. Second, as reported in two independent studies, the interobserver agreement for scoring CT scans using the current CT severity index is only moderate, with a reported percentage of agreement approximating 75% Finally, as acknowledged by Balthazar et al and confirmed by others, no significant difference in morbidity and mortality is seen, when using the CT severity index, between patients who have 30–50% necrosis and patients who have more than 50% necrosis.⁷ Therefore, it is questionable whether these specific categorizations of the degree of pancreatic necrosis are necessary. In light of these limitations, we hypothesized that a simplified CT severity index that incorporated features reflecting organ failure and extrapancreatic complications would be useful for predicting outcomes more accurately. The modified CT severity index differentiates only between presence or absence of acute fluid collections and, therefore, does not require a count of the collections. There was a stronger correlation of the parameters of the necrosis and accurate prediction of the hospital stay can be done. Malfertheiner P et al in 1987 concluded that although dilatation of main pancreatic duct is observed in acute pancreatitis, it may at times be compressed by diffuse intraparenchymal swelling.⁸ However, a mild dilatation is seen during the convalescent phase of the disease.⁸ Balthazar reported that imaging tool to diagnose and stage acute pancreatitis is helical or MDCT Combining these two prospective studies in 1990 and 2002. Balthazar et al introduced a system of classification of patients of acute pancreatitis and indicated prognostic implications based on CT findings.⁹⁻¹¹

CONCLUSION

To conclude with, the Modified CT severity index have a stronger prognostic correlation and correlates more closely with patient outcome in all the parameters studied, especially with the length of the hospital stay and the development of organ failure.

REFERENCES

1. Koenraad J. Morteale, Walter Wiesner, Lisa Intriere, Shridhar Shankar, Kelly H. Zou1, Babek N. Kalantari, Alex Perez, Eric van Sonnenberg, Pablo R. Ros, Peter A. Banks, Stuart G. Silverman: A Modified CT Severity Index for Evaluating Acute Pancreatitis: Improved Correlation with Patient Outcome, *AJR*: 2004, November.183.
2. Nisha Sainani, Onofrio Catalano, Dushyant sahani,, CT

and MRI of whole body. John R Haaga, Mosby Elseveir. Fifth edition 1599-1667

3. B U Wu, R S Johannes, X Sun, Y Tabak, D L Conwell, P A Banks The early prediction of mortality in acute pancreatitis: a large population-based study *Gut*. 2008;57:1698–1703. doi:10.1136/gut.2008.152702
4. B C Koo, A Chinogureyi, and A S Shaw: Imaging acute pancreatitis, *The British Journal of Radiology*. 2010;83:104–112.
5. Owen J. O'Connor, Sebastian McWilliams, Michael M. Maher: Imaging of Acute Pancreatitis, 1Department of Radiology, Cork University Hospital, University College Cork, Wilton, Cork, Ireland. *AJR*: 2011 August, 197.
6. Thomas L. Bollen, Vikesh K. Singh, Rie Maurer, Kathryn Repas, Hendrik W. van Es, Peter A. Banks, Koenraad J. Morteale: Comparative Evaluation of the Modified CT Severity Index and CT Severity Index in Assessing Severity of Acute Pancreatitis, *AJR*: 2011 August, 197. Balthazar: CT diagnosis and staging of acute pancreatitis, *Radiol Clin. North America* 27:19, 1989.
7. Balthazar E J, Freeny PC, Van Sonneberg E Imaging and intervention in acute pancreatitis. *Radiology*. 1994;193;23: 898-905.
8. Malfertheiner P, Buchler M: Clinical symptoms and signs and diagnostic requirements of acute pancreatitis Springer –Verleg,1987,p-104.
9. Balthazar E J, Robinson DL, Megiow AJ, Ranson JH: Acute pancreatitis: Value of CT in establishing prognosis. *Radiology*. 1990;174:331-336.
10. Balthazar EJ. acute pancreatitis: assessment of severity with clinical and CT evaluation. *Radiology*. 2002;223; 603-613.
11. Harsh Trivedi, Ronak Vyas, Kashyap Vyas, Shweta Sharma Evaluation of etiological and high risk factors in the patients of acute pancreatitis. *International Journal of Contemporary Medical Research*. 2016;3:1726-1730.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 10-05-2016; **Published online:** 13-06-2016