Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Comparison of CT Severity Index with Modified CT Severity Index in Evaluation of Acute Pancreatitis.

Richard. S. Martis[1]

[1]Associate Professor, Department of Radiodiagnosis, ACME, Pariyaram.

Received: August 2018
Accepted: September 2018

ABSTRACT

Background: Acute pancreatitis is an acute inflammatory process of the pancreas triggered by several etiologic factors of which alcoholism and choledocholithiasis are the most common. Contrast-enhanced CT currently is the most accurate single imaging modality for diagnosis, staging the severity, and detecting complications of acute pancreatitis. **Methods:** This was a prospective study of 54 patients conducted in PBM Hospital Bikaner on Siemens Somatom ART scanner and GE High speed NX/I pro dual slice scanner. Contrast enhanced CT scans were obtained 40 seconds after i.v. administration of 150 ml of non-ionic contrast media injected at the rate of 3 ml/sec .The severity of pancreatitis was assessed for each case using the CTSI developed by Balthazar as well as the modified CTSI proposed by Mortele and correlated with clinical outcome. **Results:** Modified CTSI showed a more significant correlation with the occurrence of organ failure than the CTSI (p=0.011 vs. p=0.015). The modified CTSI also correlated more closely with the length of hospital stay (>20 days) than the CTSI although both the indices showed a significant correlation (p=0.013 vs. p=0.02). **Conclusions:** Modified CTSI simplifies the evaluation of acute pancreatitis in comparison to CTSI by taking into account extrapancreatic complications of acute pancreatitis and by simplifying grading of pancreatic necrosis. Modified CTSI score showed significant correlation with all outcome parameters compared to CTSI and was better than the CTSI in predicting the occurrence of organ failure and the length of hospital stay.

Keywords: Pancreatitis, CT severity index (CTSI), Modified CT severity index (MCTSI)

INTRODUCTION

Acute pancreatitis is an acute inflammatory process of the pancreas triggered by several etiologic factors of which alcoholism and choledocholithiasis are the most common.[5] Contrast-enhanced CT currently is the most accurate single imaging modality for diagnosis, staging the severity, and detecting complications of acute pancreatitis.[1,5] The staging systems in use are CT severity index (Balthazar) and Modified CT severity index (Mortele).

CT Severity Index (Balthazar)[3]

Grading of pancreatitis (Balthazar score)

- A: normal pancreas: 0
- B: enlargement of pancreas: 1
- C: inflammatory changes in pancreas and peripancreatic fat: 2
- D: ill-defined single peripancreatic fluid collection: 3
- E: two or more poorly defined peripancreatic fluid collections: 4

Name & Address of Corresponding Author
Dr Richard. S. Martis
Associate Professor,
Department of Radiodiagnosis,
ACME,
Pariyaram.

Pancreatic necrosis

- none: 0
- ≤30%: 2
- >30-50%: 4
- >50%: 6

The maximum score that can be obtained is 10.
The CTSI is the sum of the scores obtained with the Balthazar score and those obtained with the evaluation of pancreatic necrosis:

- 0-3: mild acute pancreatitis
- 4-6: moderate acute pancreatitis
- 7-10: severe acute pancreatitis

Modified CT Severity Index (Mortele)[7]

Scores are generated by estimating pancreatic inflammation and necrosis to give a score out of 10.

Pancreatic inflammation

- 0: normal pancreas
- 2: intrinsic pancreatic abnormalities with or without inflammatory changes in peripancreatic fat
- 4: pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis

Pancreatic necrosis

- 0: none
- 2: 30% or less
- 4: more than 30%

Extrapancreatic complications

- 2: one or more of pleural effusion, ascites, vascular complications, parenchymal complications and/or gastrointestinal involvement.

Total score

Total points are given out of 10 to determine the grade of pancreatitis and aid treatment:

- 0-2: mild
- 4-6: moderate
- 8-10: severe

Aims and Objectives

1. To confirm the diagnosis of pancreatitis and to know the extent of the disease.
2. To assess the correlation of the modified CT severity index with clinical outcome in the evaluation of patients with acute pancreatitis.
3. To compare the performance of the modified CT severity index with CT severity index in predicting clinical outcome in patients with acute pancreatitis.

MATERIALS & METHODS

This was a prospective study of 54 patients conducted in PBM Hospital Bikaner on Siemens Somatom ART scanner and GE High speed NX/I pro dual slice scanner. Opacification of the gastrointestinal tract was obtained by administering 1000-1500 ml of 2% water-soluble contrast over 45 minutes. Contrast enhanced CT scans were obtained 40 seconds after i.v. administration of 150 ml of non-ionic contrast media injected at the rate of 3 ml/sec The severity of pancreatitis was assessed for each case using the CTSI developed by Balthazar,[3] as well as the modified CTSI proposed by Mortele as described above.[7]

Parameters of Clinical Outcome

Patients were followed up and following parameters of clinical outcome were included

1. Duration of hospital stay (in days)
2. Need for percutaneous (aspiration or catheter drainage) or surgical intervention
3. Development of infection

RESULTS

- No. of cases evaluated – 54
- Patients enrolled comprised of 15 females and 39 males with a mean age of 40.7 years
- Etiology of pancreatitis was alcohol induced in 28 patients(52%), gallstone induced in 19(35%) drug induced and idiopathic.

Severity of pancreatitis in study population

	CTSI	MCTSI
Mild pancreatitis	4	
Moderate pancreatitis	20	14
Severe pancreatitis	30	40

Average hospital stay (days)

	CTSI	MCTSI
Mild pancreatitis	24	
Moderate pancreatitis	40	35
Severe pancreatitis	42	38

Patients who required percutaneous intervention

	CTSI	MCTSI
Mild pancreatitis	01	
Moderate pancreatitis	05	05
Severe pancreatitis	12	16

Occurrence of infection

	CTSI	MCTSI
Mild pancreatitis	02	
Moderate pancreatitis	10	06
Severe pancreatitis	06	21

Occurrence of organ failure

	CTSI	MCTSI
Mild pancreatitis	00	
Moderate pancreatitis	05	04
Severe pancreatitis	15	17

Mortality

	CTSI	MCTSI
Mild pancreatitis	00	
Moderate pancreatitis	02	00
Severe pancreatitis	06	08

Correlation of scoring indices with patient outcome

Outcome Parameters	CSTI (p value)	MCSTI(p value)
Organ failure	0.015	0.011
Hospital stay(>20days)	0.02	0.013
Percutaneous intervention	0.001	0.002
Infection	0.009	0.011
Mortality	0.146	0.069

Figure 1: Axial CECT scan shows > 50% necrosis of the pancreatic parenchyma

- Modified CTSI showed a more significant correlation with the occurrence of organ failure than the CTSI (p=0.011 vs. p=0.015).
- The modified CTSI also correlated more closely with the length of hospital stay (>20 days) than the

CTSI although both the indices showed a significant correlation (p=0.013 vs. p=0.02).

- Both the indices correlated significantly with the need for percutaneous intervention and the occurrence of infection although the CTSI correlated more closely with the above parameters.

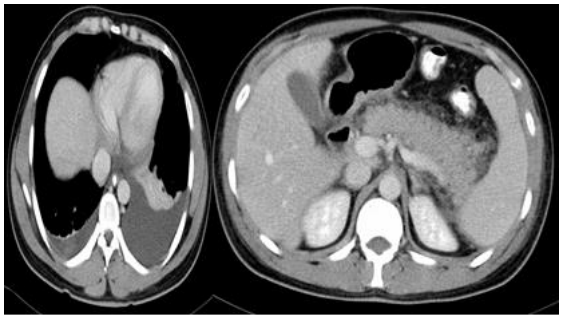

Figure 2: Acute pancreatitis, graded as mild with CTSI but moderate with modified CTSI due to the presence of pleural effusion and bowel wall inflammation.

DISCUSSION

Introduction of the CTSI revolutionised the assessment of acute pancreatitis by helping clinicians differentiate between mild, moderate and severe pancreatitis.[6] Limitations of CTSI were lack of correlation with outcome parameters such as organ failure, extrapancreatic, parenchymal or peripancreatic vascular complications.[7] Patients with >30% necrosis have similar morbidity and mortality, thus including an additional 50% in the score was not practically useful.[4]

Mortele et al,[7] in 2004 proposed the modified CTSI to overcome the shortcomings of the currently accepted CTSI. Greater weightage given to the presence of extrapancreatic complications with the aim of allowing a more accurate prediction of clinical outcome Modified CTSI correlated more significantly with the occurrence of organ failure and the length of hospital stay than the CTSI although both the indices showed significant correlation.

Both the indices correlated significantly with the need for percutaneous intervention and the occurrence of infection although the CTSI correlated more closely with the above parameters than the modified CTSI.

CONCLUSION

- Modified CTSI simplifies the evaluation of acute pancreatitis by taking into account only the presence or absence of fluid collections rather than the number of collections and also by grading necrosis into just 2 grades (<30% and >30%)
- Modified CTSI score showed significant correlation with all outcome parameters except mortality and was better than the CTSI in predicting the occurrence of organ failure and the length of hospital stay.

REFERENCES

1. Balthazar EJ, Robinson DL, Megibow AJ, et al. Acute pancreatitis: value of CT in establishing prognosis. Radiology. 1990;174(2):331–36.
2. Balthazar EJ, Freeny PC, Van Sonnenberg E. Imaging and intervention in acute pancreatitis. Radiology. 1994;193(2):297–306.
3. Balthazar EJ. Acute Pancreatitis: Assessment of Severity with Clinical and CT Evaluation. Radiology. 2002;223(3):603–13
4. Mortele KJ, Mergo PJ, Taylor HM, et al. Peripancreatic vascular abnormalities complicating acute pancreatitis: contrast-enhanced helical CT findings. Eur J Radiol. 2004;52(1):67–72
5. Owen J. O'Connor, Julliette M. Buckley and Michael M. Maher: Imaging of the Complications of Acute Pancreatitis: AJR: September 2011, Volume 197, Number 3.
6. Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, et al. Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus. Gut. 2013;62(1):102–11.
7. Mortele KJ1, Wiesner W, Intriere L, Shankar S:A modified CT severity index for evaluating acute pancreatitis: improved correlation with patient outcome.AJR 2004 Nov;183(5):1261-5.
8. Lankisch PG, Warnecke B, Bruns D, et al. The APACHE II score is unreliable to diagnose necrotizing pancreatitis on admission to hospital. Pancreas 2002; 24:217–222
9. Haaga JR. The pancreas. In: , Haaga JR, Lanzieri CF, Gilkeson RC, eds. CT and MR imaging of the whole body, 4th ed. St. Louis, MO: Mosby, 2003:1395–1486
10. Maher MM, Lucey BC, Gervais DA, Mueller PR. Acute pancreatitis: the role of imaging and interventional radiology. Cardiovasc Intervent Radiol 2004; 27:208–225
11. Tran DD, Cuesta MA. Evaluation of severity in patients with acute pancreatitis. Am J Gastroenterol 1992; 87:604–608

How to cite this article: Martis RS. Comparison of CT Severity Index with Modified CT Severity Index in Evaluation of Acute Pancreatitis. Ann. Int. Med. Den. Res. 2018; 4(6):RD01-RD03.

Source of Support: Nil, **Conflict of Interest:** None declared