

Diagnostic Accuracy of Extra Pancreatic Inflammation Assessed by CT Scan Score in Predicting the Severity of Acute Pancreatitis.**Kishan Kumar Thakur¹, Mithilesh Pratap², Madhukar Dayal³**¹Senior Resident, Department of Radiology, Nalanda Medical College Hospital, Patna, Bihar²Professor, Department of Radiology, Nalanda Medical College Hospital, Patna, Bihar³Assistant Professor, Department of Radiology, Nalanda Medical College Hospital, Patna, Bihar

Received: 02-03-2024 / Revised: 08-04-2024 / Accepted: 04-05-2024

Corresponding Author: Dr. Mithilesh Pratap

Conflict of interest: Nil

Abstract:

Background: For patients suspected of acute pancreatitis (AP), computed tomography (CT) is the preferred method for both diagnosis and assessing severity. The EPIC scoring method, focusing on extra pancreatic inflammatory changes such as ascites, pleural effusion, and inflammation in the mesentery and retroperitoneum, is gaining popularity. Unlike traditional methods, EPIC does not rely on pancreatic necrosis, which can take up to 72 hours to appear on CT scans. Another advantage of EPIC is that it does not necessitate the use of contrast agents.

Aims and Objectives: Evaluate EPIC's diagnostic performance in predicting acute pancreatitis (AP) severity and compare it with MCTSI (Modified CT Severity Index) for assessing severity and mortality in AP.

Materials and Methods: This diagnostic study was conducted in the Department of Radiology at Nalanda Medical College Hospital, Patna, Bihar from September 2022 to August 2023. It included 100 patients selected using purposive sampling from those admitted to Nalanda Medical College Hospital with clinical suspicion of acute pancreatitis during the study period.

Results: In our study, 15% of patients were classified as having mild acute pancreatitis according to MCTSI, and 19% according to EPIC. For moderate severity, 50% were categorized by MCTSI and 43% by EPIC. Severe cases accounted for 35% according to MCTSI and 38% using the EPIC scoring system. Among our patients, 2% died due to acute pancreatitis; these patients had BISAP, EPIC, and MCTSI scores of 4, 7, and 10, respectively.

Discussion: In conclusion, our study found comparable classification rates between MCTSI and EPIC for mild, moderate, and severe acute pancreatitis cases. Specifically, MCTSI identified 15% with mild, 50% with moderate, and 35% with severe pancreatitis, while EPIC classified 19%, 43%, and 38% respectively. Among our patients, 2% succumbed to acute pancreatitis, each having BISAP, EPIC, and MCTSI scores of 4, 7, and 10 respectively, underscoring the utility of these scoring systems in predicting clinical outcomes.

Conclusion: The EPIC scoring system proves to be a dependable method for assessing the severity of acute pancreatitis, demonstrating diagnostic performance on par with the MCTSI. It is envisioned that the EPIC scoring method could potentially replace MCTSI in future assessments of acute pancreatitis severity.

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Introduction

Acute pancreatitis is a commonly encountered abdominal emergency. [1] Severity and outcome prediction in AP helps in guiding appropriate management protocol for the patients, especially in those having severe disease. Recently, patients with suspected Acute Pancreatitis (AP), computed tomography (CT) study is considered as the investigation of choice for diagnostic as well as severity assessment purposes. [2] Amongst them MCTSI is the commonly used Radiological scoring system in predicting the outcome of AP. [3,4] MCTSI is based on pancreatic inflammation, necrosis and extra pancreatic complications. The EPIC scoring method, focusing on extra pancreatic inflammatory changes such as ascites, pleural effusion, and inflammation in the mesentery and

retroperitoneum, is gaining popularity. Unlike traditional methods, EPIC does not rely on pancreatic necrosis, which can take up to 72 hours to appear on CT scans. Another advantage of EPIC is that it does not necessitate the use of contrast. [5,6]

Aims and Objectives

Primary Objective: To study the diagnostic performance of EPIC in predicting the severity of AP.

Secondary Objective: To compare the predictive role of EPIC score with MCTSI for assessment of severity and mortality in AP.

Materials and Methods

This diagnostic study was conducted in the Department of Radiology at Nalanda Medical College Hospital, Patna, Bihar from September 2022 to August 2023. It included 100 patients selected using purposive sampling from those admitted to Nalanda Medical College Hospital with clinical suspicion of acute pancreatitis during the study period.

Patients admitted to Hospital with clinical impression of acute pancreatitis who underwent noncontrast and contrast enhanced MDCT within 3-5 days (mean 3.16 ± 0.04 day) after onset of Acute Pancreatitis, were included in the study.

EPIC score was calculated on NCCT and MCTSI score calculated on CECT. Outcome was assessed based on-

A) Severity- Persistent organ failure.

B) Mortality

Patients were categorized into mild, moderate, and severe groups based on scoring systems: BISAP (5 points), EPIC (7 points, assessing extra-pancreatic manifestations like pleural effusion, ascites, and retroperitoneal inflammation), and Modified CT severity index (10 points, evaluating pancreatic inflammation, necrosis, and extrapancreatic complications). Scoring was done post-contrast CT imaging.

Inclusion Criteria

1. Patients of Acute Pancreatitis, diagnosed as per revised Atlanta criteria in whom NCCT and CECT abdomen were performed.

2. Patients in whom both CT and clinical findings were available for correlation.

3. Patients of all age group and sex.

4. Patient who were admitted to this hospital.

Exclusion Criteria

1. Patients with intraductal calculi, ductal stricture and parenchymal calcification suggestive of chronic pancreatitis.

2. Patients with renal failure, H/O contrast allergy, pregnancy.

3. Patients not consenting for the study

Results

Out of 100 patients 28 (28%) developed TOF(transient organ failure), 17(17%) POF (persistent organ failure) and 55 has no organ failure.

Severity of Acute Pancreatitis-

BISAP score: We found 22(22 %) patients having BISAP score (3-5) high morbidity and mortality and 78(78%) patients having BISAP score (0-2) low morbidity and mortality.

Modified CT Severity Index (MCTSI)

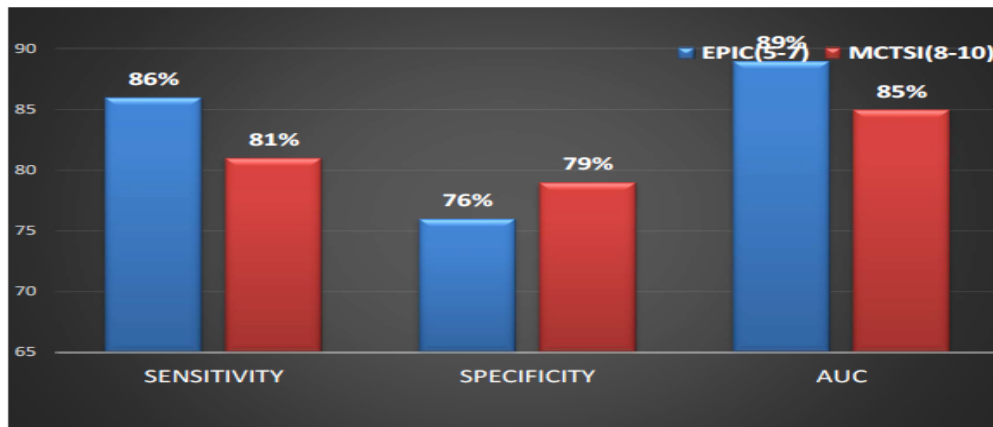
Out of 100 patients 15(15%)patients developed mild (0-2),50 (50%) moderate (4-6) and 35(35%) severe (8-10) Acute Pancreatitis

Extrapancreatic Inflammation On CT (EPIC) Score-

Number of patients correspond to 0-1 point is 19, 2-4 point is 43 and to 5-7 point is 38.

Prediction of severity of acute pancreatitis

Scoring system	Sensitivity	Specificity	AUC	P-value
EPIC (>4)	86%	76%	.898	.000
MCTSI(≥8)	81%	79%	.856	.000



Discussion

Acute Pancreatitis ranks as one of the most prevalent pathologies affecting the pancreas. International Symposium organized in Atlanta, 1992, established a clinical-based acute pancreatitis classification system. [7] In 1990, EJ Balthazar highlighted the role of CT scans in prognosticating acute pancreatitis. Their study revealed that around 54 percent of patients with peripancreatic fluid collections saw spontaneous resolution, while the remaining 46 percent developed complications such as persistent collections, enlargement, infection, abscesses, or pseudocysts. [8] In 1991, C. D. Johnson et al. observed that contrast-enhanced CT findings closely correlated with surgical findings in 13 patients diagnosed operatively with necrotizing pancreatitis. [9] In a retrospective study involving 268 patients in 2000, E. J. Simchuk et al. showed that CTSI serves as a valuable tool in evaluating acute pancreatitis severity, influencing treatment strategies, and predicting clinical outcomes. [10]

In 2008, D. Lytras et al. conducted a prospective study involving 64 patients predicted to have severe acute pancreatitis based on the modified CT severity index. They found that 33 patients developed organ failure, with 8 (24%) fatalities. Among those with both organ failure and infectious pancreatic complications (12 patients), 7 (58%) died. In contrast, among the 21 patients with organ failure but no infectious pancreatic complications, only 1 (5%) died. The study concluded that early persistent organ failure and pancreatic necrosis significantly influence patient outcomes in acute pancreatitis. [11]

The EPIC (Extra Pancreatic Inflammation on CT) score evaluates extrapancreatic inflammation based on radiological signs of systemic inflammatory response syndrome (SIRS) and organ dysfunction, rather than focusing on necrosis. It measures the extent of inflammation, potentially reflecting the severity of host injury, which correlates with organ dysfunction—a critical determinant of early-phase acute pancreatitis

severity and outcomes. It encompasses manifestations such as ascites, pleural effusion, mesenteric inflammation (seen as mesenteric fat stranding on non-contrast CT), and retroperitoneal inflammation (indicated by thickening of renal fascia, retroperitoneal collections, and fat stranding). Chen et al. suggested that the EPIC score is superior to conventional methods for predicting early-phase organ failure and length of hospital stay in acute pancreatitis. [2] They reported that an EPIC score below 2 has 100% sensitivity and specificity with an AUC of 0.724 for predicting absence of organ failure, whereas an EPIC score of ≥ 3 is 80.6% sensitive and 63.1% specific for predicting organ failure. Bollen et al. indicated that CT scoring systems are comparable to clinical scoring in assessing acute pancreatitis severity, advising against routine CT scans solely for severity assessment upon admission. [3] Mortelet et al. suggested that an updated CT severity index correlates better with patient outcomes than the traditional index, with similar interobserver variability. [4] Sharma et al. compared EPIC with traditional methods and found it marginally better in predicting outcomes like persistent organ failure, interventions, and mortality. [5] They noted a sensitivity of 76.1% and specificity of 61.8% when the EPIC score was approximately 4 ± 1.9 for predicting persistent organ failure. Delrue et al. demonstrated that the EPIC score accurately assesses acute pancreatitis severity and outcomes within 24 hours of admission, showing 100% sensitivity and 70.8% specificity when the EPIC score exceeds 4. [6] Jian et al. concluded that the EPIC score is highly accurate for predicting acute pancreatitis severity, with a cutoff of 1.5 yielding 84.4% sensitivity, 73.6% specificity, and an AUC of 0.82 for predicting organ failure. [12]

Our study found comparable classification rates between MCTSI and EPIC for mild, moderate, and severe acute pancreatitis cases. Specifically, MCTSI identified 15% with mild, 50% with moderate, and 35% with severe pancreatitis, while EPIC classified 19%, 43%, and 38% respectively. Among our

patients, 2% succumbed to acute pancreatitis, each having BISAP, EPIC, and MCTSI scores of 4, 7, and 10 respectively, underscoring the utility of these scoring systems in predicting clinical outcomes.

Conclusion

Both BISAP and CT scoring systems like MCTSI are utilized to assess acute pancreatitis severity and clinical outcomes. MCTSI, widely used for its diagnostic capability, requires contrast-enhanced CT after 72 hours of symptom onset, which may not always be feasible. Addressing these challenges, the EPIC scoring system, based on noncontrast studies, has emerged as a promising alternative for severity assessment. Our study indicates that EPIC is reliable and comparable to MCTSI in diagnostic performance for acute pancreatitis severity assessment. We anticipate that EPIC may potentially replace MCTSI in the future, pending further validation through additional research.

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