Pancreatic Enzyme Level Correlation with Modified CT Severity Index in Acute Pancreatitis Cases

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Abstract: <u>Background</u>: Acute pancreatitis (AP) is a pathological process in which the pancreatic secretes enzymes that kill its own tissues. Serum Amylase and Lipase are almost always raised in this disease. CECT abdomen and pelvis being best for diagnosis. Since AP is a crucial differential for acute abdominal pain, MCTSI is one of the best indicators to gauge the severity of the illness process. It seeks to establish a connection between MCTSI and the concentrations of lipase and amylase in acute pancreatitis. <u>Aims</u>: Establishing relationship between amylase and lipase concentration with MCTSI in acute pancreatitis. <u>Conclusion</u>: AP is a critical differential for acute abdomen pain. Hence, the role of radiologist is to provide a MCTSI to guide the clinicians in management. By comparing the serum enzyme levels with MCTSI, one can suspect the disease sooner. Thus it reduces the disease burden and fatality by early intervention.

Keywords: Acute pancreatitis, Modified CT Severity Index, Serum amylase, Serum lipase.

1. Introduction

AP is a self - limiting inflammatory disease in which the pancreatic enzymes that break down parenchyma also malfunction and impact other systems. Cholelithiasis, alcoholism, medications such as azathioprine, estrogens, tetracycline, and hypertriglyceridemia are among the most often reported causes. Identifying the origin and extent of disease is essential for treatment because the overall death rate remains static at 12 but rises to 1030 in severe AP. [1].

The overall mortality of AP is static at 1%-2% but increasing to 10%-30% in severe AP. Hence the establishment of diagnosis, cause, and severity is crucial for cure [2 - 4].

AP is a relatively common with incidence of 5–80 per 100, 000 populations worldwide [5].

It varies from transient inflammation evolving into necrotic damage with life - threatening outcomes. Any pain in the abdomen or back should raise a suscpicion for AP [11]. Use two of the three criteria to diagnose: (1) pain in the epigastrium that radiates to the back, (2) threefold rise of lipase and/or amylase, (3) findings of AP on CECT abdomen [7 - 9].

The lab parameters like amylase and/or lipase are increased by threefold [13, 14]. But the CECT is a crucial tool to diagnose the condition. CECT is the best image modality for evaluation the extent of the disease in AP. Treatment depends on MCTSI [10 - 12].

Modified CT Severity Index

Takes into account the following factors, determines how the disease is treated.

Pancreatic inflammation

0: normal

2: intrinsic 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 cure:

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

To correlate serum enzymes and MCTSI in 2021 Joshi BR et al [13], gave an insight on the MCTSI and correlated with pancreatic enzymes.

Aims and Objectives

Evaluation of amylase and lipase levels in relation to MCTSI in acute pancreatitis cases.

Research Methodology

Ours is a prospective study conducted in twenty cases who are clinically suspected and biochemically detected AP, referred to Department of Radiodiagnosis, Akash Institute for CECT Abdomen.

All the selected patients were imaged using enhanced and non - enhanced CT of abdomen performed on Siemens Somatom Emotion 16 slice CT scanner.

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CT section was analyzed pertaining to MTCSI scoring. The severity score was given using MCTSI and divided into three groups (mild, moderate and severe). The MCTSI is a 10 point scoring system derived by considering the degree of inflammation (0 to 4 points), necrosis (0 to 4 points) and extra pancreatic complications (0 or 2 points).

All cases were categorized into mild (score 0 - 2), moderate (score 4 - 6) or severe (score 8 - 10). Then it was compared with enzyme titres in the blood.

2. Observation and Results

The below mentioned tabular form represents descriptive statistics for three datasets, each with 20 observations. The values indicate variations in range, central tendency, and dispersion among the datasets.

Table 1: Mean Values of Each V	/ariable
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	Ν	N Minimum Maximum		Mean	Std. Deviation
Modified CTSI Score (Out of 10)	20	2	10	6	2.34
Serum Amylase (Normal: 31 - 107 U/L)	20	39	1526	560	407.46
Serum Lipase (Normal: 23 - 300 U/L)	20	46	5460	1585.75	1485.83

Table 2: Classification of Modified CTSI Score

Modified CTSI Score Classification	Frequency	Percent (%)
Mild (0 - 2)	2	10
Moderate (4 - 6)	11	55
Severe (8 - 10)	7	35
Total	20	100



The largest cases (55%) belong to moderate. A considerable number (35%) are severe and only 10% mild cases.

Table 3: Correlation of MCTSI and Serum Amylase

Modified			SERUN	I Amylase		p - value	Pearson's Correlation	
CTSI Score	Ν	1067	067 1526 1296.50 324.		324.56	(Anova Test)	value with p - value	
Mild	2	39	1276	626.00	303.94		-0.625 (0.002)	
Moderate	11	43	617	245.86	224.26	0.001		
Severe	7	39	1526	560.00	407.46	0.001		
Total	20	1067	1526	1296.50	324.56			



Graph 2: Correlation of Modified CTSI Score with Serum Amylase

The above mentioned Table 3 and Graph 2 indicate a statistically crucial relationship in serum amylase levels across different CTSI severity groups. There also is a strong negative relationship between CTSI score and serum amylase. The correlation is significant (p < 0.05).

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Table n4: Correlations of Modified CTSI Score and Serum Lipase								
Modified	S	ERUM L	IPASE (I	NORMAL: 23	p - value	Pearson's Correlation		
CTSI Score	Ν	Min	Max	Mean	SD	(Anova Test)	value with p - value	
Mild	2	2405	2526	2465.50	85.56		- 0.504 (0.023)	
Mod	11	142	5460	2064.91	1712.98			
Severe	7	46	1262	581.43	493.58	0.073		
Total	20	46	5460	1585.75	1485.83			



Graph 3: Correlation of Modified CTSI Score with Serum Lipase

The above mentioned representations indicate no difference in serum lipase levels and MCTSI. There is a moderate negative relationship between MCTSI and serum lipase. The relationship is statistically significant (p < 0.05).

3. Conclusion

Based on MCTSI, the cases were categorized as mild (n=2), moderate (n=11) and severe (n=7) i. e.10%, 55% and 35% respectively.

Both enzyme levels revealed negative correlation with MCTSI.

This present research concluded that the concentration of serum enzymes had non - significant correlation with MCTSI and thus did not indicate how severe the disease was.

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