To evaluate accuracy of multislice CT scan as early predictor of severe pancreatitis

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Abstract

Background: In this study 200 patients with an aim to evaluate accuracy of Multislice CT Scan as early predictor of Severe Pancreatitis at Index Medical College, Indore, of the departments of General Surgery & General Medicine with a diagnosis of acute pancreatitis.

Method: This is a prospective observational study to evaluate whether the C-reactive protein (CRP) levels and blood urea nitrogen predict the severity of pancreatitis by correlating these levels with CT severity index. Patients were enrolled in the study after obtaining informed patient consent.

Result: Spearman's rho of bivariate analysis was done to see the correlation between the CECT on day 3rd with Marshall scoring system on 7th day of admission. Spearmans rho value was 0.772, which shows the strongest positive correlation. Kruskall-Wallis Test was applied to calculate the p value of test is 0.000, which was found statistically significant.

Conclusion: To conclude, present study was again emphasize to significance of serial monitoring of BUN and CRP on day 1st 3rd 6th and Multi-slice CT scan as early prediction of severity of Pancreatitis. Although CECT alone is an excellent modality to predict the severity of Pancreatitis, but the levels of BUN & CRP acts as an adjunct to predict the severity more accurately.

Keywords: Multislice CT scan, severe pancreatitis & accuracy

Introduction

In 1896, Hans Chiari invoked a role for pancreatic enzymes in the pathogenesis of pancreatic necrosis and proposed a theory of tryptic autodigestion initiated by activation by bile as initially proposed by Claude Bernard or alternatively by enterokinase as had been suggested by Nicholas Petrovich Shepovalnikov \(^1, 2\) in 1889.

Worldwide, the incidence of acute pancreatitis is between 4.9 and 73.4 cases per 100,000. Pancreatitis is 2 to 3 times higher in African Americans when compared to Caucasians. Clinically, Acute Pancreatitis is usually characterized by the acute onset of symptoms in a previously healthy individual and the disappearance of those symptoms as the attack resolves. The incidence of acute pancreatitis has increased during the past 20 years and responsible for more than 03 lac hospital admission annually in the United States \(^3\).

The local injury induces the release of TNF-alpha and IL-1. Both cytokines produce further pancreatic injury and amplify the inflammatory response by inducing the release of other inflammatory mediators, which causes distant organ injury. This abnormal inflammatory response is responsible for mortality during the early phase of acute pancreatitis \(^4\).

Material & Method

This is a prospective observational study to evaluate whether the C-reactive protein (CRP) levels and blood urea nitrogen predict the severity of pancreatitis by correlating these levels with CT severity index. Patients were enrolled in the study after obtaining informed patient consent.

In this study 200 patients were studied between January 2017 to July 2019 at Index Medical College Hospital & Research Centre, Indore, Madhya Pradesh of the departments of General Surgery & General Medicine with a diagnosis of acute pancreatitis.

Patients were diagnosed on the basis of

1. Typical epi-gastric abdominal pain.
2. Elevation in amylase and/or lipase levels to at least 3 times of normal.
3. Abdominal USG findings.
Inclusion criteria
- Age group 25-60 years.
- Male and female both.
- Mild and severe both patients.
- Cholelithiasis
- Alcoholic patients
- Traumatic
- Drug induced
- Endocrine disorder

Exclusion criteria
- Less than 25 or more than 60 years of age
- Those patients not giving consent
- All cancer and Tuberculosis cases

Statistical analysis
The analysis was done using Quantitative analysis test: Kruskall-Wallis test and Spearman’s bivariate correlation analysis to calculate the p-value of statistical significance. The p-value for statistical significance was taken as <0.05.

Results
The Clinical severity assessment was done on the basis of 3 parameters of modified marshall scoring system:
- Respiratory status (PaO2:FiO2)
- Renal status (serum creatinine)
- Cardiovascular status (systolic BP, mmHg)
On the basis of clinical parameters used in modified marshall scoring system, out of 50 patients included in this study 10 were found as severe according to modified marshall scoring system on 7th day of admission.

<table>
<thead>
<tr>
<th>Table 1: Clinical severity assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity</td>
</tr>
<tr>
<td>Severe</td>
</tr>
<tr>
<td>Non severe</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

(Non-severe included mild and moderate pancreatitis)

Now these 3 parameters were graded into: mild, moderate and severe and labelled them an imaginary code 0, 1, 2 for the convenience of study.

<table>
<thead>
<tr>
<th>Table 2: Severity Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severity</td>
</tr>
<tr>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
</tr>
</tbody>
</table>

On 3-5 days of illness CECT was found severe in 13 cases out of which 10 cases were actually serious according to modified marshall score system, rest.

<table>
<thead>
<tr>
<th>Table 3: Illness CECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTSI</td>
</tr>
<tr>
<td>Severe(8-10)</td>
</tr>
<tr>
<td>Non severe(&lt;8)</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Spearman's rho of bivariate analysis was done to see the correlation between the CECT on day 3rd with Marshall scoring system on 7th day of admission. Spearman's rho value was 0.772, which shows the strongest positive correlation. Kruskall-Wallis Test was applied to calculate the p value of test is 0.000, which was found statistically significant.

Table 4: On the basis of previous table following data were observed

<table>
<thead>
<tr>
<th>Days</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
<th>False negativity</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd day of admission</td>
<td>100%</td>
<td>92.5%</td>
<td>76.92%</td>
<td>100%</td>
<td>0%</td>
<td>94%</td>
</tr>
</tbody>
</table>

Conclusion
To conclude, present study was again emphasize to significance of serial monitoring of BUN and CRP on day 1st 3rd 6th and Multi-slice CT scan as early prediction of severity of Pancreatitis. Although CECT alone is an excellent modality to predict the severity of Pancreatitis, but the levels of BUN & CRP acts as an adjunct to predict the severity more accurately.

References
2. Spitzer AL, Barcia AM, Schell MT et al. Applying


