Association of serum amylase and lipase levels in patients with acute pancreatitis

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Abstract

Background: Acute pancreatitis is one of the severe gastrointestinal due to gallstones, alcoholism, hypertriglyceridemia, and genetic. The amylase and lipase levels are catalysing enzymes are synthesized from the pancreas. To elevated levels of serum amylase and lipase useful for early detection of pancreatitis. Methods: This is a case-control study conducted in Akash Institute of Medical Sciences and Research Centre, A total 100 subjects (50 cases and 50 controls) included in this study after informed consent. From all the subjects blood samples are collected. The serum amylase and lipase levels was analysed by laboratory standard methods. Results: This study was evaluates the serum amylase and lipase levels in patients with acute pancreatitis and healthy subjects. The serum amylase and lipase was significantly elevated levels in acute pancreatitis when compared to healthy controls. The serum lipase levels are statistically significantly elevated than amylase levels in acute pancreatitis when compared to healthy controls (P- 0.0001). Conclusion: this study concluded that the to estimate the serum lipase levels are more specific and sensitive biomarker for acute pancreatitis than serum amylase. Serum amylase is not an a sensitive and specific biomarker because it is secreted from the other glands like salivary.

Key words: Amylase, Lipase, Acute Pancreatitis.

INTRODUCTION

Acute pancreatitis are most common Gastrointestinal disorder usually observed in abdomen diagnosed by abdominal pain, serum amylase or serum lipase or both elevated three times or more than the upper limit of normal contrast-enhanced computed tomography (CECT) or magnetic resonance imaging (MRI)¹-³. The amylase is the catalytic enzyme synthesized from the salivary glands and pancreas, involved in physiological functions of amylase is digestion of carbohydrates⁴. If any pathological changes occur in salivary glands as well as pancreas the amylase levels are increased. Serum amylase level is useful for diagnosis of acute pancreatitis and some of the previous studies suggested that serum amylase levels are sensitive and specific for acute pancreatitis ⁵. The activity of amylase rise upto 12 hours after onset of symptoms and after week its come back to normal, some of the patients the serum amylase activity maybe normal in 19–32% of cases at the time of hospital admission⁶. Serumamylase activities can be increased in other intra-abdominal inflammatory conditions and salivary gland pathologies, and also where there is decreased renal clearance because of renal impairment or macroamylasaemia⁷. The lipase is a lipolytic enzyme synthesized particularly from pancreas and gastrointestinal tract, including the oesophagus, duodenum, stomach, colon, liver, heart, lungs and leukocytes. The physiological functions of lipase act breakdown of triglycerides⁸. If any pathological occur in GI tract these levels are raised. Some of the clinical studies suggested that to measurement of serum lipase levels are to diagnosis of acute pancreatitis⁹. There is a conflict on which is specific and sensitive biomarker for diagnosis of pancreatitis. Based on this background the present study
evaluates “To measurement of serum amylase and lipase levels in acute pancreatitis”.

**MATERIALS AND METHODS**

This is a case – control study was conducted at “Akash Institute of Medical Sciences and Research Centre, Karnataka from 2017-2018. A total 100 subjects included in the present study 50 cases diagnosed with acute pancreatitis patients and 50 age and gender matched healthy controls was included. All the subjects were recruited in the study after obtaining their informed consent after obtaining of ethical clearance from the institute ( IEC No -526). Subjects with age more than 30 and less than 70 years were included in the present study. Whoever has Exclusion criteria’s for both cases and controls were patients with history of hypertension, hypercholesterolemia, cardiovascular disease, hepatic disorders, acute and chronic renal insufficiency and alcohol abuse excluded from this study. From the all subjects, after overnight fasting (12hrs), 3 ml of venous blood was collected transferred into plain tube. The collected samples were separated by centrifugation at 3000 rpm for 5 min and stored until biochemical analysis was done. The serum amylase and lipase was analysed by enzymatic kit method available in clinical biochemistry laboratory ( ERBA Fully Automated Analyser).

**Statistical Analysis**

The normal distribution of data checked by using Kolmogorov Smirnov test. All the characters descriptively summarized. The mean and standard deviation about the arithmetic mean were used. The Variations in the serum amylase and serum Lipase levels was analysed by using Student’s T-Tests. The correlation between the serum amylase and serum Lipase was done by using Pearson Correlation analysis. The Data was compiled in Microsoft excel spread sheets and analyzed using SPSS for windows version 16.0. A p value <0.05 was considered statistically significant.

**RESULTS**

Table 1 shows the data distribution of healthy controls and acute pancreatitis patients by using Kolmogorov Smirnov Test. All the parameters studied had normally distributed data in both cases as well as controls. Hence, data was logarithmically transformed before applying parametric statistical tools.

**Table 1: Assessment of distribution of data using Kolmogorov-Smirnov Test**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group 1 (n=50)</th>
<th>Group 2 (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.200*</td>
<td>0.200*</td>
</tr>
<tr>
<td>Gender</td>
<td>0.0001</td>
<td>0.0001</td>
</tr>
<tr>
<td>Serum Amylase</td>
<td>0.019</td>
<td>0.087</td>
</tr>
<tr>
<td>Serum Lipase</td>
<td>0.003</td>
<td>0.200*</td>
</tr>
</tbody>
</table>

Table 2 shows the demographic and clinical characteristics of the healthy controls and acute pancreatitis, The Serum Amylase, Serum Lipasemean levels statistically significant difference between two groups of acute pancreatitis by students T – Tests. Serum amylase and lipase levels elevated in acute pancreatitis when compared to healthy controls.

**Table 2: Demographic characteristics and biochemical parameters studied in controls and acute pancreatitis patients by Students T- Test**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group 1 (n=50)</th>
<th>Group 2 (n=50)</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>48.126.59</td>
<td>48.327.16</td>
<td>0.0001</td>
</tr>
<tr>
<td>Gender</td>
<td>0.580.50</td>
<td>0.640.48</td>
<td>0.0001</td>
</tr>
<tr>
<td>Serum Amylase</td>
<td>195.1832.26</td>
<td>84.525.30</td>
<td>0.0001</td>
</tr>
<tr>
<td>Serum Lipase</td>
<td>313.3663.50</td>
<td>104.5235.05</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Table 3 shows the positive correlation ofSerum Amylase with Serum Lipase( r = 0.778**, P = 0.0001), controls and acute pancreatitis patients. The age, Gender and serum lipase levels positively correlated with serum adiponectin in patients with acute pancreatitis when compared to healthy controls.

**Table 3:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>r value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.005</td>
<td>0.0001</td>
</tr>
<tr>
<td>Gender</td>
<td>0.019</td>
<td>0.0001</td>
</tr>
<tr>
<td>Serum Amylase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serum Lipase</td>
<td>0.778**</td>
<td>0.0001</td>
</tr>
</tbody>
</table>
Table 4: showed the regression analysis in between serum amylase and serum lipase, serum lipase levels are specific and sensitivity for acute pancreatitis and compared healthy controls.

Table 4: Showed the multi regression serum adiponectin and serum lipase in between acute pancreatitis and healthy controls

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>52.586</td>
<td>8.148</td>
<td>6.454</td>
</tr>
<tr>
<td></td>
<td>SERUMLIPASE</td>
<td>.418</td>
<td>.034</td>
<td>.778</td>
</tr>
</tbody>
</table>

DISCUSSION

The study was found that prolonged hyperamylasemia occurred in a 42.5% in a week, these patients with first acute pancreatitis and its related to alcohol consumption, local complications and severity of pancreatitis. Acute pancreatitis due to prolonged hyperamylasemia and these levels are return to normal after a week an attack of pancreatitis. Significantly an elevated level of serum amylase was observed in acute pancreatitis patients when compared to healthy controls. Similar results were found in previous studies suggested that serum amylase or hyperamylasemia has a prognostic value in acute pancreatitis, pancreatic edema and extra pancreatic fat necrosis. Some of the studies cases do not has any identifiable causes or complications of hyperamylasemia. Some of the studies observed serum amylase level was peaked because of higher sensitivity and specificity diagnosing and progression of pancreatitis.

Serum lipase is a hydrolytic enzyme which is particularly synthesized from the pancreas and also synthesized from other tissue cells like oesophagus, duodenum, stomach, colon, liver, heart, lungs and leukocytes. In this study elevated levels of serum lipase levels are identified in acute pancreatitis patients when compared to healthy controls. Similarly previous studies suggested that to estimate the serum lipase levels are useful for diagnosing and progression of acute pancreatitis. Another study found that significantly elevated levels of serum lipase useful for diagnosing of acute pancreatitis as well as Clinicians should utilize this knowledge in the interpretation and management of patients who have lipase levels over three times as high as the ULN, remaining vigilant for an alternative diagnosis to pancreatitis.

CONCLUSION

To measurement of serum lipase levels are sensitive and specific biomarker for diagnosis and progression of acute pancreatitis than serum amylase because this was produced from pancreas and serum amylase produced from pancreas as well as salivary glands.

Acknowledgement

It is purely being done with the idea of research and all the cost of the study will be borne by the investigators.

REFERENCES


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Conflict of Interest: None Declared