

## Serum amylase sensitivity in diagnosed cases of Acute pancreatitis; A Peshawar study

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### Abstract

**Objective:** To evaluate the sensitivity of serum amylase in the diagnosed cases of acute pancreatitis and to analyze the gender wise accuracy of serum amylase in the diagnosed cases of acute pancreatitis.

**Study Design:** It is a descriptive, institutional based study.

**Place and duration of study:** The study under consideration was conducted in the Department of Surgery, Rehman Medical Institute, Peshawar (Pakistan) from January 2017 to June 2018.

**Material and Methods:** A total of 147 patients presented with acute pancreatitis were taken into account of this study with simple random sampling technique used. All the patients whose pancreatic enzymes were raised due to other causes or diagnosed as other diseases were excluded from the study. Data was analyzed using the latest version of SPSS (Version 25).

**Results:** The total number of patients diagnosed as acute pancreatitis in the surgical unit of Rehman Medical Institute, Peshawar in the period ranging from January 2017 till June 2018 was 147. Amongst which 51.02% were females and 48.98% were males.

**Conclusion:** Our study concluded, that serum amylase has a lower sensitivity and misses the diagnosis of about two thirds of acute pancreatitis. Hence it is a poor screening test and health care providers should not rely solely on it and order more sensitive tests. In the peripheral areas where other tests are no available efforts should be made to provide those areas with more sensitive tests such as serum lipase and imaging rather than serum amylase.

**Keywords:** Pancreatitis, serum lipase, serum amylase, sensitivity, specificity

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### Introduction:

Acute pancreatitis is a disease which has a wide range of clinical presentation which includes mild symptoms needing conservative treatment and a severe form requiring a more aggressive approach to treat the disease as it can progress to multiple organ failure rapidly.<sup>1</sup>

Obstruction by gallstones has been recognized as the most common cause of acute pancreatitis, while other causes such as alcohol, trauma and idiopathic causes are also responsible for this condition.<sup>2</sup>

The disease is clinically classified into mild and

severe acute pancreatitis. The mild form has no associated complications such as abscess formation, necrosis, hypocalcemia while the severe form is commonly associated with these complications resulting in multi organ failure.<sup>3</sup>

Elevated levels of pancreatic enzymes remain the key to diagnosing acute pancreatitis however, a normal level does not rule out a person having the disease either.<sup>4</sup>

Serum amylase should be raised atleast three to four times in order to accurately diagnose acute pancreatitis, while such enzymes are considered important for diagnosing the duration of symp-

toms should also be taken into consideration.<sup>5</sup> Serum lipase levels are considered superior to serum amylase as the lipase stays in the bloodstream for a longer duration, sometimes even days and can help in the diagnosis.<sup>5</sup>

Several systems have been developed to assess the severity of the disease, among which Ranson's criteria is the most famous one.<sup>6</sup> It takes into consideration various parameters which are documented at the time of admission and 48 hours later and then graded which gives the severity of the disease.<sup>6</sup>

BISAP (Bedside Index of Severity in Acute Pancreatitis) is another scoring system used for grading the severity of the disease, however it may overestimate the damage caused to the pancreas and can be unreliable.<sup>6</sup>

The Balthazar scoring system is one of the recent scoring system which uses CT scan images to group the patients in to five categories (A-E), according to disease severity.<sup>6</sup>

Management of acute pancreatitis is generally based around fluid resuscitation, prompt recognition and treatment of complications.<sup>7</sup> Surgery is indicated in those conditions where the disease is severe or complications have developed beyond control.<sup>7</sup>

Studies have shown that the value of serum amylase diagnostic of pancreatitis was seen in 96.1% of all cases. This value was set at a serum amylase value of >1,000 IU/l.<sup>8</sup> Serum amylase, although, is raised in other etiologies as well, mostly abdominal pathologies. In a study serum amylase levels measured in 208 patients showed that 27 of them had an extra-pancreatic etiology with a raised serum amylase. A close correlation was observed between elevation in serum amylase and a pancreatic or extra-pancreatic disease process.<sup>9</sup> On the other extreme, acute pancreatitis can also present with no elevation in serum amylase. A study conducted in Boston showed that acute alcoholic pancreatitis presenting to the hospital showed no elevation of serum amylase in 32% of the cases.<sup>10</sup> A study has shown

that patients with only a mild elevation in serum amylase can have acute pancreatitis.<sup>11</sup>

45-patients that were admitted to Liaquat university hospital showed that a three times increase in serum amylase was observed in 36 (80%) out of the total.<sup>12</sup> Another center showed that acute pancreatitis cases admitted to a surgery unit in the combined military hospital of Sialkot reported a raised serum amylase level in all their cases.<sup>13</sup>

Lack of data from Pakistan is why this study will report the percentage of cases of diagnosed pancreatitis showing an increased level of serum amylase. Serum amylase being a cheaper investigation can facilitate patients who cannot afford to spend too much on health care. An investigation which is easily available also affects how this data can be used by general practitioners practicing in basic health units in diagnosing acute pancreatitis or at least referring them to a tertiary care hospital for further management.

#### **Material and Methods:**

A descriptive, institutional based study conducted in the Surgery department of Rehman Medical Institute, Peshawar (Pakistan) from January 2017 to June 2018. A total of 147 patients presented with acute pancreatitis were taken into account of this study with simple random sampling technique used. All the patients whose pancreatic enzymes were raised due to other causes or diagnosed as other diseases were excluded from the study. Data was analyzed using the latest version of SPSS (Version 25).

The normal value of serum amylase is 40-140UL, which goes up three to four times (400 U/L) during acute pancreatitis. The serum amylase returns back to the base levels within 3-4 days in contrast with serum lipase which can remain elevated for up to 2 weeks.<sup>14</sup>

All the patients with moderately raised serum amylase and lipase levels or symptoms pointing towards acute pancreatitis were subjected to further investigations, only the diagnosed cases were included in the study.

Table-1: Gender wise levels of serum amylase

		Serum Amylase			
		Normal	Mild elevation	3x elevation	Total
Gender	Male	23	25	24	72
	Female	23	27	25	75
		<b>46</b>	<b>52</b>	<b>49</b>	<b>147</b>

The sensitivity of serum amylase in recognizing acute pancreatitis was found to be 33%, in both the genders

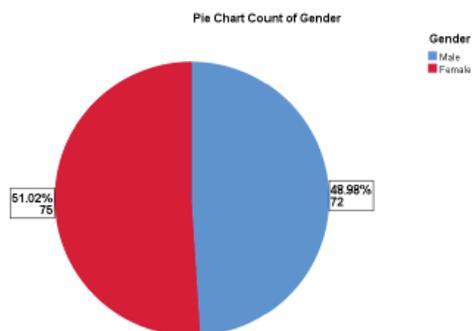


Figure. 1:

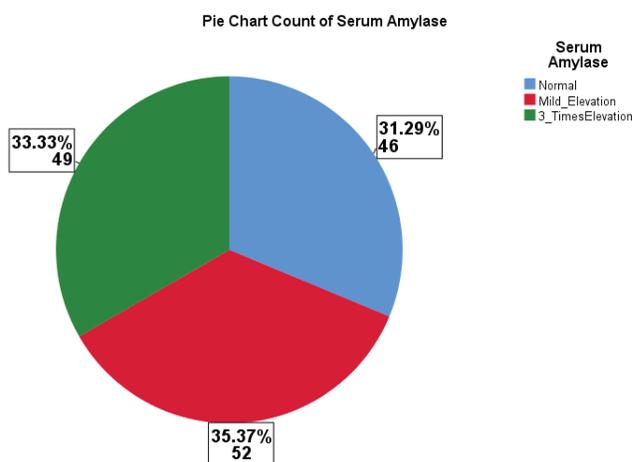


Figure. 2:

The serum amylase levels of the patients were grouped into three categories i.e. normal, mildly elevated, 3x elevated. The data was then analyzed and the sensitivity of serum amylase was calculated from all the diagnosed cases of acute pancreatitis.

The value of serum amylase was found to be normal in 31.29% of the patients, while mildly elevated in 35.37% of the patients. Serum amylase was found to be raised three times the normal value in 33.33% of the patients who were diagnosed as having acute pancreatitis.

The total number of patients having normal lev-

els of Serum amylase was 46, out of which males and females were equal in number i.e. 23. Mild elevation of Serum amylase was observed in 52 patients amongst which 27 were females and 25 were males. 49 patients had three times the level of normal serum amylase which included 25 females and 24 males.

The sensitivity of serum amylase in recognizing acute pancreatitis was found to be 33%, in both the genders.

### Discussion:

A three-fold increase in serum amylase in our study was shown to be present in 33.33% patients. Comparing that with a similar study done on acute pancreatitis in Liaquat university hospital, a diagnostic three-fold increase in serum amylase was seen in 80% of their patients.<sup>12</sup> A similar study on acute pancreatitis was carried out in Combined Military Hospital in Sialkot as well. The results showed a mean serum amylase rise of 1331.17 U/L  $\pm$  533.761. The range of serum amylase was between 770 – 4508 U/L.<sup>13</sup> A significant difference of serum amylase rise was noted in our study as compared to other studies carried out in Pakistan.

Acute pancreatitis presents as a challenge abroad as well. A study carried out in Birmingham collected the data of 417 patients. The diagnostic value of serum amylase in mild severity cases was shown in 96.1% of the patients. In severe cases it was found elevated in 87.4% of the patients. This study does indicate that serum amylase levels were significantly lower in patients after 24 hours.<sup>8</sup> Diagnosing acute pancreatitis can be rather difficult based on a rise in serum amylase hence a serum lipase is warranted. Study conducted in Boston concluded that a normal serum amylase was found in 32% of the cases which were later diagnosed with the help of Ultrasound and CT.<sup>10</sup> Even though we do take into account a three-fold rise of serum amylase as a diagnostic value, the severity of acute pancreatitis is independent of the rise in these enzymes. Patients with only a slight elevation in serum amylase can also develop severe disease.<sup>11</sup>

Serum amylase is only a screening test and hence the diagnosis does not rely on it. Due to patients having affordability issues, a serum amylase is offered. Any doubts in the clinical picture suggesting pancreatitis (with a normal serum amylase) should be followed by a serum lipase test.

### Results:

The total number of patients diagnosed as acute pancreatitis in the surgical unit of Rehman Medical Institute, Peshawar in the period ranging from June 2017 till June 2018 was 147. Amongst which 51.02% were females and 48.98% were males.

### Conclusion:

Our study concluded, that serum amylase has a lower sensitivity and misses the diagnosis of about two thirds of the diagnosis. Hence it is a poor screening test and health care providers should not rely solely on it and order more sensitive tests. In the peripheral areas where other tests are not available efforts should be made to provide those areas with more sensitive tests such as serum lipase and imaging rather than serum amylase.

**Conflict of interest:** None

**Funding source:** None

### Role and contribution of authors:

Dr. Zubair Ahmad Khan, collected the data and references and wrote the initial writeup.

Dr. Azhar Saeed, critically reviewed the article and made final changes.

Dr. M. Saad Bin Nasir, helped in collection of

references and in introduction writing.

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