

Case Study: Amylase Estimation for the Diagnosis of Pancreatitis and Parotitis

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Abstract: Pancreatitis is inflammation of the pancreas. The pancreas is a large gland behind the stomach and close to the duodenum—the first part of the small intestine. The pancreas secretes digestive juices, or enzymes, into the duodenum through a tube called the pancreatic duct. Pancreatic enzymes join with bile—a liquid produced in the liver and stored in the gallbladder—to digest food. The pancreas also releases the hormones insulin and glucagon into the bloodstream. These hormones help the body regulate the glucose it takes from food for energy. Normally, digestive enzymes secreted by the pancreas do not become active until they reach the small intestine. But when the pancreas is inflamed, the enzymes inside it attack and damage the tissues that produce them. Pancreatitis can be acute or chronic. Either form is serious and can lead to complications. In severe cases, bleeding, infection, and permanent tissue damage may occur. 200 patients of all age group clinically diagnosed as pancreatitis and parotitis were studied during my study 100 from IPD and 100 from OPD. Serum amylase levels were measured by fully automatic clinical biochemistry analyzer (DIRUI CS-400). Pancreatitis was seen most in adults and parotitis were seen in children.

Keywords: pancreatitis, parotitis, amylase

1. Introduction

An amylase is an enzyme that catalyses the hydrolysis of starch into sugars. Amylase is present in the saliva of humans and some other mammals, where it begins the chemical process of digestion. Foods that contain large amounts of starch but little sugar, such as rice and potatoes, may acquire a slightly sweet taste as they are chewed because amylase degrades some of their starch into sugar [1]. The pancreas and salivary gland make amylase (alpha amylase) to hydrolyse dietary starch into disaccharides and trisaccharides which are converted by other enzymes to glucose to supply the body with energy. Plants and some bacteria also produce amylase. As *diastase*, amylase was the first enzyme to be discovered and isolated (by Anselme Payen in 1833). Specific amylase proteins are designated by different Greek letters. All amylases are glycoside hydrolases and act on α -1, 4-glycosidic bonds [2].

Amylase is present in your blood in small amounts; this is normal [3]. If your pancreas has been injured, inflamed or blocked, however, amylase is released into the blood rather than the duodenum, which results in elevated blood-serum amylase levels. A blood test can test, diagnose or monitor pancreatic problems. Health concerns related to elevated amylase in the blood include acute pancreatitis, chronic pancreatitis, pancreatic pseudocyst, or blockage of the duct that carries amylase from the pancreas to the small intestine or gallstones. Symptoms usually related to a pancreas disorder can include abdominal pain, nausea, fever or loss of appetite [4].

2. Materials and methods

2.1 Instruments, equipments and chemicals

The instruments and equipment's with their remarks that used in this study are listed in table 1.

Table 1

Equipment	Company	Country
Biochemistry analyzer	Dirui	China
Centrifuge	Remi	India
Refrigerator	LG	S. Korea
Micropipettes	Dilab	India
Amylase reagent kit	Biogenesis	Italy

200 samples were collected both from OPD and IPD patients in period of five months. The patients were diagnosed clinically by physician specialists and surgeons. They were attendance to the Govt. Sub District Hospital Sopore Kashmir for the treatment. 100 patients were admitted in medical ward. The blood samples were collected by phlebotomist by proper procedure and precautions. Samples were transported to clinical biochemistry laboratory and amylase test were performed on fully automatic chemistry analyzer (DIRUI_cs400) after centrifugation.

3. Results

A total of 200 patients of all age group clinically diagnosed as pancreatitis and parotitis were studied during my study 100 patients from IPD and 100 from OPD. Out of the total 200 samples, 145 (70%) results were above normal range. Out of 100 IPD 95 (95%) were hyperamylasemia and out of 100 OPD 50 (50%) hyperamylasemia (Table 2).

Table 2: Total number of hyperamylasemia cases

Type of patient	Test	Hyperamylasemia	Percentage
IPD	100	95	95%
OPD	100	50	50%
Total	200	145	70%

During study I came know that children are more affected by parotitis total no of 145 hyperamylasemia cases.

Children were more affected by parotitis (36) and only (2) adults were affected by parotitis. Rest 104 adults were affected by acute pancreatitis and only 3 Children diagnosed with pancreatitis.

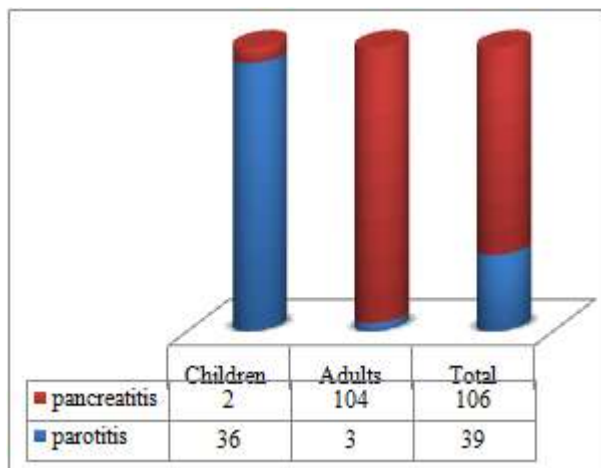


Figure 1: (Distribution of hyperamylasemia according to age)

4. Discussion

The serum amylase concentration reflects the balance between the rates of amylase entry into and removal from the blood. Hyperamylasemia can result either from an increased rate of entry of amylase into the circulation and/or a decreased metabolic clearance of this enzyme. The pancreas and salivary glands have amylase concentrations that are several orders of magnitude greater than that of any other normal tissue, and these two organs probably account for almost all of the serum amylase activity in normal persons. A variety of techniques are now available to distinguish pancreatic from salivary-type isoamylase. Pancreatic hyperamylasemia results from an insult to the pancreas, ranging from trivial (cannulation of the pancreatic duct) to severe (pancreatitis). In addition, loss of bowel integrity (infarction or perforation) causes pancreatic hyperamylasemia due to absorption of amylase from the intestinal lumen. Hyperamylasemia due to salivary-type isoamylase is observed in conditions involving the salivary glands. In addition, this type of hyperamylasemia occurs in conditions in which there is no clinical evidence of salivary gland disease, such as chronic alcoholism, postoperative states (particularly postcoronary bypass), lactic acidosis, anorexia nervosa or bulimia, and malignant neoplasms that secrete amylase. Hyperamylasemia can also result from decreased metabolic clearance of amylase due to renal failure or macroamylasemia (a condition in which an abnormally high-molecular-weight amylase is present in the serum). Patients with abdominal pain and a markedly elevated serum amylase (more than three times the upper limit of normal) usually have acute pancreatitis, and additional serum enzyme testing is not helpful. Patients with smaller elevations of serum amylase often have conditions other than pancreatitis, and measurement of a serum enzyme more specific for the pancreas (pancreatic isoamylase, lipase or trypsin) is frequently of diagnostic value in such patients.

This study reveals that children with higher amylase levels were diagnosed with mumps and some adult patients with acute pancreatitis also have cholelithiasis. Children were more affected by parotitis.

5. Conclusion

According to the results of this study I conclude:

- 1) Pancreatitis is the most common in Kashmir.
- 2) Males were affected more than females with pancreatitis and the higher rate of hyperamylasemia was within the age of 25-45 years.
- 3) Parotitis was common in children within age of 1-10 years.

References

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