

## URINARY AMYLASE IN THE DIAGNOSIS OF ACUTE PANCREATITIS

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Received : 10/10/2023  
Received in revised form : 13/11/2023  
Accepted : 26/11/2023

**Keywords:**

Acute pancreatitis, serum amylase, Urinary amylase, Gallstone disease.

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DOI: 10.47009/jamp.2023.5.6.114

Source of Support: Nil,  
Conflict of Interest: None declared

*Int J Acad Med Pharm*  
2023; 5 (6); 558-561



**Abstract**

**Background:** Acute pancreatitis (AP) remains one of the most important causes of acute abdominal pain presenting in casualties, especially in our country where alcohol abuse is more common. Gallstone disease is identified as the most common aetiology of the first attack, accounting for 30-50%. Alcohol association is between 20 and 40% of patients with AP. Worldwide, the main aetiology is biliary tract disease (41%) and alcohol abuse (31.7%). **Materials and Methods:** The proposed prospective case control study was carried out in the department of gastroenterology, for period of one year from August 2022 to July 2023. This study was carried out on total 200 study subject. Total 100 patients who have clinically, radiologically and investigation were performed for diagnosed of acute pancreatitis and they were included in study group and 100 subjects were included in control group. All patients with acute pancreatitis were admitted in gastroenterology Department. The written informed consent was obtained from each subject prior starts of study. **Result:** In present study, age wise distributions of patients with acute pancreatitis and control subjects were shown in table 1. Majority of the patients were aged between 21 and 50 years. The mean value of age was statistically non-significant ( $p < 0.05$ ) between cases and control group. Similarly, there was no statistical significant ( $p > 0.05$ ) difference was observed with regard to the gender of the patient between cases and controls as per chi-square test. **Conclusion:** Although serum amylase is considered the most practical biochemical marker for diagnosis of acute pancreatitis, yet it is not diagnostic in many cases like mild acute pancreatitis and in cases which present late after the onset of the disease. Urinary amylase is a convenient and a more sensitive test for diagnosis of acute pancreatitis. Urinary amylase can be used in the diagnosis of acute pancreatitis as it was establish to have analogous sensitivity and specificity as that of serum amylase and serum lipase.

## INTRODUCTION

Acute pancreatitis (AP) remains one of the most important causes of acute abdominal pain presenting in casualties, especially in our country where alcohol abuse is more common. Gallstone disease is identified as the most common aetiology of the first attack, accounting for 30-50%. Alcohol association is between 20 and 40% of patients with AP. Worldwide, the main aetiology is biliary tract disease (41%) and alcohol abuse (31.7%).<sup>[1]</sup> The clinical course may range from mild discomfort with minimal pancreatic inflammation (80%) to severe necrotizing pancreatitis, complicated by multiorgan system failure and death (20%). Thus careful clinical assessment and the judicious use of biochemical tests and radiological imaging enables

us to differentiate AP from other causes of acute abdomen and to assess the severity of disease.<sup>[2]</sup> Serum amylase is being utilized more frequently than any other test in assisting the diagnosis of acute pancreatitis. The diagnosis of pancreatitis is usually not a problem in the patients with typical symptoms of acute pancreatitis or elevated serum amylase values. Diagnostic problems are encountered in the acute cases with atypical presentation or that have partially subsided or in the atypical cases with normal or subclinical serum amylase values.<sup>[3]</sup> In such cases, pancreatitis may be overlooked, diagnostic studies may be omitted, and hospitalization may not be indicated leading to misdiagnosis and increased morbidity and mortality from AP. Thus many newer investigations like serum procalcitonin, IL-6 and urinary trypsinogen-2 are now used in the diagnosis of acute pancreatitis.

But most of these investigations are expensive and require trained personnel.<sup>[4]</sup>

Urinary amylase is increased in acute pancreatitis and may remain elevated for 7 to 10 days after serum levels have returned to normal. Thus it is useful in diagnosis of atypical cases with normal serum amylase and those cases with late presentation of AP.

Urinary amylase may also be useful in cases of hypertriglyceridemia and macroamylasemia in which serum amylase values may be misleading diagnosis of AP. Thus this study is done to find the significance of urinary amylase levels and its comparison with serum amylase and serum lipase in cases of acute pancreatitis.

## MATERIALS AND METHODS

The proposed prospective case control study was carried out in the department of gastroenterology, for period of one year from August 2022 to July 2023.

This study was carried out on total 200 study subject. Total 100 patients who have clinically, radiologically and investigation were performed for diagnosed of acute pancreatitis and they were included in study group and 100 subjects were included in control group. All patients with acute pancreatitis were admitted in gastroenterology Department. The written informed consent was obtained from each subject prior starts of study.

All patients were admitted in hospital after that all data was collected by standard operating procedure such as history taking, scrupulous physical examination and proper serological and radiological (USG) investigations, all patients admitted with acute pancreatitis, investigations were achieved in order to identify the cause for acute pancreatitis. Serum amylase levels, serum lipase levels and urinary amylase levels were estimated in all study subjects in both groups: study/cases and controls.

The sensitivity and specificity of serum amylase, serum lipase and urinary amylase levels was established after comparing their values in patients with acute pancreatitis and controls subject. Another biochemical parameters random blood sugar, serum electrolytes, blood urea, serum creatinine, serum total protein, serum bilirubin, alkaline phosphate SGPT, lipid profile serum amylase and lipase, etc were determined by enzymatic method using commercial available diagnostic kit on fully automated biochemical analyzer. The hematological parameters were estimated by five part hematological analyzer. USG was to be done on all study participants.

Patients with uncontrolled blood sugar or diabetic, hypertensive and chronic kidney disease were excluded from present study and those patients not willing for study they were also excluded.

**Statistical Analysis:** Data was analyzed using Statistical package for social sciences, version 20 (SPSS Inc., Chicago, IL). Results for continuous variables are presented as mean  $\pm$  standard deviation, and unpaired students't test was used to compare mean data between study/cases and control groups. Chi-square test and Fischer's exact chi square test were used for the comparison of categorical variables and presented as percentage. The level  $p < 0.05$  was considered as significance.

## RESULTS

In present study, age wise distributions of patients with acute pancreatitis and control subjects were shown in [Table 1]. Majority of the patients were aged between 21 and 50 years. The mean value of age was statistically non-significant ( $p < 0.05$ ) between cases and control group. Similarly, there was no statistical significant ( $p > 0.05$ ) difference was observed with regard to the gender of the patient between cases and controls as per chi-square test.

**Table 1: Age Distribution**

S.No	Age Groups (Years)	Study Group/Cases (n=100)	Control Groups (n=100)
1	<20 years	4 (4%)	4 (4%)
2	21-30 years	20 (20%)	24 (24%)
3	31-40 years	44 (44%)	48 (48%)
4	41-50 years	16 (16%)	12 (12%)
5	>50 years	16 (16%)	12 (12%)
6	Total	100 (100%)	100 (100%)

**Table 2: Gender Distribution**

Gender	Study Group/Cases	Control Groups	P Value
Male	84 (84%)	36 (36%)	>0.547
Female	16 (16%)	64 (64%)	
Total	100 (100%)	100 (100%)	

**Table 3: Baseline and USG Characteristics of cases and control subjects**

Baseline and USG Characteristics		Study Group/Cases	Control Groups
Symptoms	Abdominal pain	100 (100%)	0 (0)
	Vomiting	78 (78%)	0 (0)
Habits (n=100)	Alcohol	80 (80%)	16 (16%)
	Smoking	20 (20%)	24 (24%)
Co-morbidities	DM	4 (4%)	6 (6%)

(n=20)	HTN	4(4%)	8 (8%)
	IHD	10 (10%)	2 (2%)
	Obesity	2(2%)	6 (6%)
USG findings (n=100)	Diffusely enlarged and hypo echoic pancreas	52 (52%)	0 (0)
	Diffusely enlarged and hypo echoic pancreas with cholelithiasis	8 (8%)	0 (0)
	Pancreas obscured by bowel gas	40 (40%)	0 (0)

**Table 4: Diagnostic markers of acute pancreatitis in both groups**

Diagnostic markers	Study Group/Cases (Mean ± SD)	Control Groups (Mean ± SD)	P Value
Serum amylase (U/l)	688.12±289.42	42.80±67.12	0.001
Serum lipase (U/l)	760.46± 210.15	50.14±35.50	0.001
Urinary amylase (U/l)	1575.1.60±456.80	296.12±350.15	0.001

In our study, patients with acute pancreatitis expressed symptoms of pain abdomen and vomiting. All 100 (100%) patients showed pain abdomen while only 78 % of the patients expressed with vomiting. In study group, 80% of the patients were alcoholics and 20% of the patients were smokers among acute pancreatitis whereas 16% of the patients were alcoholics and 24% of the patients were smokers in control group. Among study group, 4% of the patients of acute pancreatitis were diabetic, 4% of the patients with acute pancreatitis were hypertensive, 2% of the patients had IHD and 10% of the patients were obese. Similarly, among controls group, 6% of the subjects were diabetic, 8% of the subjects were hypertensive, 2% subject with IHD and 6% of the subjects had obese.

Ultrasound (USG) of the abdomen presented diffusely enlarged and hypo echoic pancreas in 52% of the patients with acute pancreatitis, diffusely enlarged and hypoechoic pancreas with cholelithiasis in 8% of the patients and pancreas obscured by bowel gas in 40% of the patients in study group.

This study, increase the serum amylase, lipase and urinary amylase mean values of patients with acute pancreatitis when compared with those without acute pancreatitis were observed statistically significant ( $p < 0.001$ ).

## DISCUSSION

Acute pancreatitis is a common emergency, accounting for 3% of all patients admitted with acute pain abdomen. The spectrum of the disease is wide ranging. The mild attacks often go undiagnosed predisposing to a severe second attack. Although the overall mortality of acute pancreatitis is static at 1 to 2%, in severe acute pancreatitis mortality is 10 to 30%.<sup>[6]</sup>

Early diagnosis of acute pancreatitis is important to start immediate and proper treatment. Yet the diagnosis of acute pancreatitis is still a major challenge. The clinical signs are non-specific and the presentations are atypical. The measurement of serum amylase has been the cornerstone in the diagnosis of acute pancreatitis since 1929. There are over 200 different assays for the enzyme and no upper limit of normal values has been set.<sup>[7]</sup>

Although serum amylase is considered the most practical test in the diagnosis of acute pancreatitis, yet it poses various problems in the diagnosis of acute pancreatitis. Moreover, serum amylase remains elevated for a maximum of one week after the onset of acute pancreatitis and also certain other conditions are associated with raised serum amylase levels like- intestinal infarctions and perforation, appendicitis, hepatitis, peritonitis, cholecystitis etc.<sup>[8]</sup>

In our study, preponderance 40 (80%) belonged to age group of 21-50 years whereas as there were only 8 (16%) patients aged >50 years with 42 (84%) males and 8 (16%) females. Our results are similar with the results of the Chauhan et al, where in most affected age group was 50-59 years and mean age being 54 years. As compared to female, male were more affected by acute pancreatitis in their study. In another study performed by Kandasami et al, in which the mean age of the patients was 43.5 years (SD±14.7 years) and with 77 males and 56 females. In our study, patients with acute pancreatitis expressed symptoms of pain abdomen and vomiting. All 100 (100%) patients showed pain abdomen while only 78% of the patients expressed with vomiting. Our findings are comparable with study done by Nehal Naik et al, in their study observed 100% of the patient's pain abdomen as the presenting symptoms, 66% of them presented with vomiting and 30% with abdominal distension.<sup>[9]</sup>

In our study we had 80 (80%) patients with alcoholic and 20 (20%) were smokers which is accordance with Kandasami et al studied alcohol as the predominant factor associated with acute pancreatitis in their study they noted 63 patients (47.7%) alcoholic.

In our study, connected co-morbidities in the studied patients is concerned, diabetes mellitus were found in 4(4%) patients, hypertension in 4 (4%) patients, IHD in 2(2%) patients and obesity in 10 (10%) patients. A study done by Prakash et al in their study observed that 35% patients had one or more co-morbidities like type 2 diabetes mellitus, hypertension and ischemic heart disease. Ultrasound (USG) of the abdomen presented diffusely enlarged and hypo echoic pancreas in 52 % of the patients with acute pancreatitis, diffusely enlarged and hypoechoic pancreas with cholelithiasis in 8% of the

patients and pancreas obscured by bowel gas in 40% of the patients in study group, our outcomes comparable to several previous studies.<sup>[10]</sup>

## CONCLUSION

Although serum amylase is considered the most practical biochemical marker for diagnosis of acute pancreatitis, yet it is not diagnostic in many cases like mild acute pancreatitis and in cases which present late after the onset of the disease. Urinary amylase is a convenient and a more sensitive test for diagnosis of acute pancreatitis. Urinary amylase can be used in the diagnosis of acute pancreatitis as it was establish to have analogous sensitivity and specificity as that of serum amylase and serum lipase.

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