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Comparative Study Of Serum Vs Intraoperative / Interventional Cystic Fluid Parameter Analysis In Patients With Complicated Pseudocyst Pancreas.

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ABSTRACT

Pancreatic pseudocyst are complications of acute or chronic pancreatitis. Initial diagnosis is accomplished most often by cross-sectional imaging. Most pseudocysts resolve spontaneously with supportive care. Detection of elevated levels of blood pancreatic enzymes is crucial in the diagnosis of acute pancreatitis. Proteolytic activity of trypsin in the cystic fluid has been speculated to be an important cause for producing vascular complications in pseudocyst. Measurement of trypsin in serum is not possible as it is not stable and hence cystic fluid is widely recommended. Aim of our study is to compare the levels of serum and intraoperative /interventional cystic fluid enzymes in normal and complicated Pseudocyst Pancreas. All the participants or their attenders will be informed about the study and informed consent will be obtained from them or from their attenders, if the patients is not able to sign. A brief history about their personal was obtained. Serum and cystic fluid was analysed for all enzymes (amylase, lipase trypsin) protein, sugar, electrolytes, lipid profile, Renal profile, LFT, along with CBC done in fully automated analyser at the time of complication of pancreatic pseudocyst going for rupture. Mean value of trypsin of 59 BAEE units and above are prone to go for complication in Pseudocyst pancreas, which was found out by Spectrophotometer. Amylase in cystic fluid was found to be higher than serum. Since pancreatitis raises the levels of lipase and amylase, evaluating the morbidity and mortality of patients is not important. Since the trypsin enzyme causes vascular difficulties through proteolytic activity, trypsin levels can be measured at the start of pseudocyst symptoms before the patient has an issue and can be conservatively handled. According to our study, patients were at a significantly increased risk of developing vascular problems if their value was higher than 59 BAEE units. As a result, the treating surgeon can keep an eye on the patients and take active action when necessary.

Keywords: Pancreatic pseudocyst, Complicated, amylase, lipase.

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INTRODUCTION

Pancreatic pseudocysts can be described as fluid-filled cavities arising from the pancreas and surrounded by a wall of fibrous or inflammatory tissue, but lacking an epithelial cover. The cyst can be filled with pancreatic juice containing amylase, lipase, and zymogens, or if no communication with the pancreatic ducts exists, with protease-free serous fluid.

Acute or chronic pancreatitis frequently results in the development of pancreatic pseudocysts. According to reports, between 6% and 18.5% of patients with acute pancreatitis have pancreatic pseudocysts. Between 20% and 40% of patients with chronic pancreatitis, have pancreatic pseudocysts. Patients with alcoholic chronic pancreatitis are most likely to develop pancreatic pseudocysts (70% to 78%). Idiopathic chronic pancreatitis (6%–16%) is the second most frequent cause, while biliary pancreatitis (6%–8%) is the third most prevalent. There was no characteristic or highly diagnostic biochemical finding that could distinguish between acute and chronic pseudocysts; nevertheless, the peripancreatic fluid collection had a higher plasma admixture, and the acute pseudocysts had a higher trypsin-like proteolytic activity.

The pancreatic pseudocyst, a confined fluid collection with a fibrous tissue wall devoid of epithelium, is rich in amylase and other pancreatic enzymes [1]. The pancreatic parenchyma either directly or indirectly connects pseudocysts to the pancreatic duct system. They are caused by disruption of the pancreatic ducts following an increase in pancreatic ductal pressure, which can be caused by stenosis, calculi, or protein plugs obstructing the primary pancreatic ductal system, or by pancreatic necrosis following an acute pancreatitis episode [2, 3]. Pseudocysts are a prevalent clinical problem that affects 30 to 40 percent of patients with chronic pancreatitis [4].

The occurrence and etiology of pseudocysts are similar to those of pancreatitis, despite the fact that they are less common following acute pancreatitis than chronic pancreatitis and more common following alcohol-induced pancreatitis than following non-alcohol-related pancreatitis. Alcohol-related pancreatitis appears to be the main cause, accounting for 59% to 78% of all pseudocysts, according to studies conducted in countries with high alcohol intake [5]. Most of the people in the idiopathic category were thought to have alcohol-related disorders, despite the lack of hard evidence [6].

Regardless of the source, the incidence of pseudocyst is very low, ranging from 1.6% to 4.5%, or 0.5-1 per 100,000 people annually [9, 10]. Following emergency hospitalization for an acute pancreatitis episode, 86 individuals in an Imrie experiment developed pseudocysts [11]. The local hospital population, which included 879 patients in for acute pancreatitis at the same time, provided sixty-two of the 86 pseudocysts resulting from acute pancreatitis. Overall, 7% of cases had pseudocysts due to acute pancreatitis [11].

There is a dearth of reliable data based on the long-term follow-up of individuals with chronic pancreatitis, in contrast to acute pseudocysts, which can happen in patients who have had the condition for 10, 20, or more years. Accordingly, individuals with chronic pancreatitis are more likely to experience a pseudocyst at least once over the course of a protracted illness [14]. Clinically, a pancreatic pseudocyst may manifest as a patient with no symptoms or, in the event of complications, as a major abdominal catastrophe [16–18]. Acute complications include bleeding (usually from a splenic artery pseudoaneurysm), infection, and rupture. The diagnosis of pancreatic ascites was based on chronic ascites with the triad of elevated serum amylase, elevated ascitic fluid amylase (346-97 000 Somogyi units/100 ml) and elevated ascitic fluid proteins (2.5-5.5 g/100 ml). Aim of our study is to compare the levels of serum and intraoperative /interventional cystic fluid enzymes in normal and complicated Pseudocyst Pancreas.

METHODOLOGY

This study was done in Government Stanley Medical College – involving the following departments - department of Biochemistry, Institute of Surgical Gastroenterology and Liver Transplantation for a period of 12 months as a comparative cross-sectional study in 29 patients. Pseudocyst Pancreas of patients with age 18 to 60 admitted in Surgical Gastroenterology department was included in this study.

This study was approved by Institutional Ethics Committee. The samples were collected after obtaining a clearly written informed consent from patients and their attenders admitted in Department of Gastroenterology. Patients with acute and chronic pancreatitis going for complications of Pseudocyst formation diagnosed with clinical examination, diagnostic procedures like USG abdomen, CT abdomen. Admitted patients shall be of both sexes and above 18 years of age group were included in this study.

Whereas patients with congenital cysts of pancreas, patients with neoplastic swelling, Hydatid cyst of pancreas and all the true cysts of pancreas were excluded.

All the participants or their attenders was informed about the study and informed consent was obtained. A brief history about their personal details was obtained. General examination and Systemic examination was done. Serum and cystic fluid will be analysed for all enzymes (amylase, lipase trypsin) protein, sugar, electrolytes, lipid profile, Renal profile, LFT, along with CBC done in fully automated analyser at the time of complication of pancreatic pseudocyst going for rupture.

The collected data were analyzed with IBM.SPSS statistics software 23.0 Version. To describe about the data; descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean & S.D were used for continuous variables. To find the significant difference between the bivariate samples in independent groups; the Unpaired sample t-test was used. Probability value .05 is considered as significant level.

RESULTS

Among the 29 subjects in our study population, 11 (37.93%) was in 31 - 40 years followed by 9 (31.03%) in 21 - 30 years and 1 (3.45%) was < 20 years. Also 28 (96.55%) were Male and 1 (3.45%) were Female. Among the subjects, 25 (86.21%) had H/o alcohol intake.

Among the subjects, 25 (86.21%) had Alcohol induced pancreatitis followed by 1 (3.45%) had Idiopathic pancreatitis, 1 (3.45%) had Hypertriglyceridemia and 1 (3.45%) had Trauma. Among the subjects, 19 (65.52%) had Nil comorbidities followed by 2 (6.9%) had COPD and least 1 (3.45%) had Aortic aneurysm.

Among the subjects, 19 (65.52%) had High Serum Amylase and 10 (34.48%) had Normal Serum Amylase. Among the subjects, 19 (65.52%) had High Serum Lipase and 10 (34.48%) had Normal Serum Lipase.

The mean Serum Amylase among the subjects was 576.07 (\pm 818.14) ranging from 24 to 3411. The mean Serum Lipase among the subjects was 444.17 (\pm 440.78) ranging from 34 to 1823. The mean Total bilirubin among the subjects was 1.28 (\pm 0.78) ranging from 0.28 to 3.59. The mean Direct bilirubin among the subjects was 0.63 (\pm 0.53) ranging from 0.1 to 2.5. The mean Serum protein among the subjects was 6.34 (\pm 0.77) ranging from 4.6 to 7.8. The mean Serum albumin among the subjects was 3 (\pm 0.58) ranging from 1.7 to 4.1. The mean Serum Urea among the subjects was 34.93 (\pm 27.88) ranging from 9.2 to 110. The mean Serum creatinine among the subjects was 0.86 (\pm 0.39) ranging from 0.4 to 3.

Table 1: Biochemical parameters.

	Mean	Std. Deviation	Minimum	Maximum
Serum Amylase	576.07	818.14	24.0	3411.0
Serum Lipase	444.17	440.78	34.0	1823.0
Total bilirubin	1.28	0.78	0.3	3.6
Direct bilirubin	0.63	0.53	0.1	2.5
Serum protein	6.34	0.77	4.6	7.8
Serum albumin	3.00	0.58	1.7	4.1
Serum Urea	34.93	27.88	9.2	110.0
Serum creatinine	0.86	0.39	0.4	2.0
Cyst fluid amylase	23008.31	24576.17	66.0	112378.0
Cyst fluid protein	2.94	1.00	0.3	4.6
Cyst fluid albumin	1.90	0.63	0.5	3.5
Cyst fluid trypsin	66.11	82.04	1.8	317.0

The mean Serum Amylase was 576.07, which is lower than mean Cyst fluid amylase, which was

23008.31, and the difference between Serum Amylase and Cyst fluid amylase was statistically significant. The mean Serum protein was 6.34 which is higher than mean Cyst fluid protein which was 2.94 and the difference between Serum protein and Cyst fluid protein was statistically significant. The mean Serum albumin was 3 which is higher than mean Cyst fluid albumin which was 1.9 and the difference between Serum albumin and Cyst fluid albumin was statistically significant.

Table 1: Comparison between serum and cystic fluid values.

GROUP	MEAN	S.D.	p value
Serum Amylase	576.07	818.14	0.001
Cyst fluid amylase	23008.31	24576.17	
GROUP	MEAN	S.D.	p value
Serum protein	6.34	0.77	0.001
Cyst fluid protein	2.94	1.00	
GROUP	MEAN	S.D.	p value
Serum albumin	3.00	0.58	0.001
Cyst fluid albumin	1.90	0.63	

Among the subjects, 22 (75.86%) had Complicated Pseudocyst and 7 (24.14%) had Normal Pseudocyst. The mean Cyst fluid trypsin among Complicated Pseudocyst cases was 85.26 (\pm 85.91) which is higher by 79.31 and statistically significant compared to 5.94 (\pm 3.24) in Normal Pseudocyst cases.

Table 3:2 Distribution of Pseudocyst in the study population.

	Pseudocyst	N	Mean	Std. dev.	p value
Cyst fluid trypsin	Complicated	22	85.26	85.91	0.001
	Normal	7	5.94	3.24	

DISCUSSION

Of the 29 patients in the current study group, 22 experienced vascular problems from pseudocysts or acute necrotizing pancreatitis, and 7 had normal, uncomplicated pseudocysts who received treatment at our institute during a 26-month period. Despite the fact that this study was the first of its type to confirm that trypsin activity in pseudocysts can predict vascular problems in these patients, early management is actually more important than waiting and watching pseudocyst phenomena. Similar research was conducted in 1993 by Ake Lasson et al., [19] who biochemically examined 15 pseudocyst patients and assessed the total proteolytic activity in acute versus chronic pseudocysts.

In serum or cystic fluid, elevated levels of routinely measured lipase or amylase did not predict any morbid clinical course or consequences following acute or chronic pancreatitis and its complications by S. lipase and S. amylase at the time of presentation. At the time of admission, these criteria were assessed.

Serum amylase levels in the current study group averaged 576.07 did not forecast the problems or indicate any clinical path. The cause of pseudocyst was idiopathic, and the etiology did not match the biochemical results since 26 out of 29 patients were alcoholic, and the other three cases—two in the complex group, with hypertriglyceridemia in a 15-year-old male and trauma in a 35-year-old male—were in the control group. Pseudocysts are associated with a high rate of complications and a mortality rate of 3–10%. Therefore, bleeding within a pseudocyst and the development of pseudo aneurysms may very well be explained by proteolytic digestion of the vascular tissue by activated trypsin activity in contact with the pseudocyst or in the necrotic fluid.

Testing of trypsin includes the volume of bleeding, the timing of presentation, the presence of infection, and whether the bleeding occurs inside the pseudocyst or into the pancreatic duct. Therefore, it

was intended to quantify trypsin activity in 22 out of 29 patients who had vascular problems and compare it to 7 out of 29 patients who had simple pseudocysts. To preserve the enzymatic activity in every situation, we used the Spectrophotometer method and kept the fluid at -20 °C prior to measurement. In every instance of acute pancreatitis with complications or chronic pancreatitis with pseudocyst, the most crucial biochemical markers are examined. In 8 out of 22 instances, or 36% of the current investigation, radiological proof of pseudoaneurysm of the arteries surrounding the pancreas was found.

Enzymatic activity was higher in all the test group, except in the first 6 cases due to long term storage of sample. The average mean trypsin activity in test group in 22 cases is 93.6 BAEE units compared to the cyst fluid in uncomplicated group which is about 5.62 BAEE units and is statistically significant with p value 0.001. Mortality in present study group was 2/22 cases in case 317 BAEE units and case 209 BAEE units due to sepsis and MODS. The majority of the mortality in the current research group was avoided by prompt intervention with interventional radiological therapy with coil embolization and early surgical surgery, despite the fact that all of these cases were presented in emergency or semi-emergency situations. The most frequent causes of death in these situations would be acute blood loss, chronic malnutrition, sepsis, lack of access to advanced care, and delayed diagnosis.

Reducing morbidity and mortality in cases of vascular complications in both acute and chronic pancreatitis with pseudocyst was the initial rationale behind the current investigation. The average mean value of trypsin activity in these pseudocyst cases with vascular complications will give us a roadmap to reduce the mortality because cases with such severe disease have significant mortality, even though the trypsin activity in these patients' pseudocysts varies from case to case and depending on the etiology.

CONCLUSION

The illness was prevalent in people aged 18 to 61 and primarily affected men. Conservative treatment was used for acute pseudocysts, while external drainage was necessary for infected and burst cysts. In our cases, percutaneous aspiration led to recurrence. Most cases involved successful nastomoses of the cyst to the nearby bowels, either cystogastrostomy or cystojejunostomy. Abdominal discomfort and wound infection are the most frequent postoperative consequences. Two of the 22 complex cases died as a result of vascular problems and bleeding, while the remaining seven cases received conservative treatment. Trypsin levels was found to be increased in complicated pseudocyst compared to normal cases. This will help the surgeons to concentrate on the monitoring and management of patients and thereby reduce mortality and morbidity in patients anticipated to go into vascular complications.

In order to prevent mortality and morbidity, patients who are diagnosed with pseudocyst by ultrasound or CT scan should be investigated along with routine parameters. Cystic fluid trypsin analysis will help us determine which patients will experience vascular complications and which will recover normally with conservative management. We should also regularly watch, observe, and monitor the susceptible patients experiencing complications in a tertiary care hospital. In the future, the study may cover a larger number of patients.

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