ORIGINAL ARTICLE

Comparison of the diagnostic Accuracy of 4 hours' Serum Lipase and Amylase in Estimation of Pancreatitis in Patients Planned (Endoscopic Retrograde Cholangio-Pancreatography) for Pancreatic and Biliary Ductal Disease

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ABSTRACT

Aim: To compare the diagnostic accuracy of four-hourserum lipase and amylase in determinationof pancreatitis among patients planned forendoscopic retrograde cholangio-pancreatography due to bile duct or pancreatic disease.

Method: This Cross-sectional study was held at the Faculty of Gastroenterology; Sheikh Zaid Lahore Hospital among patients of both gender with age range from 20-80 years andvariouspancreatic andbiliary ductal diseases intended forendoscopic retrograde cholangio-pancreatography.

Results: Thespecificity, sensitivity, NPV, PPV and diagnostic accuracy of serum amylase were 89%, 85.8%and 87.6% and 89%correspondingly. Although serum lipase is 100% correct in the diagnosis of pancreatitis after endoscopic retrograde cholangio-pancreatography. One of theanalysis suggested that serum amylase specificity, sensitivity, NPV and PPV were81.25%, 85%, 14.7% and 99.29%and serum lipasespecificity, sensitivity, NPV and PPV were 87.5%, 84.5%, 15% and 99.52%.

Conclusion: Therefore, serum lipase is more precise than serum amylase in diagnosing pancreatitis after endoscopic retrograde cholangio-pancreatography. We now have local evidence that will be important in the local environment.

Keywords: Severeacute pancreatitis Serum lipase, serum amylase

INTRODUCTION

Endoscopic retrograde cholangio-pancreatographyis a method that performs a mixture of laparoscopic and fluorescent images to detect and manage disordersrelated with the pancreatobiliary system. Endoscopic Retrograde Cholangiopancreatography (ERCP) have developed from a difficult diagnostic test to a valuable but multifaceted therapeutic technique.[1-2]Although this is -associated with an increased incidence of all popular endoscopic procedures, like many other treatments, there is a growing tendency to be taken and unsubscribed on the same day.

The key problem in determining which patients can be safely discharged on the same day is to predict who will develop after ERCP, the most common ERCP complication[3]. Early detection of pancreatitis after ERCP will allow timely coordination of admission at night and prompt initiation of appropriate supportive treatment for patients at risk and safe discharge from the hospital from others. Since ERCP pancreatitis usually occurs late, clinical evaluation alone is not reliable[4].

Various analyses have been conducted to clarify the factors that may allow an endoscopist to predict ERCP pancreatitis.[5]One of the most practical tests that occur is the level of amylase and lipase after ERCP. Although hyperamylaazine after ERCP is a common and often benign phenomenon, it has been found to be constantly associated with ERCP pancreatitis[5-6]

Endoscopic retrograde cholangio-pancreatography is a broadly used technique for diagnosing and treating bile duct and pancreatic diseases likecholelithiasis, malignant and benign strictures, etc. In the USA, about 500,000 procedures are doneper annum.[7]

Regardless of the use in diagnostic or therapeutic methods, there are some complications associated with this procedure. Amid these impediments, the most common is ERCP pancreatitis. ERCP complications comprise bleeding, pancreatitis, cholecystitis, perforation and contrast-induced sepsis[8].

This most common complication is around 10%. Although this is a fairly morbid disease that brings serious consequences that require a long hospital stay.[9]Temporary amylase and lipase peaks occur in 72% of patients, but these increases do not confirm the presence of the disease.

In the meta-analysis, the formation of pancreatitis after ERCP was about 3.7%, but it changed ominously depending on the patient's choice (1.5-15.6%). For acute 0.5% and 1%, there are some risk factors associated with the patient and method, and this danger works by an endoscopic doctor to provide the patient with real preventive treatment to avoid difficulties[10].

Predicting the development of a procedure associated with pancreatitis is very much respected. This preventive diagnosis then governs the disease course and averts the patient from pathological difficulties caused by the disease. Serum amylase levels were found to increase within ninety minutes after disease onset and peaked within 4 hours instead of 2 hours.

Testone et al[11]determined that serum amylase levels measured over four hours with endoscopic papillary cut were the most constant symptom of ERCP pancreatitis.

Serum amylase has been shown to be clinically important as a pancreatitis analyst 4 hours after ERCP.

Several studies have revealed that blood lipase levels are a more sensitive sign than blood amylase levels to diagnose other forms of severe pancreatitis, but some studies only consider the related dimensions of different pancreatic enzymes as a means of predicting post-ERCP pancreatitis.[10,11] In addition, it remains uncertain whether there are changes in the pancreatic enzyme levels diagnostic accuracy help to predict pancreatitis after ERCP according to the procedure.

When the cut-off value will be more than 3 times the normal limit, the specificity of amylase is close to 95%, but in some studies it has low sensitivity up to 61%. Studies have shown over 95% of the characteristics, and allergies range from 55% to 100%. The rationale behind the study is that we equate the accuracy of serum lipase and amylase4 hours after the diagnosis procedure, with particular emphasis on comparing these two markers as diagnostic tools.

Previous studies have shown that these two indicators can help predict pancreatitis 4 hours after ERCP before surgery. However, this does not happen consistently. Therefore, in this study, we want to highlight the use of serum amylase and lipase for future prediction and early diagnosis to identify appropriate measures for early detection and control of patients. ERCP.

MATERIAL AND METHODOLOGY

The cross-sectional study was conducted at Gastroenterology department of Shaikh Zayed Hospital Lahore from20th January to 20th July 2017. A total of 275patients wereincluded. It is planned to join ERCP with various bile or pancreatic diseases from 20 to 80 years old, both sexes. Patients with pulmonary and Cardiovascular diseases (myocardial infarction or medical history of an anomalous ECG), medical history of previous endoscopic sphincterotomy with papillary balloon extension or hyperamylaemia, liver disease history and kidney failure (creatinine> 1.2mg/dl) were included. Four skilled endoscopist consultants have implemented ERCP. All subjects who underwent ERCP were informed and selected for the analysis. Demographic information such as contact, age and name has also been recorded. Then, 5 hours after ERCP, 5 ml blood samples were taken into pre-cooled disposable syringes through aseptic measures. To assess serum amylase and lipase levels; samples were referred to a hospital laboratory. Then after ERCP and 24 hours later; Serum lipase and amylase levels were then resent. All cases were clinically assessed for pancreatic abdominal pain 4 and 24 hours after ERCP. Ultrasound examination of the abdomen was performed after ERCP 24 hours later. Patient's data with pancreatitis wascompare after 24 hours according to the ACG criteria and after 4 hours. Patients with> 3 times higher ULN serum lipase and amylase were also confirmed after ERCP 4 hours later in the presence of abdominal pain and pancreatitis. The whole procedure was observed as (attached). Threshold levels of serum lipase and amylase were then determined using the receiver operator curve. The data analysis was achieved by SPSS version 20.0.

RESULTS

The patient's maximum and minimum age was 22 and 76 years.50.41±16.97 years was the patient's mean age. There were 154(56%) males and 121(44%) females (Fig. 1).

In this study, abdominal pain was not noted in 156(56.7%) patients at 4 hours post ERCP while abdominal pain was perceived in 119(43.3%) patients post ERCP at 4 hours (Tables 2-3). In this study, 24 hours post ERCP, abdominal pain was not observed in 172(62.5%) while post ERCP after 24 hours; 103(37.5%) patients had pain in abdomen (Table 4). 453.50 ± 604 IU/l was the patients mean serum amylase level at 24 hours was. The patients mean serum amylase level at 4 hours was 207.46 ± 253.94 IU/l (Table 5). On serum amylase finding; positive patients for pancreatitis were 120 (43.64%) while negative patients were 155 (56.36%).

818.81±1176.90 IU / L was the patients mean serum lipase level at 24 hours and the patients mean serum lipase level at 4 hours was at 456.12±536.82 IU / L.

On serum lipase findings, pancreatitis positive patients were120 (43.64%) while pancreatitis negative patients were 155(56.36%).
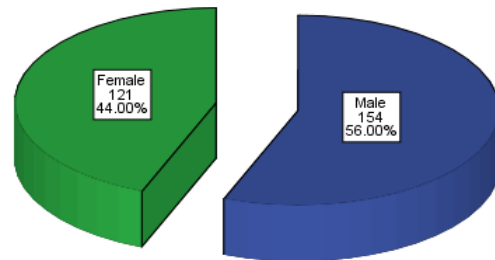
Fig. 1: Distribution of gender of patients

Table 1 Distribution of pancreatic type abdominal pain at four hours (n=257)

Pain at 4 hours in abdomen	No.	%
No	156	56.7
Yes	119	43.7

Table 2 Distribution of pancreatic pain in abdomen for 24 hours (n=257)

Pain at 24 hours in abdomen	No.	%
No	172	62.5
Yes	103	37.5

Table 3 Descriptive statistics of post ERCP serum amylase

	Post ERCP after 4 hours Serum amylase	Post ERCP after 24 hours Serum amylase
N	275	275
SD	253.94	604.00
Mean	207.46	453.50
Maximum	781	1936
Minimum	11	8

The pancreatitis was noted in 120 (43.64%) patients after 24 hours and 155 (56.36%) patients did not encompass pancreatitis. 87.6%, 85.8%, 89%, 85.8% and89%was the diagnostic accuracy, specificity, sensitivity, PPV and NPV of serum amylase, correspondingly. Although serum lipase is hundred percent correct in

diagnosing pancreatitis after ERCP. In one analysis, it is shown that serum specificity, sensitivity, NPV and PPV of amylases were 81.25%, 85%, 14.7% and 99.29%, respectively, but specificity, sensitivity, NPV and PPV for serum lipase was 84.5%, 99.52%, 87.5% and 15% respectively (Tables 6-7).
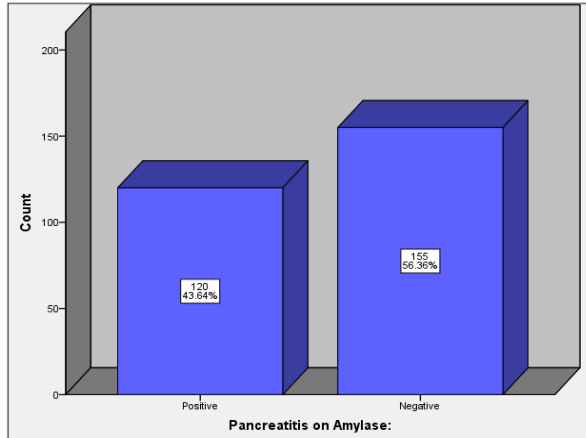
Fig. 2: Distribution of pancreatitis on amylase

Table 4: Descriptive statistics of post ERCP serum lipase

	4 Hour Post ERCP Serum lipase	24 Hour Post ERCP Serum lipase
N	275	275
SD	536.82	1176.90
Mean	456.12	818.81
Maximum	1600	4600
Minimum	11	11

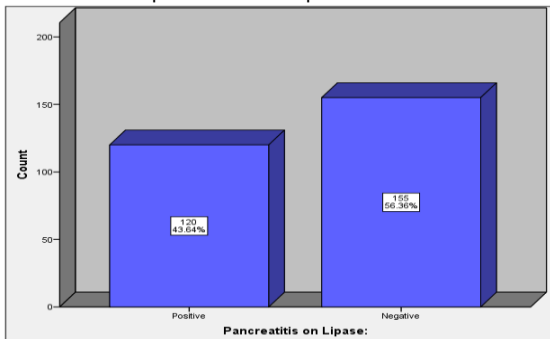Fig.1 Distribution of pancreatitis on lipase
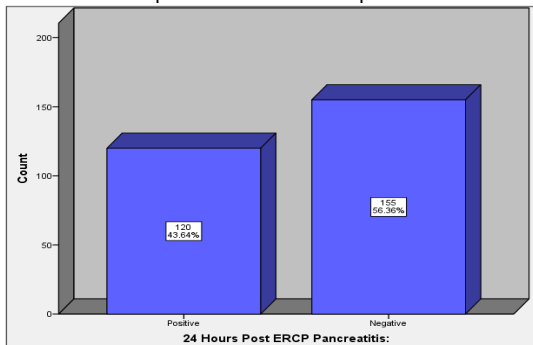

Fig. 4: Distribution of pancreatitis 24 hours post ERCP

Table 6: The serum amylase accuracy for pancreatitis

Pancreatitis on amylase	24 Hours post ERCP pancreatitis		Total
	-ve	+ve	
Negative	17	103	120
Positive	138	17	155
Total	155	120	275

Sensitivity = 85.8%, Specificity= 89%, PPV = 85.8%, NPV = 85.9% Diagnostic accurateness:87.6%

Table 7: Accuracy of serum lipase for pancreatitis

Pancreatitis on lipase	24 Hours post ERCP pancreatitis		Total
	-ve	+ve	
Negative	0	120	120
Positive	155	0	155
Total	155	120	275

Specificity = 100% PPV + 100%,   Sensitivity = 100%, NPV = 100%, Diagnostic accuracy: 100%

DISCUSSION

Detailed history and clinical constellation of findings with amylase and lipase values reaching more than three times upper limit of normal constitute the diagnosis[11-12]. Relative analysis of the sensitivity and properties of lipase and amylase levels has shown that blood lipase is more defined in treatment. However, these symptoms do not indicate an increase in pancreatitis and do not help with predictions[13,14].

After diagnosis, regular intensive treatment of these symptoms is not recommended. However, it was found that the decrease in these symptoms showed improvement. On the other hand, an increase in stable levels indicates some serious diseases, such as pseudocysts or pancreatic duct disease. In addition, regular observations are cost-effective and can lead to unnecessary financial limits. Because lipase is in the pancreas, it is more pronounced when combined with amylase, which is very common in the body and therefore less specific compared to lipass[15,16].

The average age of the patient was 50.41 7 16.97. The males were 154(56%) and females were 121(44%). In this analysis, abdominal pain was noted in 119(43.3%) patients at 4hours post ERCP and at 24hours after ERCPabdominal pain was observed in 103(37.5%) patients. After 4 hours, patients' normal amylase was 207.46 0.9 253.94 IU / L. Patients had amylase of 453.50 I 604 IU / L at 24 hours. 456.12± 536.82 IU/lwas the patient's serum level at 4 hours. 818.81±176.90 IU/l was the patients means age at 24hours. There were 120(43.64%) positive for pancreatitis patients after 24 hours while negative patients were 155(56.36%). Sensitivity, specificity and diagnostic sensitivity of PPV, NPV and serum amylases were 85.8%, 89%, 85.8%, 89% and 87.6%, respectively. Cirrus Lepis has a 100% correct diagnosis of pancreatitis after ERCP.[17]

Research statistics show that subjects with pancreatitis after ERCP have hyperamylasemia which was checked after 2 hours. No increase in amylase levels was observed in patients without pancreatitis two hours after surgery. Therefore, serum amylase levels were accurately measured two hours after surgery; this is typicallydignifiedtwenty four hours after the procedure[18-9]. Other study statisticsexhibited that serum lipase and

amylase levels determined two hours after surgery were as precise with diagnosis of pancreatitis as 24 hours after surgery[20]. This analysis is also grounded on the past and clinical results. Few cases who had pancreatitis 24 hours later did not experience any symptoms two hours after surgery. It was therefore established that clinical results only were not correctly diagnose the pancreatitis and that serum lipase and amylase levels were about 6 times greater than normal in patients with pancreatitis. Therefore, it has been found that levels of amylase and lipase, which are almost six times higher than the upper limit of normal, are more accurate in the diagnosis of pancreatitis[20-22].

Previous studies have shown that early confirmation of amylase and lipase sometimes saves lives when calculating pancreatitis. Other studies have shown that levels of serum amylasedignified four hours after surgery show 75% sensitivity and 95.3% specificity[23-24].

The specificity of serumamylase and lipase levels, measured more than threetimes overhead the upper limit of normal, is 91% and sensitivity 61%. 16 functions are defined as 95%, and after eliminating the cut three times, the sensitivity varies between 55-100%.

CONCLUSION

Therefore, serum lipase is much precise than serum amylase in diagnosing pancreatitis after ERCP. We now have local confirmation that will be important in the local environment. Now, the serum lipase results in the future to predict ERCP pancreatitis in patients with bile or pancreatic disease.

REFERENCES

1. Dumonceau J-M, Andriulli A, Devière J, Mariani A, Rigaux J, Baron T, et al. European Society of Gastrointestinal Endoscopy (ESGE) Guideline: prophylaxis of post-ERCP pancreatitis. Endoscopy 2010;42(6):503.
2. Puig I, Calvet X, Baylina M, Isava Á, Sort P, Llaó J, et al. How and when should NSAIDs be used for preventing post-ERCP pancreatitis? A systematic review and meta-analysis. PloS one 2014;9(3):e92922.
3. Freeman ML, Guda NM. Prevention of post-ERCP pancreatitis: a comprehensive review. Gastrointest Endosc 2004; 59(7):845-64.
4. Masci E, Toti G, Mariani A, Curioni S, Lomazzi A, Dinelli M, et al. Complications of diagnostic and therapeutic ERCP: a prospective multicenter study. Am J Gastroenterol 2001; 96(2): 417-23.
5. Cheng C-L, Sherman S, Watkins JL, Barnett J, Freeman M, Geenen J, et al. Risk factors for post-ERCP pancreatitis: a prospective multicenter study. Am J Gastroenterol 2006;101(1):139-47.
6. Cotton P, Lehman G, Vennes J, Geenen J, Russell R, Meyers W, et al. Endoscopic sphincterotomy complications and their management: an attempt at consensus. Gastrointest Endosc1991; 37(3):383-93.
7. Andriulli A, Loperfido S, Napolitano G, Niro G, Valvano MR, Spirito F, et al. Incidence rates of post-ERCP complications: a systematic survey of prospective studies. Am J Gastroenterol 2007;102(8):1781-8.
8. Cotton PB, Garrow DA, Gallagher J, Romagnuolo J. Risk factors for complications after ERCP: a multivariate analysis of 11,497 procedures over 12 years. Gastrointest Endosc 2009; 70(1):80-8.
9. Anderson MA, Fisher L, Jain R, Evans JA, Appalaneni V, Ben-Menachem T et al. Complications of ERCP. Gastrointest Endosc 2012;75(3):467-73.
10. Sahakian AB, Buxbaum JL, Van Dam J. Prevention and Management of Post-ERCP Pancreatitis. JOP 2014;15(6): 544-51.
11. Thomas PR, Sengupta S. Prediction of pancreatitis following endoscopic retrograde cholangiopancreatography by the 4-h post procedure amylase level. J Gastroenterol Hepatol 2001;16(8):923-6.
12. Ito K, Fujita N, Noda Y, Kobayashi G, Horaguchi J, Takasawa O, et al. Relationship between post-ERCP pancreatitis and the change of serum amylase level after the procedure. World J Gastroenterol 2007;13(28):3855.
13. Testoni PA, Bagnolo F, Caporuscio S, Lella F. Serum amylase measured four hours after endoscopic sphincterotomy is a reliable predictor of postprocedure pancreatitis. Am J Gastroenterol 1999; 94(5):1235-41.
14. Koizumi M, Takada T, Kawarada Y, Hirata K, Mayumi T, Yoshida M, et al. JPN Guidelines for the management of acute pancreatitis: diagnostic criteria for acute pancreatitis. J Hepatobiliarypancreatic Surg 2006;13(1):25-32.
15. Nishino T, Toki F. Prediction of post-ERCP pancreatitis.In: Rodrigo L, ed. Pancreatitis – treatment and complications. InTech2012
16. Yadav D, Agarwal N, Pitchumoni C. A critical evaluation of laboratory tests in acute pancreatitis. Am J Gastroenterol 2002; 97(6):1309-18.
17. Kylänpää-Bäck M-L, Kemppainen E, Puolakkainen P, Hedström J, Haapiainen R, Korvuo A, et al. Comparison of urine trypsinogen-2 test strip with serum lipase in the diagnosis of acute pancreatitis. Hepatogastroenterology 2002;49(46): 1130-4.
18. Lankisch PA, Banks M. Acute pancreatitis.. Lancet 2015; 386: 85–96.
19. Yadav D, Lowenfels AB. The epidemiology of pancreatitis and pancreatic cancer. Gastroenterology 2013;144(6):1252-61.
20. Vos T, Allen C, Arora M, Barber RM, Bhutta ZA, Brown A, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 2016;388(10053):1545.
21. Feigin V. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet 2016; 388 (10053):1459-544.
22. Abubakar I, Tillmann T, Banerjee A. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2015;385(9963):117-71.
23. Muniraj T, Aslanian HR, Farrell J, Jamidar PA. Chronic pancreatitis, a comprehensive review and update. Part I: epidemiology, etiology, risk factors, genetics, pathophysiology, and clinical features. Disease-a-month 2014; 60(12):530-50.
24. Singla A, Csikesz NG, Simons JP, Li YF, Ng SC. National hospital volume in acute pancreatitis: analysis of the Nationwide Inpatient Sample 1998–2006. HPB (Oxford) 2009;11(5):391-7