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Comparision of Urine Trypsinogen With Serum Amylase and Lipase in Acute Pancreatitis – Case Study

Medical Science

KEYWORDS : Acute Pancreatitis,Urine Trypsinogen Dipstick,Serum Amylase, Lipase.

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ABSTRACT

Background: Urine trypsinogen-2 (UT2) as a screening test for acute pancreatitis and comparision of the results with standard blood tests for acute pancreatitis(Amylase and Lipase).

Methods: In 100 patients with acute abdominal pain presenting to the emergency room, urine samples were obtained and tested for trypsinogen levels with the dipstick.Then,we compared the urinary trypsinogen-2 dipstick test and serum amylase and lipase levels in all the cases with provisional diagnosis of acute pancreatitis which was made on the basis of a typical clinical picture and elevated serum amylase,lipase levels and/or radiological evidence.All the positive cases were confirmed by studying Contrast Enhanced CT scan of Abdomen in later course.

Results: Urine trypsinogen-2 dipstick test was having 97.2% sensitivity and 93.75% specificity in diagnosing acute pancreatitis. It was found to be better than Serum amylase and Lipase in diagnosing acute pancreatitis.

Conclusion: Urine Trypsinogen test is a simple, non-invasive test in diagnosing acute pancreatitis in emergency department. As the sensitivity and specificity are high, it can be used as a screening test, which helps in easy diagnosis and early treatment of acute pancreatitis.

INTRODUCTION :

Acute pancreatitis is an inflammatory process which occurs in a normal Pancreas, characterised by acute abdominal pain, nausea and vomiting.1 Diagnosis is usually delayed due to routinely done non specific investigations. The 48 hours delay to collect the standard scores has prompted everybody to investigate new and early markers like urine trypsinogen-22.

Trypsinogen is a pancreatic proteinase having 2 isoenzymes (1) and (2), secreted in high concentrations into pancreatic fluid. Tubular reabsorption of trypsinogen-2 is lower than that of trypsinogen-1 and consequently, the urinary concentration of trypsinogen-2 is higher.3

A minimum concentration of 50 ng/mL trypsinogen-2 in urine sample ,can be detected by rapid urinary dipstick test.The urinary trypsinogen-2 concentration correlates with the severity of the disease.4

Acute Panc reatitis rarely presents as severe attack, consisting of pancreatic necrosis, sepsis and multiorgan failure with life threatening morbidity and mortality.5 Clinical features combined with elevated serum amylase and/or lipase levels is the most commonly employed system to diagnose acute pancreatitis. But elevation of these enzymes is not satisfactory because of their low sensitivity and specificity.6The gold standard investigation is contrast enhanced computed tomography which is the most accurate method for diagnosing and assessing the severity of acute pancreatitis. But it cannot always readily be performed because of its limited availability, high cost and side effects.7 Hence we need a simple, more sensitive/specific and low-cost screening test which can diagnose acute pancreatitis rapidly8

MATERIALS AND METHODS :

Type of study : Prospective study

Period of study : March 2013 to March2016

No. of patients : 100

Place of study : ASRAM medical college,Andhra Pradesh,India and Kannur medical college, Kerala, India.

Inclusion criteria : Patients with acute abdominal pain to casualty(with clinical suspicion of Pancreatitis) within 24 hours of onset of symptoms. The diagnosis of acute pancreatitis, made on the basis of typical clinical picture and serum amylase and lipase more than the highest normal level and typical findings on abdominal X ray/ultrasound/CECT.

Exclusion criteria : Known cases of chronic pancreatitis/history of acute pancreatitis in past.

PROCEDURE : Urine samples obtained in the emergency room were tested with the dipstick. We compared the urinary trypsinogen-2 dipstick test results and serum amylase,lipase levels in 100 patients with acute abdominal pain. Diagnosis of acute pancreatitis was made/confirmed on the basis of a history of acute, severe abdominal pain, high serum Amylase and/or Lipase levels and the presence of signs of pancreatitis on abdominal ultrasonography/CECT abdomen.

TRYPSINOGEN TEST : The tip of the strip was immersed into a urine sample bottle and was held for 20-25 seconds and taken out completely. After 5 min, the dipstick is exmined. The urine dipstick test for trypsinogen-2 is an immunochromatographic test. Trypsinogen-2 present in urine sample,binds to monoclo-

nal-antibody-labeled blue latex particles, which migrate across a nitrocellulose membrane with a zone containing another antibody specific for another epitope on trypsinogen-2. The Actim Pancreatitis test strip (Medix Biochemica, Kauniainen, Finland), an immunochromatographic test, was used for urine trypsinogen-2 determination (detection limit:50 µg/L). If there is excess of (>50 µg/L) urinary trypsinogen-2 in sample, 2 blue stripes are seen. (FIGURE-1 HERE) But only one stripe (referred to as the control stripe) appears when urinary trypsinogen-2 concentration is in the normal range which is considered as negative test result. If no blue line is found, the dipstick is discarded nd test is repeated with a fresh stick.

RESULTS :

1) 100 patients were included in the study, 36% were confirmed with diagnosis of acute pancreatitis and other 64% were other causes of acute abdominal pain like intestinal obstruction/perforation/acute cholangitis/gastritis/appendicitis.

2) Out of 36 cases with Acute Pancreatitis, UT2 was positive in 35(true positive) and negative in 1 case(false negative). Out of 64 cases other than pancreatitis, it was found positive in 4 cases(false positive) and 60 were true negative. Hence, in our study, Sensitivity and Specificity of Urine Trypsinogen are found to be 97.2% and 93.75% respectively.

3) Out of 36 cases with Acute Pancreatitis, Serum Amylase was positive in 24(true positive) and negative in 12 cases(false negative). Out of 64 cases other than pancreatitis, it was found positive in 9 cases(false positive) and 55 were true negative. Hence, in our study, Sensitivity and Specificity of Serum Amylase are found to be 66.6% and 85.9% respectively.

4) Out of 36 cases with Acute Pancreatitis, Serum Lipase was positive in 26(true positive) and negative in 10 cases(false negative). Out of 64 cases other than pancreatitis, it was found positive in 8 cases(false positive) and 56 were true negative. Hence, in our study, Sensitivity and Specificity of Serum Lipase are found to be 72.2% and 87.5% respectively.

5) In our study, we found that Sensitivity and Specificity of Urine Trypsinogen-2 was more than that of Serum Amylase and Lipase in diagnosing Acute Pancreatitis cases. (FIGURE-2 HERE)

DISCUSSION

In our study 100 patients were included and 36 were diagnosed to be having acute pancreatitis. Remaining 64 patients were other causes of acute abdominal pain like acute intestinal obstruction/perforation/acute appendicitis/gastritis/cholangitis/cholecystitis.

Ultrasound of abdomen was considered positive for pancreatitis if bulky/edematous pancreas and peripancreatic collection were present.

All patients with acute abdominal pain in the emergency room, were tested with urinetrypsiongen-2 using the dipstick. In our study, out of 36 cases with acute pancreatitis,Urine Trypsinogen-2 was positive in 35 and negative in 1 case whereas Serum Amylase was positive in 24 cases & negative in 12 cases and Lipase was positive in 26 cases & negative in 10 cases. Out of 64 cases other than pancreatitis, UT2 was found positive in 4 cases and 60 were true negative. Whereas Serum Amylase was positive in 9 cases and Serum Lipase in 8 cases. Hence,Sensitivity and Specificity of Urine Trypsinogen-2 were found to be 97.2% and 93.75% respectively. Sensitivity and Specificity of Serum Amylase were found to be 72.2% and 87.5% respectively. Sensitivity and Specificity of Serum Lipase were found to be 72.2% and 87.5% respectively.

Hedstrom et al., in 1996 reported that urinary trypsinogen-2 concentration may be increased in other diseases such as hepatobiliary and pancreatic malignancies,colon cancers and chronic pancreatitis9. Kemppainen et al. in 1997 reported false positive results in patients with abdominal pain who may in some instances have reflected subclinical pancreatic irritation or tumor derived trypsinogen-22.Trypsinogen-2 has been reported to be a tumor marker for gastrointestinal and ovarian cancers as mentioned above in the study done by Hedstrom et al. It is also expressed in the epithelium of bile ducts and peribiliary glands, reported by Terada et al. in 1991.

Comparing the sensitivity and specificity of Urine trypsinogen-2 dipstick test with Serum Amylase ,Lipase levels in the diagnosis of acute Pancreatitis , our study found that Urine trypsinogen testing is far more superior to the standard blood tests.

Also there are various advantages of dipstick test ; non-invasive, by urine sample of the patient. It can be instantly performed as an effective screening test in emergency/doubtful cases on outpatient basis10. Quick result : within 5 minutes and these results are objective, reproducible, hence reliable. It serves best not only in early diagnosis but also prevents complications in severe acute cases by prompting aggressive/and effective treatment11.

CONCLUSION : Urine Trypsinogen test is a simple, non-invasive test in diagnosing acute pancreatitis in emergency department. As the sensitivity and specificity are high, it can be used as a screening test, which helps in easy diagnosis and early treatment of acute pancreatitis.

FIGURE -1: Picture showing 2 blue lines on a urine Trypsinogen dipstick which shows positive test .

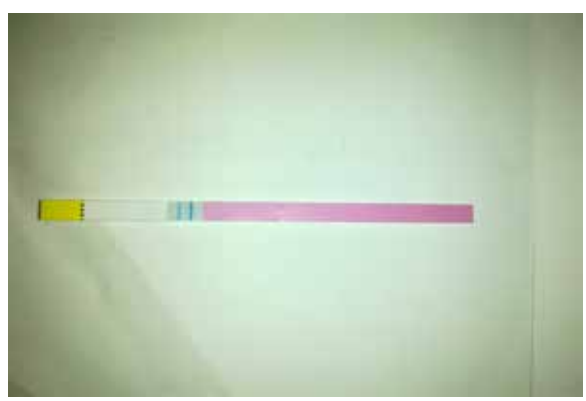
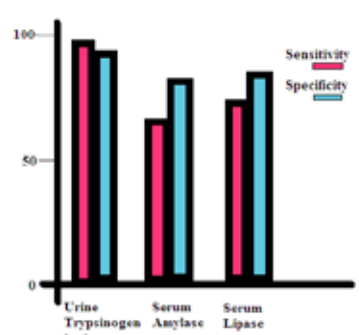


FIGURE-2 : Graph showing Sensitivity and Specificity of Urine Trypsinogen in comparision with Serum Amylase and Lipase.



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