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Original article

Amylase Creatinine Clearance Ratio In Post-operative Patients For Evaluation Of Acute Pancreatitis

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ABSTRACT:

Background: Post operative pancreatitis is a well known complication of biliary tract operations, particularly following supraduodenal exploration of the common bile duct and transduodenal sphincterotomy. Although this event occurs in a relatively small number of patients following these procedures, it is an event that should

be avoided whenever possible. It is found that the diagnostic value of amylase measurements may be enhanced if amylase excretion is related to creatinine excretion.

Material and Methods: It is a study conducted on the amylase creatinine clearance ratio in post operative patients for evaluation of pancreatitis. The data collected for our study included patients from Hitech medical college and hospitals, Bhubaneswar, Odisha, India during the period from August 2012 to November 2014.

Results: The study was conducted on sixty cases who were posted for surgery for at Hitech medical college and hospital Bhubaneswar, Odisha, India. They were divided into two groups of thirty cases each depending on the surgeries involved.

Conclusion: In this present study we assess the changes in the level of amylase creatinine clearance ratio in the post operative period and its value in the diagnosis of post-operative pancreatitis.

KEYWORDS: Pancreatitis; Serum amylase; Amylase creatinine clearance ratio.

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INTRODUCTION

Post operative pancreatitis is an uncommon but serious complication. Acute pancreatitis has been recognized following 0.8 to 1.7 percent of surgical operations on the stomach and 0.7 to 9.3 percent of biliary operation¹. Apart from high morbidity, the mortality with post operative pancreatitis is 50%². The clinical diagnosis of post operative pancreatitis may be difficult as the symptoms of post operative pancreatitis are often masked by the pain and gastrointestinal dysfunction of the surgery itself. The diagnostic

value of serum and urinary amylase levels in post-operative pancreatitis is diminished because of the fact that these values may be normal in as much as 20% of patients having overt clinical pancreatitis. Although amylase levels may be raised though patients are clinically normal. Other criteria therefore must be designed for assessing post operative pancreatitis. The test should be simple, reliable, specific and at the same time sensitive. It is believed that the amylase clearance expressed as a percentage of the creatinine clearance i.e., the

amylase creatinine clearance ratio (ACCR) is a more reliable and sensitive method for diagnosing acute pancreatitis than the routine amylase estimation in blood and urine.

AIMS AND OBJECTIVES

1. To study the changes in amylase creatinine clearance ratio (ACCR) in the post operative period.
2. To evaluate the value of ACCR in diagnosing post operative pancreatitis.

MATERIALS AND METHODS

The study included sixty patients undergoing various surgery in the department of General Surgery of Hitech medical college and hospitals, Bhubaneswar from August 2012 to November 2014. These patients have been divided into two groups. Group-A (30 cases) consist of patient undergoing biliary, gastric and pancreatic surgery, i.e. surgery in the region of the pancreas and carries a higher incidence of post operative pancreatitis. This group has been called the 'High

Risk'. Group-B (30 cases) this group of patients undergoing extra abdominal surgery (head, neck, lower limb surgery, herniorrhaphy etc was studied for any alteration of the amylase creatinine clearance ratio (ACCR) in the post operative period. This groups of patients is termed the 'Low Risk' and has acted as a control. Each patient from both the groups was assessed clinically preoperatively and post operatively for clinical symptoms and signs of acute pancreatitis, namely inappropriate pain radiating to the back, large amount of drainage of pancreatic juice from drain site, delay in return of normal gastrointestinal function⁶. Creatinine and amylase from blood and urine were estimated by the methods which are routinely used by the biochemistry department. Urinary creatinine, serum creatinine, serum amylase by a method using starch as a substrate, urinary amylase were estimated. The amylase to creatinine clearance ratio (ACCR) was determined by a formula as follows:

$$\text{Amylase Creatinine Clearance Ratio (\%)} = \frac{\frac{\text{Urine Amylase}}{\text{Serum Amylase}} \times \text{Urine Volume Per Unit Time}}{\frac{\text{Urine Creatinine}}{\text{Serum Creatinine}} \times \text{Urine Volume Per Unit Time}} \times 100$$

$$= \frac{\text{Urine Amylase}}{\text{Serum Amylase}} \times \frac{\text{Serum Creatinine}}{\text{Urine Creatinine}} \times 100$$

OBSERVATION AND RESULTS

In the present study the post-operative alterations in the ACCR (Amylase creatinine clearance ratio) were studied in sixty (60) patients. These patients were divided into two groups Group A, Group B. Group A (30 cases), 'high risk', consisted of the cases who had undergoing abdominal surgery that include biliary surgery or surgery in the region of the common bile duct carrying high risk of post-operative pancreatitis. This group included 15 females and 15 males, their average age being 42.5 years. Group B (30 cases), low risk, acted as control group⁸. This group consist of the cases patients who had undergoing extra abdominal surgery. In this group there were 12 males and 18 females,

their average being 40.3 years. The pre-operative and post-operative ACCR levels of the 'high Risk' (Group A) patients were compared statistical to the corresponding levels of the 'control' (Group B) patients using the student's t-test for independent subjects (Table1). There was no significant statistical difference in the pre-operative ACCR in the 'high risk' (Group A) patients as compared to the 'control' (Group B) patients⁷. However, on the 1st post-operative day, the ACCR was significantly elevated in the 'high Risk' (Group A) patients as compared to the 'control' (Group B). On the 2nd and 3rd post-operative days, there had been no significant difference in the ACCR when both the groups were compared.

Table 1. The mean of serum and urinary amylase (SU%), creatinine (mg%) and ACCR in group-A versus group-B patients.

S.No		Serum Amylase	Urine Amylase	Serum Creatinine	Urine Creatinine	ACCR
1.	Pre- Operative Control Gr-B	122.6	176.6	1.06	66.7	2.28
	High Risk	146.7	179.6	1.15	63.3	2.22

Gr-A						
2.	Post-Operative Day-1 Control Gr-B	139.93	205.16	1.16	53	3.22
	High Risk Gr-A	111.7	230.7	1.37	50.4	5.6
3.	Day-2 Control Gr-B	162.8	207.8	1.09	64.2	2.16
	High Risk Gr-A	153.8	188.1	1.89	56.6	4.08
4.	Day-3 Control Gr-B	161.2	208.7	1.04	65.5	2.05
	High Risk Gr-A	151	198.5	1.27	6.2	2.5

DISCUSSION

Post operative pancreatitis accounts for 6 to 13% of all case of acute pancreatitis. It is a well known complication of biliary tract surgery, particularly following supraduodenal exploration of the common bile duct and transduodenal sphincteroplasty⁴. Local trauma to the sphincter alone appears to play an important part in the occurrence of this condition⁵. There has been adequate experimental evidence to suggest that an important cause of pancreatitis in cases with an isolated duodenal loop is duodenal reflux, which can be prevented by tying the pancreatic duct⁶. Apart from high morbidity, the mortality with post-operative pancreatitis is 50%. The clinical diagnosis of postoperative pancreatitis may be difficult as the symptoms of postoperative pancreatitis are often masked by the pain and gastro-intestinal dysfunction of the surgery itself. The process is usually very well advanced before the clinician becomes alert to the danger. It is seen that those cases (45%) who developed pancreatitis within 24 hours of operation, had no clinical signs suggestive of pancreatitis in most of them, and the diagnosis was made on the elevated enzyme levels alone. The rest (55%) were diagnosed between the second and tenth postoperative day on the basis of the clinical signs. This was confirmed by a raised urinary diastase and a serum amylase consistently above 1000 units /100ml. Confirmation and even recognition of postoperative pancreatitis usually depends on a raised serum amylase level only. Although serial serum amylase estimations have been recommended to establish an earlier diagnosis, the actual rise, not infrequently, fails to reach the accepted level in most laboratories of 1000SU/100ml. The diagnostic value of serum and urinary amylase levels is diminished because these values may be normal in as much as 20% of patients having overt clinical pancreatitis. The

serum amylase may also rise in a variety of other conditions including intestinal obstruction, mesenteric thrombosis, after administration of morphine, penetrating duodenal ulcer; hepatitis and uncomplicated common duct obstruction due to stones. Again the serum amylase levels may be raised though patients are clinically normal. From the present study, it appears that post operative patients must be added to the growing list of normoamylasemic conditions such as burns, diabetic ketoacidosis, post cardiac surgery, duodenal perforations, bence jones proteinuria which may have an elevated ACCR and it seems likely that the diagnostic application of the ACCR should be largely limited to hyperamylasemic patients. It seems far more likely that the elevation of ACCR in the post operative period is an exaggeration of the 'non-specific' increase in ACCR observed in almost all post operative patients. Our data, therefore, support the conclusion that an elevated ACCR in the post operative patient cannot be used as an evidence of pancreatitis. We conclude that ACCR is not raised significantly post operatively following non abdominal surgery. However, it is often elevated on the first post operative day following biliary surgery without any clinical evidence of pancreatitis. .

CONCLUSION

In the present study, the changes in the levels of ACCR (amylase creatinine clearance ratio) in the post-operative period and its value in the diagnosis of post-operative pancreatitis were assessed. This study included sixty patients. These patients were divided into two groups. Group A (30 cases) 'high risk' – consist of the cases who had biliary surgery or surgery in the region of the common bile duct carrying high risk of post-operative pancreatitis. Group B (30 cases) 'low risk' acted as control group. This group included patients who had extra

abdominal surgery. In every patient from both the groups, ACCR was measured pre and post-operatively for three days or until the ACCR came to normal. In the 'high risk' (Group A) patients, the mean ACCR rise from a preoperative level of 2.22 to 5.6, 4.08 and 2.5 on the first, second, and third days post-operatively. The rise in ACCR on the first post-operative day was statistically significant. In eighteen of the thirty (60%) patients of group A, the ACCR was abnormally elevated from a mean pre-operative level of 2.32 to mean of 7.08, 2.94 and 2.57 post-operatively on the day first, second and third respectively. In the 'low Risk' (Group B) cases, the mean pre-operative ACCR of 2.28 became 3.2, 2.16 and 2.05 on the first, second and third post-operative days respectively. The alteration of ACCR was not statistically significant. In twelve out of thirty (40%) of (Group B) patients, the ACCR was abnormally elevated from a mean pre-operative level of 3 to mean of 6.08, 2.58 and 2.15 on the first, second and third post-operative days respectively. None of the patients from both the groups had clinical or laboratory evidence of pancreatitis⁶. We conclude, therefore, that the ACCR is often abnormally elevated nonspecifically following biliary surgery and cannot be used as an evidence of post-operative pancreatitis, although

the ACCR is significantly elevated on the first post-operative day in patients undergoing biliary surgery as compared to patients undergoing extra abdominal surgery.

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