Original Research Paper

Volume-10 | Issue-2 | February - 2020 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

General Medicine

SERUM AMYLASE LEVELS IN PATIENTS OF END STAGE RENAL DISEASE- A PROGNOSTIC FACTOR

Mehta Pranav	PG Resident, Department Of Medicine, Shri Ram Murti Smarak Institute Of Medical Sciences, Bareilly
Mowar A B*	Professor And HOD, Department Of Medicine, Shri Ram Murti Smarak Institute Of Medical Sciences, Bareilly *Corresponding Author
Grover Ankit	PG Resident, Department Of Medicine, Shri Ram Murti Smarak Institute Of Medical Sciences, Bareilly
Johri Sharat	Professor, Department Of Medicine, Shri Ram Murti Smarak Institute Of Medical Sciences, Bareilly

ABSTRACT **BACKGROUND-** Chronic Kidney Disease(CKD) encompasses a spectrum of path physiologic process associated with abnormal kidney function and a progressive decline in glomerular filtration rate(GFR). Amylase enzyme is rapidly excreted by kidney so there is elevated serum Amylase in patients of CKD.

AIM- To study correlation between serum amylase and Urea, Creatinine levels by measuring the level of serum Amylase in patients with CKD-ESRD and in healthy controls.

MATERIAL AND METHOD-50 Non dialysed chronic kidney disease patients and 50 patients with End stage Renal Disease on hemodialysis coming to Medicine and nephrology department at Shri Ram Murti Smarak Institute Of Medical Sciences and Hospital, during time period of May 2018-June2019 were included in this study.Quantitative analysis of Serum Amylase, Urea and Creatinine were done by photometric method.

RESULTS-Our study showed Serum Amylase levels were significantly higher in end stage renal disease and chronic kidney disease patients as compared to healthy controls(p value<0.05)

CONCLUSION-Use of Serum Amylase as a diagnostic tool in recognising Acute Pancreatitis in CKD patients can lead to false positive results.

KEYWORDS :

INTRODUCTION-

Chronic Kidney Disease(CKD) encompasses a spectrum of path physiologic process associated with abnormal kidney function and a progressive decline in glomerular filtration rate(GFR). National Kidney foundation Guidelines stratify CKD from Stage 1(GFR≥90ml/min/1.73m^2) to Stage 5 with kidney failure or GFr<15 ml/min/1.73 m^2.[1]

End Stage Renal Disease represent stage of CKD where the accumulation of toxins ,fluid and electrolytes normally excreted by the kidneys leads to death unless the toxins are removed by Renal replacement therapy, using dialysis or Kidney Transplantation.[2,3]

Amylase is produced by exocrine pancreas and salivary glands that helps in hydrolysis of starch. It is normally present in human plasma with molecular weights from 54,000 to 62,000 Dalton. Amylase enzyme is easily filtered through glomeruli of the kidneys and excreted in urine.[4] Elevated Amylase levels can be seen in acute pancreatitis but it is also elevated in non pancreatic conditions, Renal insufficiency is one such common cause for non-specific elevation. Serum Amylase levels is elevated in patients with CKD in absence of Pancreatitis[4-7], exact mechanism of increased levels is unclear. About 25% of serum amylase is excreted in urine[8], so their levels are increased in CKD in absence of Pancreatic disorders due to decreased clearance by kidneys.[9]

This study was done to study elevated Amylase levels in renal insufficiency and to see for any relationship between magnitude of renal insufficiency and elevation of amylase levels.

AIMS AND OBJECTIVES-

1. To measure Serum Amylase levels in healthy controls and CKD patients.
2. To find out correlation between Urea, Creatinine levels and Serum Amylase levels.

MATERIALS AND METHODS-

The study was carried out in Department of Medicine, Nephrology and Biochemistry Department at SRMS-IMS BAREILLY. All the investigations and studies were carried out after obtaining Informed consent and after approval by the Ethical Committee of the Institution.

INCLUSION CRITERIA-

Patients above 18 yrs of age of either sex diagnosed as having CKD were included. Blood samples were collected after overnight fasting and were analysed for serum Urea, Creatinine, Amylase and blood Glucose.

EXCLUSION CRITERIA-

1. Diabetes Mellitus
2. Pancreatic disorders
3. Perotinitis
4. Smoking or Alcohol consumption
5. Hepatobiliary Disorders

Subjects were divided into 3 Groups, where Group 1 included 50 normal healthy individuals, Group 2 and Group 3 included sex and age matched 50 non dialysed CKD patients and 50 patients with ESRD(on Maintenance Haemodialysis). Blood urea was estimated using Urease-GLDH(glutamate Dehydrogenase) method, Normal range at our lab=15-40mg/dl. Serum creatinine were estimated using Modified Jaffes Method, Normal range in our Lab=0.7-1.4 mg/dl. Plasma Glucose was based on Trinder's GOD/POD method, Normal range=70-110mg/dl(Fasting). Serum Amylase was measured using MERCK microlab 300 Semiautoanalyser by CNPG(2-chloro-4-nitrophenol-1-4 galactopyranosylmaltotrioside)method, Normal value = upto 60U/L at 37C.

One way analysis of variance(ANOVA) test were used to analyse differences in characterstics between the studied groups.

RESULTS-

Out of total number of subjects 60% were males and 40% were females.

AGE DISTRIBUTION IN STUDIED GROUPS

CATEGORY	AGE DISTRIBUTION (IN YEARS)	FREQUENCY
GROUP 1	21-30	5
	31-40	12
	41-50	18
	51-60	12
	61 and above	3

GROUP 2	21-30	3
	31-40	5
	41-50	24
	51-60	14
	61 and above	4
GROUP 3	21-30	0
	31-40	4
	41-50	18
	51-60	19
	61 and above	09

SERUM AMYLASE, BLOOD UREA AND CREATININE LEVE LS IN STUDIED GROUPS

Parameters	GROUP 1	GROUP 2	GROUP 3	p value
Serum Amylase(U/L)	34.1±11.5	90.2±24.3	82.2±19.4	<0.05
Urea(mg/dl)	30.48±9.4	46.28±11 .4	41.3±10.4	<0.0001
Creatinine(mg/dl)	0.71±0.12	3.47±1.22	12.7±3.9	<0.0001

DISCUSSION

Our study demonstrated that serum amylase levels were elevated in patients of CKD and ESRD. Elevations were due to impaired Renal clearance. Non dialysed CKD patients had higher Amylase levels- than ESRD patients. This could be due to clearance of Amylase during Dialysis and associated malnutrition in ESRD. Similar to our study Berk et al [10]indicated that elevated amylase was found in 50% of their Uremic patients. Royse et al[11] reported hyperamylasemia in 81% o their patients. Zachee et al[12] showed elevated amylase in 48% cases. However Gross et al[13] showed in 63 azotemic patients no significant increase in amylase.

Bailey et al[8] reported that 32% of their 175 uremic patients had hyperamylasemia. Lin et al[14] also reported significant elevations of amylase levels. Ventrucci et al[15]observed hyperamylasemia in 58% of patients. Jian et al [16] in their study on patients with end stage renal disease found high serum amylase in 60.7%. Zachee et al[12] and Lin et al [14] suggested that an amylase value of more than 10 times the upper limit may indicate pancreatic injury in patients of Renal insufficiency. Similar to our study Lin et al [14] and Gross et al [13] found correlation between increase in urea , creatinine and increase in amylase levels. Johnson et al [17] provides strong evidence in favour of tubular absorption of amylase in man and that loss of this preferential clearance of amylase is evident in Renal insufficiency.

CONCLUSION-

Elevation of serum Amylase was found in both CKD and ESRD patients when compared with control. Elevated Amylase levels can be used as a prognostic factor for ESRD patients as it was seen in our study that amylase was lower in patients of ESRD on hemodialysis due to preferential clearance of amylase during hemodialysis. Patients with uremia commonly have nausea, vomiting and abdominal discomfort, also seen in Pancreatitis. Due to elevated levels of Serum Amylase in Uremia , it gives false results if used as diagnostic tool for Acute Pancreatitis.

REFERENCES

1. Levey AS, Coresh J, Balk E, Kausz AT, Levin A, Steffes MW et al. National Kidney Foundation Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification. Ann Intern Med 2003; 139 (2): 137-47.
2. Longo DL, Kasper DL, Jameson JL, Fauci AS, Hauser SL, Loscalzo J, et al, editors. Chapter: Chronic Kidney Disease. Harrison s principles of internal medicine. 20th ed. New York: McGraw-Hill; 2012. p. 2308-2321.
3. Current chronic kidney disease (ckd) nomenclature used by kdigo. Kdigo. 2012 Aug; 2(4).
4. Burtis CA, Ashwood ER, Burns DE,editors. Teitz textbook of Clinical Chemistry and Molecular Diagnostics. 5th ed. Philadelphia: Elsevier; 2012.p. 583 585
5. Vaziri ND, Chang D, Malekpour A, Radaht S. Pancreatic enzymes in patients with end stage renal disease maintained on hemodialysis. Am J Gastroentrerol.1988; 83:410.
6. Lin XZ, Chen TW, Wang SS. Pancreatic enzymes in uremic patients with or without dialysis. Clin Biochem .1988; 21:189.
7. Montalto G, Carroccio A, SparacinoV. Pancreatic enzymes in chronic failure and transplant patients.Eur J Clin Chem Clin Biochem .1997;35:237.
8. Bailey GL, Katz AI, Hampers CL, Merill JP. Alterations in serum enzymes in chronic renal failure. JAMA, 1970; 213: 2263-65.
9. Bastani B, MifflinTE, Lovell MA, Westervelt FB.Serum amylases in chronic and end stage renal failure: effects of mode of therapy, race, diabetes and peritonitis. Am J Nephro.1987; 7:292-299.
10. Berk JE, Fridhandler L, Ness RL. Amylase and Isoamylase activities in renal insufficiency. Ann Intern Med, 1979; 90: 351-3.
11. Royse VL, Jensen DM, Corwin HL. Pancreatic enzymes in Renal Failure. Arch Intern Med, 1987; 147: 537-539.
12. Zachee P, Lins RL, De Broe ME. Serum amylase and lipase values in acute renal failure. Clin Chem, 1985; 31: 1237.
13. Gross JB, Parkin JW, Maher RT, Power MH. Serum amylase and lipase values in renal and extra renal azotemia. Gastroenterology, 1960; 39: 76-82.
14. Lin, Chen, Wang et al. Pancreatic enzymes in Uremic patients with or without dialysis. Clin Biochem, 1988; 21: 189-192.
15. Ventrucci M, Campieri C, Di Stefano M et al. Alterations of exocrine pancreas in End stage renal disease. Do they reflect a clinically relevant uremic pancreopathy Dig Dis Sci, 1999; 40(12): 2576-81.
16. Jian CF, Ng KW, Tan SW et al. Serum level of Amylase and Lipase in various stages of Chronic Renal Insufficiency. Chinese Medical Journal (Taipei), 65, 2002, 49-54.
17. McGeachin RL, Hargan LA. Renal clearance of amylase in man .Journal of applied physiology.1956; 9:129-131