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SERUM AMYLASE AND SERUM LIPASE LEVELS AMONG CHRONIC RENAL FAILURE PATIENTS ON HAEMODIALYSIS AT TERTIARY CARE CENTRE

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ABSTRACT **Background-** Patients with chronic renal disease often display abnormal concentrations of gastrointestinal hormones resulting in antagonistic effects on the pancreas. Conventional haemodialysis does not help in reducing the levels of these gastrointestinal hormones. Therefore, hormones continue to rise, causing hyper secretion of pancreatic enzymes. Hence, this study was undertaken to estimate serum amylase and serum Lipase levels among chronic renal failure patients on haemodialysis. **Methodology-** After ethics committee approval, Serum Amylase and serum Lipase levels of 90 diagnosed patients of chronic renal failure on haemodialysis were estimated before and after haemodialysis. Depending on the duration of haemodialysis, these patients were divided into three groups as Group1 (0-6months), Group 2 (6months-1year), Group 3(1-4years). **Results-** Serum Amylase and serum Lipase were compared group wise and statistical analysis was done using unpaired t test.There was statistically significant difference in serum Amylase and serum lipase levels in pre and post haemodialysis patients of group 1 only. (P=0.0133, P=0.0001 respectively) Further analysis showed that the difference in pre and post dialysis Serum Amylase level was statistically significant between Group 1 and Group 2 (pre dialysis P=0.0043, post dialysis P=0.0002) Group 1 and Group 3 (pre dialysis P=0.0001, post dialysis P=0.0003). While there was statistically no significant co relations of Serum Lipase level in any groups. **Conclusion-** The monitoring of serum amylase and serum lipase levels along with the clinical presentation may help to rule out acute pancreatitis at early stage in chronic renal failure on haemodialysis to prevent further complications.

KEYWORDS : Chronic renal failure, haemodialysis, serum amylase, serum lipase

INTRODUCTION

The annual incidence of acute pancreatitis (AP) ranges from 4.9 to 73.4 cases per 100,000 worldwide. Patients with end-stage renal disease on dialysis have an increased risk for developing acute pancreatitis (AP) compared with patients without renal disease. In addition to the general population risk factors, there are factors related to renal insufficiency and dialysis process that might predispose to AP in this population. Clinical features and diagnosis are the same as those in patients without renal failure; however, amylase and lipase levels should be interpreted cautiously as they might be falsely elevated in renal failure. [1]

Chronic kidney disease is a progressive loss in renal function over period of many months or years. There is decline in nephron function and number generally quantitated as reduction in glomerular filtration rate. As the GFR declines there is accumulation of metabolic end products excreted by Kidney. Amylase is one of enzyme that is rapidly excreted by kidney, thus patients in chronic kidney disease have elevated serum pancreatic enzymes

Amylase is one of the enzyme that is produced by exocrine pancreas and salivary gland that hydrolyses starch is rapidly cleared by kidney .Twenty percent of pancreatic enzymes is excreted by the kidney thus patients with end stage renal disease have elevated levels of serum pancreatic enzymes. The serum amylase and lipase are elevated in patients with end stage renal disease in absence of pancreatitis. [2,3]

Certain risk factors seem to predispose chronic dialysis patients to AP. The kidneys serve as a major site for degradation and excretion of gastrointestinal hormones. As such, patients with chronic renal disease often display abnormal concentrations of gastrointestinal hormones including gastrin, cholecystokinin, serum gastric inhibitory polypeptide, and glucagon, resulting in antagonistic effects on the pancreas. Conventional hemodialysis does not help in reducing the levels of these gastrointestinal hormones. Therefore, hormone concentrations continue to rise, causing hyper secretion of pancreatic enzymes.

Hence this study was undertaken to estimate and to compare serum amylase and serum Lipase levels among chronic renal failure patients before and after haemodialysis considering the duration also.

Aims And Objectives

i) To estimate serum amylase level (pre dialysis and post dialysis) in patients with chronic renal failure on haemodialysis.
ii) To estimate serum lipase level (pre dialysis and post dialysis) in patients with chronic renal failure on haemodialysis.
iii) To compare serum amylase and serum lipase levels done in pre haemodialysis and post haemodialysis samples.
iv) To determine co relation of serum amylase and serum lipase levels with the duration of hemodialysis (The period from the patient's first dialysis till date.)

MATERIAL AND METHODS-

Study Type- Cross sectional study

Study Design- Diagnosed patients of chronic renal failure on haemodialysis were included in the study. Biochemical parameters - serum Amylase and serum Lipase were estimated for these patients in central clinical laboratory using fully automated Biochemistry analyzer.

Study Setting- Diagnosed patients of chronic renal failure coming for hemodialysis at tertiary care center were included in the study.

Target Population- Diagnosed patients of chronic renal failure coming for hemodialysis between the age group of 18-70yrs.

Sample Size- About 90 diagnosed patients of chronic renal failure on hemodialysis were included in the study and were divided into 3groups.(30 patients in each groups) as per methodology.

Duration Of The Study- One year

Data Collection- All data relevant to study objectives including patient information, consent, and duration of dialysis from first one, biochemical parameter test results were collected.

Data Analysis- Data collected was analyzed using appropriate statistical test.

Ethical considerations-The patient data was used for research purpose only and confidentiality was maintained throughout the study. None of the information was used for public consumption at any stage of the study.

Inclusion Criteria- Diagnosed patients of chronic renal failure on hemodialysis irrespective of any co-morbidity.

Exclusion Criteria-

I) Diagnosed patients of chronic renal failure on peritoneal dialysis.

ii) Patients with history of Acute Pancreatitis.

Methodology

After ethics committee approval, written informed consent from the patients of chronic renal failure was obtained. Blood sample for serum amylase and serum lipase was collected before and after hemodialysis procedure. Patients were grouped depending upon the duration of hemodialysis (period from first dialysis till date) as

Group 1- patients on hemodialysis since 0-6 months

Group 2- patients on hemodialysis since 6months-1 year

Group 3- patients on hemodialysis since 1year-4 years

Serum amylase and serum lipase levels in pre and post dialysis samples were compared in groups by statistical analysis using unpaired t test.

RESULTS

Table-1- Distribution Of The Samples (based On Duration And Gender)

Duration	Group	Male	Female	Total
0-6mth	1	30	0	30
6mth-1yr	2	28	2	30
1yr-4yr	3	29	1	30

Table-2- Comparison of the Serum amylase levels (Pre and Post dialysis)

		Amylase Pre	Amylase post	p value	
1	0-6mth	66.56± 1.79	69.72± 6.54	0.0133	significant
2	6mth-1yr	88.30± 40.01	101.35± 43.83	0.2333	not significant
3	1yr-4yr	92.58± 35.03	93.15± 32.83	0.9484	not significant

Table-3 Comparison of the Serum Lipase levels (Pre and Post dialysis)

		Lipase Pre	Lipase post	p value	
1	0-6mth	101.29±2.44	96.79±3.51	0.0001	significant
2	6mth-1yr	110.55±59.75	103.21±57.42	0.6294	not significant
3	1yr-4yr	91.50±30.53	87.53±26.31	0.5869	not significant

Table-4 Comparison of the Serum amylase levels (Pre and Post dialysis) within the groups

	Amylase Pre dialysis		**Amylase Post- dialysis**	
	P value		P value	
Group 1 and 2	0.0043	significant	0.0002	highly significant
Group 1 and 3	0.0001	highly significant	0.0003	highly significant
Group 2 and 3	0.6610	not significant	0.4155	not significant

Table-5 Comparison of the Serum Lipase levels (Pre and Post dialysis) within the groups

	Lipase Pre dialysis		**Lipase Post- dialysis**	
	P value		P value	
Group 1 and 2	0.3998	not significant	0.5434	not significant
Group 1 and 3	0.0853	not significant	0.061	not significant
Group 2 and 3	0.1254	not significant	0.1792	not significant

DISCUSSION-

Amylase is one of the enzymes that is produced by exocrine pancreas and salivary gland that hydrolyses starch is rapidly cleared by kidney. Twenty percent of pancreatic enzymes is excreted by the kidney thus patients with end stage renal disease have elevated levels of serum pancreatic enzymes. The serum amylase and lipase are elevated in patients with end stage renal disease in absence of pancreatitis. The highest levels of amylase and lipase are noted in advanced renal failure patients but marked elevations can also be seen in patients undergoing peritoneal dialysis. [2]

The present study has demonstrated that serum amylase and serum lipase levels showed significant difference in Group 1 before and after hemodialysis while there was no significant difference in these levels in Group 2 and 3. Further analysis in our study demonstrated that the difference in pre and post dialysis Serum Amylase level was statistically significant between Group 1 and Group 2 (pre dialysis P=0.0043, post dialysis P=0.0002) Group 1 and Group 3 (pre dialysis P=0.0001, post dialysis P=0.0003).While there was statistically no significant co relations of serum Lipase levels in any groups. We also found that the difference in serum amylase and serum lipase levels was significant in the initial duration of six months only. As the duration increases there was no significant difference in the levels. We think, this may be due to the inflammation due to the introduction to the hemodialysis procedure. As the duration and the regular dialysis proceeds, this inflammation may suppress.

N D Vaziri et al [4] observed that hyperamylasemia is not associated with increased P3 isoamylase level unless pancreatitis is present and serum lipase rises with hemodialysis, presumably because of the lipolytic effect of heparin used during this procedure. Chaw-Fung Jiang et al [5] showed that Serum pancreatic enzymes are often elevated within threefold normal in end stage renal disease (ESRD) patients on dialysis. Both the studies support our findings.

A Stanescu et al [6] and G Manes et al [7] showed that Hemodialysis did not affect any of the investigated pancreatic serum-enzymes. Elastase 1 determination in serum appears superior to the other pancreatic serum-enzymes because of higher specificity not limited by renal insufficiency and thereby may be of value in the diagnosis of the exocrine pancreatic disease in patients with CRF on hemodialysis.

Limitations-

As this study included a small group of patients, many such studies with large number of samples are required to support our findings. We included only two parameters (serum amylase and serum lipase) in our study. Further studies with more specific parameters can also be done.

CONCLUSION-

The monitoring of serum amylase and serum lipase levels along with the clinical presentation may help to rule out acute pancreatitis at early stage in chronic renal failure on haemodialysis to prevent further complications. Other significant markers may contribute to the early diagnosis and intervention.

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