RESEARCH PAPER | Medical Science | Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

Case Report of Acute on Chronic Pancreatitis with Hyperparathyroidism with Chronic Kidney Disease

KEYWORDS: hypercalcemia, hyperparathyroidism , pancreatitis

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ABSTRACT *We report the case of a young female patient with acute on chronic pancreatitis with hypercalcemia as first manifestation of secondary hyperparathyroidism caused by chronic renal failure due to medullary sponge dysplastic kidneys. The patient was managed conservatively. Although the association of hypercalcemia and acute pancreatitis is known in medical entity , it is very uncommon. The pathophysiology of hypercalcemia induced acute pancreatitis is therefore not well known. Although some mechanisms have been proposed, it is important to treat the provoking factor. Acute pancreatitis results in a tendency to hypocalcemia and secondary hyperparathyroidism(24,25).*

Introduction :-

In the western world , alcohol and biliary stones are the main causes of acute pancreatitis. (2, 3). As shown by the Ranson(4) grading of acute non alcoholic pancreatitis, severe pancreatitis is usually associated with decrease in serum calcium levels. However relationship between increased serum calcium levels and acute pancreatitis may be the diagnostic clue to hyperparathyroidism.

Case Report :-

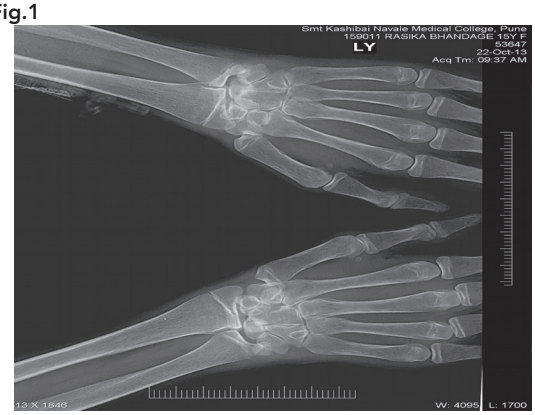
A 15 year old, young female presented at the emergency room with a sudden attack of severe epigastric pain , fever and vomiting. She also complained of difficulty in walking due to severe bony pains. Her past medical history revealed two to three similar episodes in last few years. Also she was diagnosed as chronic kidney disease at an outside hospital. She was not going to school due to illness.

Clinical examination revealed a severely ill patient , toxic and febrile. She was emaciated and dehydrated. Vitals showed tachycardia , tachypnea and hypotension. Abdominal examination showed that the abdomen was distended with painful percussion and palpation. Other system examinations were normal.

Routine blood tests showed signs of inflammation and septicaemia with an elevated c- reactive protein and leucocytosis (24,500/ cumm) with elevated neutrophils (86%). Renal function was impaired as shown by an increase in serum creatinine (2.6 mg/dl) , Blood urea level (90 mg/dl). Both liver trasaminase and bilirubin were normal except alkaline phospatase which was 148 IU/L (42-128 IU/L).Pancreatic enzymes were elevated in the form of serum lipase being 6,578 U/L (73-393 U/L) and serum amylase 662 IU/L (22-80 IU/L).Serum calcium showed mild elevation of 10.8 mg/dl (8.4 -10.4 mg/dl), serum phosphorus was 6.0mg/dl (2.5-5.5 mg/dl),vitamin D level showed hypovitaminosis ,value being (25.90 ng/ml). 2 D Echo was normal. Serum TSH was normal. Stool showed steatorrhoea. Her blood sugar was normal.

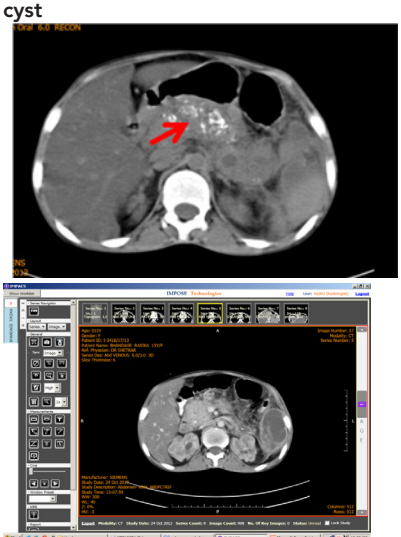
X- ray pelvis , dorsolumbar spine , chest were within normal limits. X-ray both hands (fig.1) showed small periosteal reaction seen in radial aspect of third metacarpals on both sides suggesting hyperparathyroidism.

Fig.1



Her CT abdomen showed acute on chronic pancreatitis with multiple intrapancreatic and peripancreatic pseudocysts, dilated pancreatic duct with multiple ductal calculi (fig.2). Both kidneys showed lobulated irregular margins with few tiny cortical cysts and loss of corticomedullary differentiation favouring medullary sponge or dysplastic kidneys (fig.3).

Fig.2 showing pancreatic calcification Fig.3 showing renal cyst



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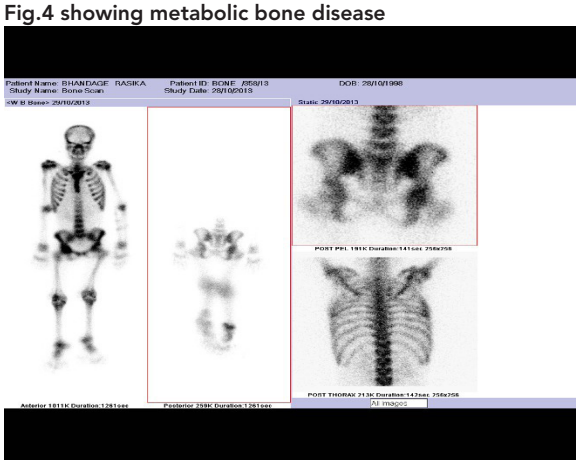
Her Bone scan showed, target to back ground ratio increased with increased tracer uptake in bilateral costochondral junction and calvarium, suggestive of metabolic bone disease(fig.4). Also there was increased uptake in the head of right femur suggesting a site of old or impending fracture.

Fig.4 showing metabolic bone disease



Her serum parathyroid hormone assay was suggestive of hyperparathyroidism with levels of 106.20 (12-72 pg/ml). Due to non affordability of patient parathyroid scan couldnot be done. This result confirmed hypercalcemia caused by hyperparathyroidism. Ultrasound of the parathyroid glands showed no abnormalities. After exclusion of other causes of pancreatitis as well as auto-immune pancreatitis, elevated serum calcium levels remained another potential etiology of acute pancreatitis.

DISCUSSION

Acute pancreatitis caused by PHPT-induced hypercalcemia is a rare condition. The prevalence of acute pancreatitis in patients with PHPT is estimated between 1.5% and 7% (6). Hyperparathyroidism is a rare cause of pancreatitis. The nature of the relationship between the two entities is not well defined, i.e. is it casual or causal? (9). The rate of pancreatitis among patients with PHPT was higher than that reported in general among hospitalized patients without PHPT. A higher serum calcium level may contribute to pancreatitis in these cases, along with additional genetic or environmental insults. Hypercalcemia may predispose the pancreatic acinar cell to abnormal, sustained calcium levels, leading to premature pancreatic protease activation, and pancreatitis. (10). Pancreatitis may complicate the clinical course of hyperparathyroidism, particularly when hypercalcaemia is moderate to severe (11).

Acute pancreatitis caused by PHPT was first described by Cope et al [5] in 1957. Since that date, the exact relationship between these two entities has been questioned, but nowadays PHPT has been acknowledged as an accepted etiology of pancreatitis(1,7,8). Incidence of acute pancreatitis in patients with PHPT has varied from 1% (12) to 12% (7) in retrospective series, with intermediate values(13,14). Jacob et al (15) have shown a 28-fold increased risk of pancreatitis in hyperparathyroid patients compared to the general population. After eliminating all other causes, mean plasma calcium level seems to be the only predictive factor for pancreatitis development (7,15,16) although hyperparathyroidism is found in < 1% of patients who present with acute pancreatitis (17). The pathophysiological mechanism that leads to pancreatitis seems more related to hypercalcemia than to PHPT. It has been shown that hypercalcemia from any cause can lead to pancreatitis(18-20). As confirmed by experimental studies, calcium ions cause calculus deposition within the pancreatic ductules, with consequent obstruction and inflammation(21). Moreover, calcium can trigger the pancreatitis cascade by promoting conversion of trypsinogen to trypsin (22-23).

Interrelation between acute pancreatitis and parathyroid function can be summarized as follows: (1) acute pancreatitis results in a tendency to hypocalcemia and secondary hyperparathyroidism(24,25). Compensation need is correlated to pancreatitis severity as shown by PTH level(26); (2) severe and/or complicated pancreatitis can lead to overt hypocalcemia through relative deficiency in PTH secretion(25), because exogenous administration of PTH normalizes calcium level(27); (3) in severe pancreatitis, resistance to PTH action in bones and kidneys may occur because of fluid sequestration and reduction in efficient arterial blood volume(24).

Bhadada et al(28) have studied PHPT-induced chronic pancreatitis and compared it to pancreatitis of other causes. PTH and calcium levels are significantly more elevated in PHPT, while in others, elevated PTH level is secondary to maintain normocalcemia. With regard to complications, it seems that chronic pancreatitis secondary to PHPT does not differ from chronic pancreatitis of other causes. This entity needs to be studied by larger studies for further understanding.

Pancreatitis risk is approximately 10-fold elevated in PHPT, but pancreatitis occurs infrequently. This indicates an existing but minor impact of PHPT-related hypercalcemia, a combination of both hypercalcemia and genetic variants in SPINK1 or CFTR increases the risk to develop pancreatitis in patients with PHPT.(29)

Patients admitted with PHPT have a 28-fold increased risk of developing pancreatitis compared with patients admitted without parathyroid disease (30). Though above all references suggest hypercalcemia of any etiology can cause pancreatitis . Ours is rare case with secondary hyperparathyroidism presenting as pancreatitis and hypercalcemia.

In conclusion, serum calcium level must be considered among the usual tests in patients with rare and/or non-specific abdominal symptoms. . Also correlation of secondary hyperparathyroidism and pancreatitis needs further studies.

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

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