



Study of Association of Serum Vitamin-D Level with Severity of Acute Pancreatitis

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Abstract

Introduction

Serum vitamin-D is classified as following-Normal level (>20ng/dl), insufficient (>10- <20ng/dl), deficient (<10ng/dl). Serum vitamin D level negatively correlated with severity of acute pancreatitis and its deficiency associated with increased severity of acute pancreatitis. Hence this is study being conducted to know the prevalence of serum vitamin-D level among patient with acute pancreatitis and its association with its severity. My scoring system is based on revised ATLANTA SCORE- 2012.

Aim of This Study

The Serum Vitamin-D level in patients of acute pancreatitis, severity of acute pancreatitis & its association with serum vitamin D levels. Prevalence of serum vitamin-D level among patients with acute pancreatitis

Material and Methodology

It is a Hospital based, cross sectional, observational study. A study named ‘VITAMIN –D deficiency predicts severe pancreatitis. Patients age 18 or above 18 presenting with acute pancreatitis at outpatient or inpatient services of department of medicine, Dr. B.R.A.M Hospital Raipur. Hospitalized patients of acute pancreatitis.

Result and Discussion

In our study, out of 130 patients of AP, majority of the patient belong to Mild category i.e. 73 (56.2%) followed by 41 (31.5%) patients were Moderate category and only 16 (12.3%) patients belong to Severe category as per "ATLANTA" severity score.

In our study out of 130 patients of AP, 93(71.50%) patients were Vitamin-D Deficient (<20 ng/dl) and 37(28.49%) patients were having normal vitamin-D level.

Among Vitamin-D deficient group, 47(50.5%) patients were of mild category, 31(32.6%) patients were of moderate category and 15(16.8%) patients were of severe category of pancreatitis.

Conclusion

This study show that Vitamin D deficiency was the independent factor for predicting severity acute pancreatitis. So, we conclude that vitamin D level can be used as marker for accessing the severity of patients at the time of admission in hospital.

Keywords

Serum Vitamin - D, ATLANTA and Acute Pancreatitis

Introduction

Acute pancreatitis is inflammatory process that causes local and systemic inflammatory response. It is associated with high morbidity and mortality. The early recognition of acute pancreatitis may be helpful to optimize intensive therapy and improve outcomes.

Serum vitamin-D is classified as following- Normal level (>20ng/dl), insufficient (>10-<20ng/dl), deficient (<10mg/dl). Serum vitamin D level negatively correlated with severity of acute pancreatitis and its deficiency associated with increased severity of acute pancreatitis. Hence this is study being conducted to know the prevalence of serum vitamin-D level among patient with acute pancreatitis and its association with its severity. My scoring system is based on revised ATLANTA SCORE- 2012.

Vitamin D is a steroid hormone that plays an essential role in the maintenance of calcium, phosphate, and bone metabolism. Emerging evidence demonstrates that vitamin D has a plethora of antitumor properties as well, including the induction of cell differentiation, the stimulation of apoptosis, and the inhibition of cell proliferation, angiogenesis, and metastasis ¹. Ample

epidemiologic studies have suggested that individuals with sufficient vitamin D levels are at lower risk for multiple types of cancers, including colorectal, breast, prostate, lung, and ovarian cancers. For example, the risk of developing colorectal cancer was 50% lower among individuals with serum 25-hydroxyvitamin D (25[OH]D) levels of 33 ng/mL or more as compared with those with 25(OH)D levels of 12 ng/mL or less. The risk of pancreatic cancer in association with vitamin D levels has been controversial; one study suggested an increased risk of cancer with 25(OH)D levels of more than 100 nmol/L², whereas another reported that the plasma level of 25(OH)D was inversely associated with the odds of developing pancreatic cancer.

Vitamin D levels have also been shown to have an impact on the clinical outcomes of several cancer types, including breast, colon, lung, and prostate cancers as well as leukemia and lymphoma⁸. For example, higher 25(OH)D levels at the time of diagnosis in patients with colorectal cancer were associated with a significant reduction in overall mortality ($p=0.02$) and an improvement in overall survival ³. Patients with prostate cancer whose serum 25(OH)D levels were medium (50–80 nmol/L) or high (>80 nmol/L) had significantly better prognoses as compared with those with low (<50 nmol/L) serum concentrations ⁴. Although studies have suggested that higher vitamin-D levels are significantly associated with improved survival among patients of acute pancreatitis.

This is the first study to extensively investigate the potential impact of vitamin D on the clinical outcomes of AP. In conclusion, we demonstrated that lower blood vitamin D is a risk factor for ICU admission and severity of disease in patients with AP.

This finding suggests that vitamin D status in individuals might be helpful to predict the prognosis of AP. Further prospective cohort or randomized trials are warranted to confirm our findings and to gain in-depth insight into the role of vitamin D in AP prognosis.⁵

Aim of This Study

To Study the Association of Serum Vitamin - D Level with Severity of Acute Pancreatitis

Objectives of This Study

1. To determine the Serum Vitamin-D level in patients of acute pancreatitis.
2. To assess the severity of acute pancreatitis & its association with serum vitamin D levels.
3. To study the prevalence of serum vitamin-D level among patients with acute pancreatitis.

Material and Methodology

Study design

It is a Hospital based, cross sectional, observational study.

- Hospital based.
- Cross sectional.
- Observational.

Study reference of sample size

- A study named 'VITAMIN -D deficiency predicts severe pancreatitis'

Sample size formula

Sample size correlation for using correlation- $n =$ sample size

$Z @ =$ confidence interval at 95% (standard value of 1.96) $Z_b =$ is 80% power of the test (0.842)

$C = B$ is correlation (0.252)

By putting values in formula they get, $n = 120.95$

$n = 130$

So they will take sample size 130.

Study population

- Patients age 18 or above 18 presenting with acute pancreatitis at outpatient or inpatient services of department of medicine, Dr. B.R.A.M Hospital Raipur.
- Case: - Hospitalized patients of acute pancreatitis.

Diagnosis of pancreatitis will be established based on

- Clinical- Typical abdominal pain.
- Biochemical- Serum amylase / Lipase > 3 times of upper normal limit.
- Radiological- USG abdomen and CECT Abdomen.

Inclusion Criteria

All patients Clinically, Biochemically or Radiologically diagnosed as acute pancreatitis.

Exclusion Criteria

1. Known cases of serum vitamin D deficiency (Rickets/ Osteomalacia/Osteoporosis)
2. Chronic pancreatitis
3. Chronic kidney disease
4. Skin diseases
5. Liver Cirrhosis
6. Malignancy.
7. Patients on vitamin D supplementation

Result and Discussion

This study was Hospital based, cross sectional, observational study conducted on Patients age 18 or above presenting with acute pancreatitis at outpatient or inpatient services of Department of Medicine, Dr. B.R.A.M Hospital Raipur. All patients based on Clinically, Biochemically & Radiologically parameters were diagnosed as acute pancreatitis as per Atlanta severity score.

Acute pancreatitis is inflammatory process that causes local and systemic inflammatory response. It is associated with high morbidity and mortality. The early recognition of acute pancreatitis may be helpful to

optimize intensive therapy and improve outcomes. For early diagnosis and in low-cost setup clinical scoring system plays the vital role. In this study we use Atlanta severity scoring systems for severity of diagnosis.

In our study out of 130 patients, majority were from 31-40 years age group i.e., 45(34.6%) followed by 33(34.4%) from 21-30 and 41-50 yrs., 8(6.2%) from 51-60 and 18-20 years, and least i.e., 3(2.3%) from above 60 years of age. This showed that the mean Age (mean \pm s.d.) of patients was 36.5077 \pm 10.5274.

Among them, majority of patients of AP were Male i.e., 108(83.1%) and 22(16.9%) were Female.

Nesvadaerani et al. (2015) ⁶ In In this study included 50 patients who were diagnosed to have acute pancreatitis aiming to assess different etiologies, clinical characteristics, and outcomes of acute pancreatitis. The mean age of those patients was 50.96 \pm 9.71 years with a range between 24 and 73 years. 30 (60%) patients were males and 20 (40%) patients were females. In agreement with our study observed that the mean age of their patients was 50 years.

Vengadakrishnan and Koushik et al. (2015)⁷ in their study observed that most patients were in the age group of 21 to 40 years; also, a total of 38 (40%) patients was in the 4th decade of their life with a mean age of 36. Lindkvist et al. showed a higher incidence of acute pancreatitis in males.⁸

In our study, most common cause of AP is alcohol i.e. 100 (76.9%) patients. Followed by 15(11.5%) patients having idiopathic etiology, 13(10%) patients having Hypertriglyceridemia, 2(1.5%) patients had Calculi.

"The most frequent causes of acute pancreatitis are obstruction of the common bile duct by stones (38%) and alcohol abuse (36%) in developed countries. Baig et al. observed alcoholism was the most frequent

cause followed by biliary stones.⁹ while Wang et al. confirmed that biliary stones (38%) and alcohol abuse (36%) were the most frequent causes of acute pancreatitis.¹⁰

Smoking emerged as an independent factor associated with AP. Several experimental animal studies have suggested that exposure to smoking can induce pathologic and functional changes in the pancreas that can cause inflammatory activity. Hamada, Shin, et al (2014) concluded that Alcoholic AP was the most common cause in male and gallstone AP was the most common cause in female patients.¹¹ Among 246 patients M: F = 153:93, most common aetiology among men was alcoholism and among women was gallstone disease. Yang, Zhiyong, et al. conducted a study in which, 3260 patients were admitted having Cholelithiasis (58.7%), hyperlipidemia (14.3%), and alcohol (4.5%) was the top 3 aetiologies, Besides in 16.7% of patients, the etiology still unexplained.¹²

In our study, out of 130 patients of AP, majority of the patient belong to Mild category i.e. 73 (56.2%) followed by 41 (31.5%) patients were Moderate category and only 16 (12.3%) patients belong to Severe category as per "ATLANTA" severity score. So in our study, the Association of "ATLANTA" severity score with Vitamin- D level was statistically significant (p<0.05) (Chi- score value: 6.046; p- value- 0.048654)

Out of 130 patients of AP, only 11 (8.5%) patients died and rest 119 (91.5%) patients were improved and Discharged. So, mortality amongst studies was 8.5 %. In our study Association of "Atlanta severity score with Out Come was statistically significant (p<0.0001).

Among 11 patients who were died, 7(63.6%) patients were from rural area and 4(36.4%) patients

were from urban area. In discharged 119 patients, 63(52.9%) patients were from rural area and 56(47.1%) patients were from urban area. This shows that the Association of Residential area with Out Come was not statistically significant ($p=0.4960$).

Mortality rate of severe AP can reach 30% which underlies the desperate need of finding proper treatment. Fourteen studies comprising 1478 patients with acute pancreatitis were meta-analyzed. A total of 600 patients developed OF and 179 of them died (mortality, 30%); 314 patients developed IPN and 102 of them died (mortality, 32%). As per 119 cases, 42 (35.2%) developed organ failure and were classified as severe acute pancreatitis (SAP), 47 (39.5%) developed PNec, and 12 (10.1%) died. The area under the curve (AUC) results for BISAP score in predicting SAP, PNec, and mortality were 0.962, 0.934 and 0.846, respectively. Ranson's score showed a slightly lower accuracy for predicting SAP (AUC 0.956) and mortality (AUC 0.841). CTSI was the most accurate in predicting PNec, with an AUC of 0.958. The sensitivity and specificity of BISAP score, with a cut-off of ≥ 3 in predicting mortality, were 100% and 69.2%, respectively.

In study conducted by Yang, Zhiyong, et al. 3260 patients were admitted. 1238 patients (38.0%) were categorized as mild, 1551 (47.6%) as moderate, and 471 (14.4%) as severe acute pancreatitis.¹²

In our study, AP having normal level of amylase and lipase were found in 2.3% and 17% patients respectively. Level above normal limit but less than 3-fold were seen in 26.3% and 58.1% patients respectively. Level and more 3-fold raised amylase and lipase were found in 71.3% and 58.1% patients respectively.

Chang, J., & Chung, C. (2011).¹³ suggested that Both amylase and lipase had high accuracy index in the area under the ROC curve (0.992 and 0.996 respectively). The sensitivity and specificity of amylase at 3-fold above normal limit were 63.6% and 99.4% while those of lipase were 95.5% and 99.2% respectively.

Out of 130 patients of AP, 93 (71.53%) patients were Vitamin-D Deficient and 37(28.46%) patients were having normal vitamin-D level.

In Vitamin-D deficient group, 47(50.5%) patients are of mild AP, 31(32.6%) patients of are moderate AP and 15(16.8%) patients are of severe AP. In normal Vitamin-D group, 26(70.2%) patients are of mild AP, 10(27.02%) patients are of moderate AP and only 1(2.7%) patient had severe AP.

The above Association of "ATLANTA" SEVERITY SCORE with Vitamin- D was statistically significant associated ($p<0.048654$).

Conclusion

As per our present study, we concluded that

To conclude diagnosis of acute pancreatitis should never be dependent solely on elevated amylase and lipase level.

In our study, we found that vitamin-D deficiency was prevalent among patients of acute pancreatitis' and we found a significant association between ATLANTA severity score and Vitamin-D LEVEL, which was negatively correlated with ATLANTA severity index.

This finding suggests that vitamin D status in individual might be helpful to predict the prognosis of acute pancreatitis and we recommends, that vitamin D level may be used as marker for assessing severity of acute pancreatitis'

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Table 1: Distribution of patients according to "ATLANTA" severity score in study group (n=130)

"ATLANTA" SEVERITY	Frequency	Percent
Mild	73	56.2%
Moderate	41	31.5%
Severe	16	12.3%
Total	130	100.0%

Table 2: Distribution of patients according to Vitamin -D level and “ATLANTA’ severity score in study group (n=130)

	<20ng/dl (DEFICIENT)	>20ng/dl (NORMAL)	TOTAL PATIENT
Mild	47 (50.5%)	26(71.4%)	73
Moderate	31(32.6%)	10(27.02%)	41
Severe	15(16.8%)	1(2.70%)	16
TOTAL	93(71.53%)	37(28.46%)	130

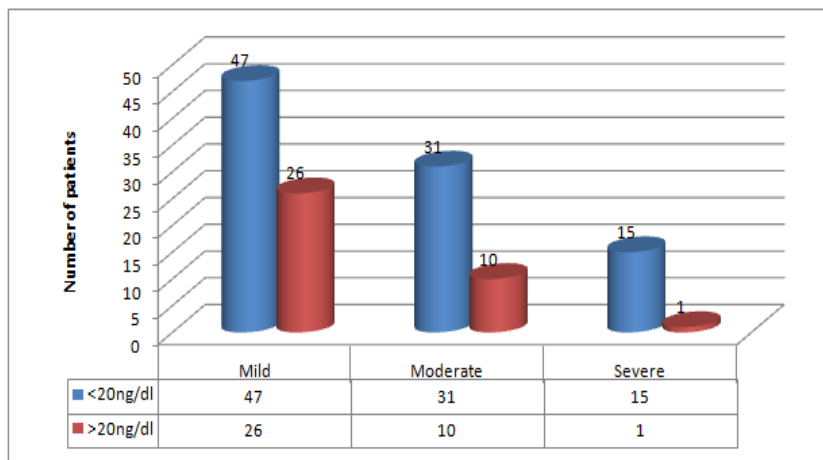


Table 12: Distribution of Vitamin-D deficient patients according to ATLANTA severity score in study group (n=130)

	TOTAL PATIENT	VITAMIN D DEFICIENT PATIENT	DEFICIENT %
MILD	73	47	64.38%
MODERATE	41	31	75.60%
SEVERE	16	15	93.75%
TOTAL	130	93	71.53%

