



Changing Trend in the Clinical Presentation of Hypercalcemia in a Tertiary Care Hospital

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Abstract

Background

Our body needs calcium for many intracellular and extracellular functions. Profiling symptoms of patients having hypercalcemia helps healthcare professionals to understand the changing pattern in their symptoms. This will help physicians and other healthcare workers to make proper diagnosis, as in most recent cases, patients show different symptoms than normal. The aim of our study is to describe the changing presentation of inpatients with hypercalcemia.

Materials and Methods

Our study is a cross sectional study conducted at the department of general medicine in Believers church medical hospital. 125 patients were in the study and they were evaluated on the basis of their symptoms. The data was entered in Microsoft Excel -2010 version and results were presented in tabular and graphical forms.

Result

Our study found a shift in the clinical presentation of people having hypercalcemia, with them shifting from asymptomatic to symptomatic. On the

basis of patients reviewed so far, the common presenting complaints are gastrointestinal symptoms such as loss of weight, abdominal pain, vomiting, belching and constipation. About 26% of the population enrolled in the study had gastrointestinal symptoms. Hence providing evidence that there is a change in the pattern of clinical presentation of hypercalcemia. We also found out that hypercalcemia was more prominent in older people.

Conclusion

Previously, studies related to the profiling of patients' symptoms in hypercalcemia have hardly been done in Kerala. Therefore, conducting this study has enabled us to discern what to expect from the patients in this region. As a result of profiling of patients with hypercalcemia we have ascertained that there is a change in trend in its clinical symptoms. We have observed that patients who were asymptomatic earlier on, have now become symptomatic.

Keywords

Hypercalcemia, parathyroid hormone [PTH] , calcium

Introduction

Calcium is a very important mineral which is essential in the body for many intracellular and extracellular functions, as well as for skeletal support. Calcium is required for various functions, such as enzymatic reactions, membrane transport and stability, blood coagulation, nerve conduction, neuromuscular transmission, muscle contraction, vascular smooth muscle tone, hormone secretion, bone formation and

resorption, control of hepatic glycogen metabolism, and cell growth and division. Calcium must be maintained within the normal limits for normal homeostasis in our body. When this normal calcium level is disrupted in our body it may lead to hypercalcemia or hypocalcemia condition ^[1,2]. Many organs are involved in maintaining calcium homeostasis in our body. Most important among them are parathyroid gland and thyroid gland. When calcium level in our body drops, the parathyroid glands increase secretion of parathyroid hormone (PTH). PTH binds to the PTH receptor and causes serum calcium levels to increase. And thus normalize the calcium level in the body. Similarly, the Para follicular cells present in the thyroid gland secretes calcitonin which decreases calcium levels by inhibiting osteoclast activity and renal reabsorption of calcium ^[3]. The common causes of hypercalcemia are classified as either PTH mediated or Non-PTH mediated. PTH mediated causes include primary hyperparathyroidism, familial hypocalciuric hypercalcemia, and humoral hypercalcemia of malignancy. Non-PTH mediated causes are tumor related etiologies, drug related etiology and granulomatous diseases are the most frequent. Hypercalcemia can be classified as Mild hypercalcemia: 10.5 to 11.9 mg/dL, Moderate hypercalcemia: 12.0 to 13.9 mg/dL, Hypercalcemic crisis: 14.0 to 16.0 mg/dL ^[4]. The clinical presentation of the hypercalcemic patient ^[5] may involve any of several organ systems ^[6,7].

Table 1: Clinical Manifestations of Hypercalcemia

Cardiovascular	Neuromuscular	Renal	Gastrointestinal	Skeletal	Other
Arrhythmias (rare unless on digitalis)	Emotional lability	Polyuria	Nausea/vomiting	Bone pain/arthritis	Shock
Bradycardia	Confusion	Polydipsia	Anorexia	Osteopenia/osteoporosis in cortical bone (often seen in wrist)	Death
Hypertension	Delirium	Nocturia	Constipation		
Bundle branch/AV blocks	Psychosis	Nephrolithiasis	Abdominal pain		
Cardiac arrest (if severe)	Stupor	Nephrocalcinosis	Peptic ulcers		
	Muscle weakness	Renal failure	Pancreatitis		
	Headache	Hypercalciuria			
	Seizures (rare)				

Materials and Methods

Study Design and Setting

Our study was a hospital based cross sectional study. The study was conducted at Believers Church Medical College Hospital(BCMCH), Thiruvalla in the general medicine department. The study period was for 6 months from February 2021 to July 2022).

Sample Size

The estimated minimum required sample size is not less than 200 based on the value of corrected calcium level. The sample size has been calculated by the formula. Corrected calcium level (mg / dl) = measured total calcium (mg / dl) + 0.8 x 4.0 - serum albumin[g/dl])

Study Criteria

Inclusion Criteria

- In patients with an age group of greater than 18 years.

- Patients for whom serum calcium, serum PTH, and serum Albumin test were ordered.

Exclusion Criteria

- Female subjects who are pregnant.

Data Collection Procedure

The data was obtained by visiting the general medicine department and entering the data in predesigned data collection proforma. We assessed Patients initial symptoms when they got admitted to the hospital. The information was obtained from patient’s case records and lab reports.

Data Analysis

The data was entered in Microsoft excel-2010 version and results were presented in tabular form and presented as frequency and percentages.

Ethical Consideration

This study was approved by the Institutional Ethical Committee of BCMCH, Thiruvalla reference no: IEC/2021/08/235.

Results

Table No. 2: Distribution of Age Group

S. No.	Age Group	Frequency	Percentage
1	21 – 30	4	3
2	31 – 40	3	2
3	41 - 50	11	9
4	51 – 60	30	24
5	61 – 70	34	27
6	71 – 80	27	22
7	81 – 90	16	13
	Total	125	100

Figure 2: Distribution of age group

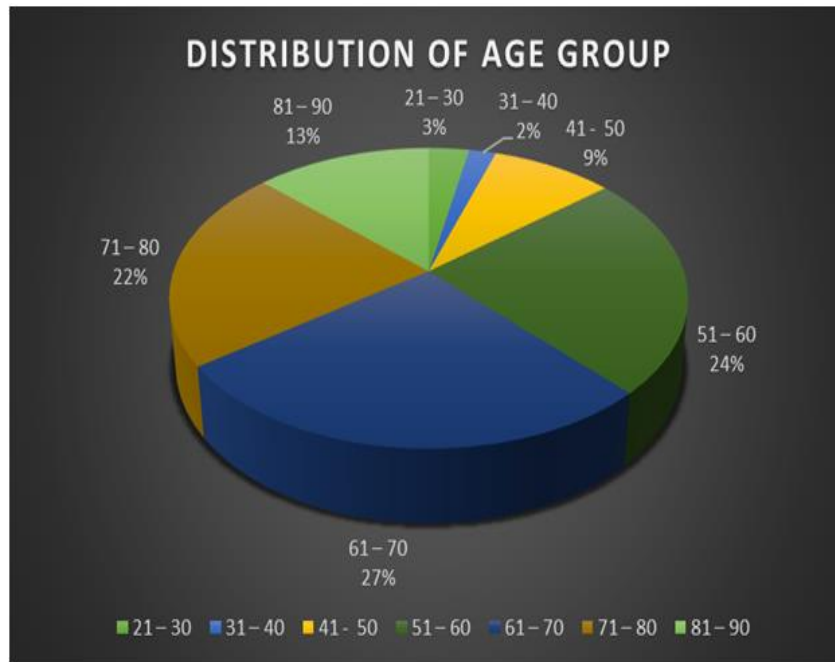


Figure 2: Distribution of Age Group

From the Fig 2: Among 125 study population enrolled in the study, the majority of the subjects belong to the age group of 61-70 years [27%] followed

by 51-60 years [24%], 71-80years [22%], 81-90years [13%], 41-50years [9%], 21-30years [3%] and 2% in age group of 31-40.

S. No.	Presenting Complaints	Frequency	Percentage
1	CVS	3	2
2	CNS	27	13
3	RS	30	16
4	GI	51	26
5	RENAL	15	8
6	URINARY	8	4
7	ORTHO	14	7
8	ONCO	12	6
9	OTHERS	35	18
TOTAL		195	100

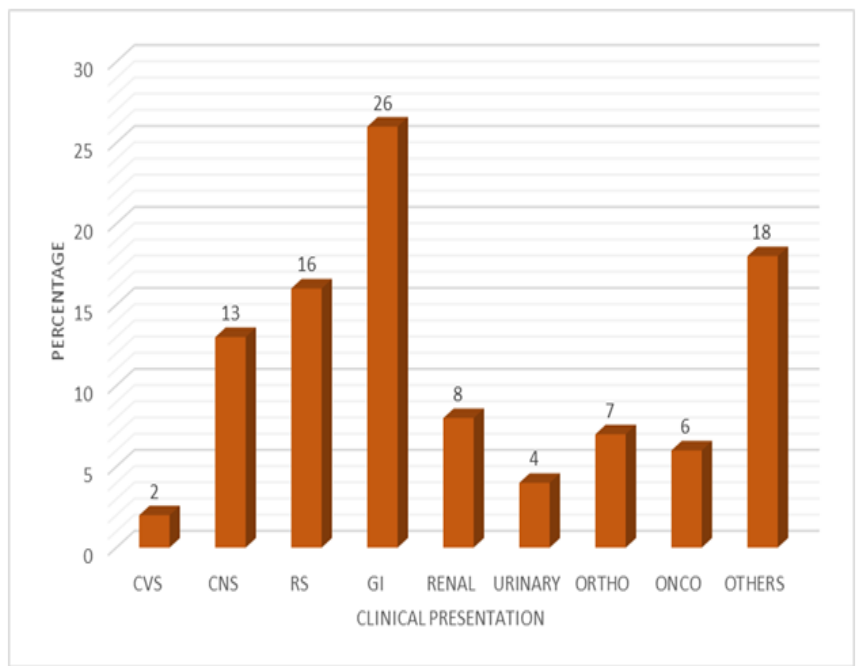


Figure 3: Distribution of Clinical Presentation

From Fig 3: Among 125 study populations enrolled in the study for hypercalcemia, subjects were presented with different symptoms of which gastrointestinal symptoms were predominant which is 26%.16% of patients had respiratory symptoms, 13% had cardiovascular symptoms. The different symptoms presented include:

CVS: Chest pain radiating to back, retrosternal pain

CNS: Headache, altered sensorium, giddiness, tremulousness, sleeplessness, difficulty in walking, slurring of speech, shivering, decreased response, loss of consciousness, fall, swaying of body, dryness of mouth, sweating, drowsy, numbness, seizure, paraesthesia.

Respiratory Symptoms: Shortness of breath, cough

Gastrointestinal Tract: Loss of appetite, abdominal pain, vomiting, nausea, belching, constipation.

Renal: Lower limb swelling, admitted with increased RFT, reduced urine output, leg oedema, AVF creation

Urinary tract: Burning micturition, pus discharge from penis, loin pain, melena dysuria, urinary retention, nocturia.

Orthopedics: Hip pain, ankle twist, back pain, joint pain, pain coccyx, swelling metacarpal, knee pain, orthopnoea.

Oncology: CT guided biopsy from soft tissue component around D9 vertebrae and rib, breast lump, cancer screening, neck lump.

Others: Fever, generalized weakness, weight loss, hypercalcemia, elevated parathyroid hormone, pancytopenia, chills, rigor, weight loss, itching, swelling in the thyroid, jaundice and gallstone.

Discussion

The objective of the study was to evaluate patients with hypercalcemia in terms of Initial clinical presentation and age. A total of 125 subjects were taken

in the study. The study was a hospital based cross sectional study. The information regarding the patients were collected from February 2021 to July 2021 from the department of general medicine, BCMCH. The data was entered into a predesigned data collection proforma. According to the study carried out by *Kuchay MS, Kaur P et.al.* to understand the profile of hypercalcemia in all patients who were presented to the hospital, they found a shift in the pattern of presentation of hypercalcemia^[8]. The main aim of our study is to find out whether there was a change in trend in the clinical presentation of hypercalcemia in a tertiary care hospital.

In our study we found that the majority of the subjects who presented with hypercalcemia fall under the age group of 61- 70 years. This was supported by a study conducted by *Catalano A et.al.* The incidence of hypercalcemia in the age range 19-65 was 16.92% and inpatients over 65 years was 18.11 %.^[14] The reason behind this are as people grow older they become more prone to diseases. Hypercalcemia is usually seen as secondary to one etiology. Patients with chronic kidney disease, malignancy, parathyroid problems etc. as comorbidities have a high chance of developing hypercalcemia. Besides, especially in states like Kerala where the health and education is high and the easy availability of over the counter medicines there is a high chance of drug induced hypercalcemia.

Among 125 people 26% had gastrointestinal complaints and are followed by fever, generalized weakness, weight loss, hypercalcemia, elevated parathyroid hormone, pancytopenia, chills, rigor, weight loss, itching, and swelling in the thyroid, jaundice and gallstone. According to the study conducted by *Renaghan AD et.al.* symptoms of hypercalcemia are non-specific and include fatigue,

weakness, nausea, vomiting, abdominal pain, bone pain, polyuria and confusion as well as coma in severe cases.

^[15] According to a similar study done by Han CH et.al. asymptomatic hypercalcemia were found to be common.^[16]

Conclusion

From this study we found out that the majority of subjects who presented with hypercalcemia belonged to the age group of 61-70years. The patients who got admitted in the hospital where symptomatic and gastrointestinal symptoms were found to be more predominant in them. The majority of patients presented with gastrointestinal complaints such as loss of appetite, abdominal pain, vomiting, nausea, belching and constipation. From this study we found that there was a shift in the presentation of symptoms from asymptomatic to symptomatic.

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