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Case report

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Periarticular nodular swelling in an adolescent boy with high serum phosphate and low serum vitamin C level

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Abstract

A 14-year-old boy, 3rd issue of consanguineous parents presented with a nodular swelling in the lateral and upper aspect of his left thigh with difficulty in walking. Considering a bone tumor, he had undergone two orthopedic surgeries. During surgery, chalky material came out and histopathology revealed deposition of calcium hydroxyapatite. Biochemically he had persistent hyperphosphatemia. Imaging revealed a dense calcification around the left greater trochanteric region. Interestingly, his vitamin C level was found low. Biochemical screening of family members also revealed hyperphosphatemia in one of his elder brothers. We diagnosed the case as hyperphosphatemic familial tumoral calcinosis. The patient was advised to take a phosphate-restricted diet, phosphate binder, and vitamin C. The ectopic deposition of calcium in the soft tissue around a joint may be mistaken as a tumor. Family history and biochemical findings can help to reach the diagnosis. *[J Assoc Clin Endocrinol Diabetol Bangladesh, January 2023; 2 (1): 32-34]*

Keywords: Hyperphosphatemia; Familial tumoral calcinosis; Periarticular calcinosis; vitamin C

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Introduction

Familial tumoral calcinosis (FTC) includes a heterogeneous group of inherited disorders characterized by the occurrence of periarticular calcified masses. Hyperphosphatemic FTC (HFTC) has been shown to result from mutations in any of the three genes (fibroblast growth factor-23, α-klotho, and UDP-N-acetyl-D-galactosamine: polypeptide N-acetylgalactosaminyltransferase 3) with autosomal recessive inheritance resulting in hyperphosphatemia and ectopic calcification.[1,2] The uncontrolled production of 1,25 dihydroxy vitamin D results in increased phosphate reabsorption from the kidney and intestine.[3] This rare disorder is characterized by the early onset of a slowly growing tumor-like mass around the large joints leading to pain, disability, and even perforation of skin with a discharge of liquid hydroxyapatite. A patient may present with local as well as systemic features and involvement of eyes, blood vessels, heart, and teeth.[4] Here we report a young boy who presented with unilateral hip joint involvement.

Case presentation

Our patient was a 14-year-old boy, 3rd issue of a consanguineous parent presented with the progressive development of a nodular swelling in the upper and lateral aspect of the left thigh. It was associated with difficulty in walking and it hampered his daily activity like going to school. There was no history of fever, weight loss, anorexia, trauma, or abdominal pain. With these complaints he visited an orthopaedic surgeon where he was diagnosed as a case of bone tumor and undergone surgery. His swelling reduced initially but again within three months it returned back to its previous size.

Again, the lesion was surgically opened and some chalky material came out. This time the histopathology report revealed tumoral calcinosis. He was referred to the department of Endocrinology of Bangabandhu

Table-I: Calcium panel in the 1st degree family members of the patient

Investigations	Unit	Patient (13 years)	Brother 1 (29 years)	Brother 2 (22 years)	Mother (45 years)	Father (50 years)	Reference values
Corrected calcium	mg/dL	10.4	9.7	9.4	9.2	9.3	8.5 - 10.5
Phosphate	mg/dL	**8.3**	**6.8**	4.1	4.6	4.5	2.3 - 4.7 (3.0 - 7.0)*
Intact parathormone	pg/mL	34.8	21	18	31	19	11 - 67
Alkaline phosphatase	U/L	46	43	48	64	45	30 - 120
25(OH) vitamin D	ng/mL	55.8	33.2	29.8	31	35	20 - 100

*Reference range for children

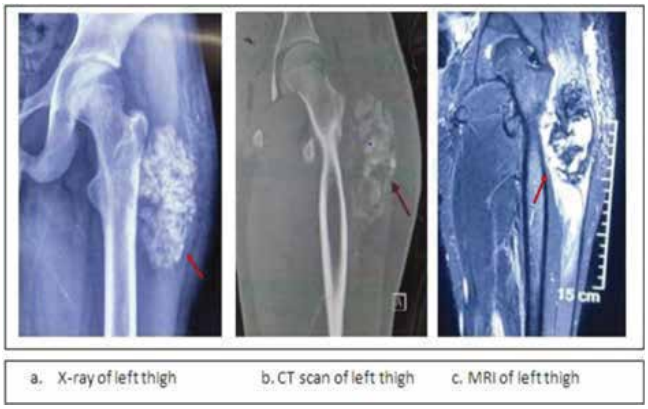

Figure-1: Different types of imaging revealed a large lobular mass in the lateral aspect of the left thigh with dense calcification and soft tissue edema

Sheikh Mujib Medical University (BSMMU) for further evaluation. On examination two scar marks were noted in the upper part of the lateral aspect of the left thigh with a hard mass and some restriction of joint movement. Other systemic examinations revealed no abnormality. His biochemical reports revealed persistent hyperphosphatemia with an otherwise normal calcium panel along with normal renal and liver function. Different types of imaging were done which revealed a large lobulated soft tissue mass {(10.7 × 6.3 × 4.7) cm} with dense calcification along the lateral aspect of the proximal left femoral shaft (Figure-1). From our previous experience, we also did vitamin C levels in our patient and interestingly found it very low (0.0032 mg/dl; reference value: 0.6-2 mg/dl).

We screened all the family members clinically and biochemically. There was no such lesion in any family member but one of his elder brothers was also found to have hyperphosphatemia (Table-I). The patient and parents were counseled about the disease and its prognosis. The patient was also referred to a dietitian for phosphate restricted diet. A phosphate binder (sevelamer 800 mg, tds) and vitamin C (ascorbic acid 250 mg bd) were also added. Further follow-up and genetic analysis could not be done as the patient was lost to follow-up.

Discussion

This is a typical case of FHTC with hyperphosphatemia and normal calcium, intact parathyroid hormone, and vitamin D levels. But as this disease is very rare, there may be difficulty in recognizing this illness. Even calcification may be difficult to separate from ossification by plain X-ray.[5]

Calcification may be of different types- metastatic, dystrophic, calcinosis, etc. The common causes for calcinosis include collagen disorders, tumoral calcinosis and idiopathic calcinosis universalis. Tumoral calcinosis may be sporadic (normal biochemistry), metabolic (increased solubility product of calcium and phosphate), and familial (high phosphate).[6] Our patient is a case of a familial type of tumoral calcinosis.

The differential diagnosis considered in this case of soft tissue calcification includes calcinosis secondary to renal failure, which can be differentiated by the renal function test and vitamin D level. However, the serum level of 1,25-dihydroxycholecalciferol level is found higher in HFTC. Synovial chondromatosis is usually intra-articular and shows a ring, arc appearance. Myositis ossificans is characterized by rapid evolution and lacks lobular morphology.[7]

One interesting finding in our patient is low vitamin C levels. It was also the size of calcification that improved with vitamin C supplementation in a previous case report.[8] However, the association or pathogenesis is unknown.

The treatment of choice is surgical resection as the use of medical treatment for hyperphosphatemia is controversial. However, we started a low-phosphate diet and a phosphate binder with the hope to reduce the progression of calcification.[9] Steroid and radiotherapy were also suggested by other authors. Complete

surgical removal may be the best approach to prevent recurrence.[7]

Conclusions

Any nodular swelling around a joint may have many differential diagnoses. But family history, calcium panel, and imaging can help us to distinguish those disorders in most cases. Though tumoral calcinosis is very rare, it should be considered as a cause of soft tissue calcification, especially around the periarticular region. A high index of suspicion and a multidisciplinary approach is required for correct diagnosis and effective treatment. Close follow-up is mandated because of a high propensity of recurrence even after surgical removal.

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We are grateful our patient and his legal guardian for giving the consent to report the case.

Conflict of Interest

The authors have no conflicts of interest to disclose.

Financial Disclosure

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Data Availability

Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Written informed assent was taken from the patient and consent from the legal guardian.

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