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Premature idiopathic costochondral calcification: A Case Report

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ABSTRACT

Calcification of costal cartilage increases with age and it is rare before the age of thirty years. Early onset of costochondral calcification can be associated several endocrine and metabolic diseases, following a trauma, infections, malignancies or due to genetic factors and very rarely idiopathic. Our case exemplifies premature calcification of costal cartilages. The patient was a 20-year-old lady, referred to endocrine clinic in UMS polyclinic, Kingfisher, University Malaysia Sabah for evaluation of metabolic and endocrine causes of premature costochondral calcification. Physical examination findings were normal except mild tenderness over the left lower lateral part of the chest. Investigation results were inconclusive to detect any underlying endocrine, metabolic or inflammatory conditions. Chest X-Ray revealed bilateral calcification of the 10th, 11th and 12th costal cartilages and was diagnosed as idiopathic calcification of costal cartilage. Only analgesics were given as treatment and the pain subsided after few days.

Keywords: idiopathic, costochondral, calcification

INTRODUCTION

Premature costochondral calcification is very rare before the age of thirty [1,]. Possible underlying causes of premature calcification of costal cartilage can be due to some endocrine and metabolic disorders like Hyperthyroidism[1, 2], Hyperparathyroidism[3], Porphyria[1, 4], Wilson's disease [3], Haemochromatosis[3], Corticosteroid medication[5], Tumours releasing PTH like substance[6], ovarian tumours[1]. Other causes can be due to underlying pulmonary infection and costochondral Inflammation [6, 7]. Rare congenital diseases such Adrenogenital syndrome [8, 9] or Keutel syndrome[10, 11] are also associated with costochondral calcification.

CASE PRESENTATION

A 20-year-old lady presented mild productive cough for one month associated with tiredness. She had no other symptoms such as night sweats, fever, and loss of appetite or weight loss. After a month, the cough became worse and more frequent during night time. She developed pain on her left lower part of the chest, for which she had difficulty to sleep in left lateral position for about a week. One day, while coughing quite badly she heard a "pop" sound on her left rib followed by intense pain for which she went to the emergency department of Hospital. X-ray chest was done which revealed fracture in left 12^{th} rib.

One of the Patient's housemate had extra-pulmonary Tuberculosis (TB). TB workout was done, which were inconclusive. She denied any history of recent or past trauma. Her past medical history was unremarkable. She used to play futsal during her high school years.

On physical examination there were tenderness over the left lower chest, there was no palpable swelling. General, cardiovascular, respiratory, abdominal and neurological examinations were unremarkable.

Investigation results include normal full blood counts (FBC), C- reactive protein (CRP) & Erythrocyte sedimentation rate (ESR) and negative Anti-nuclear antibody (ANA). Mantoux skin test and sputum smear microscopy were negative which excludes tuberculosis. Liver function test (LFT), renal function test (RFT) and thyroid function tests (TFT) were normal. Serum calcium, phosphorus, alkaline phosphatase, vitamin D, parathormone, ceruloplasmin, ferritin and urinary 5-aminolevulinic acid (ALA), PBG (porphobilinogen) levels were with in normal limit. In chest X ray there was bilateral, symmetrical calcified tongue like protrusions of costal cartilages of 10^{th}, 11^{th} and 12^{th} ribs (Figure 1), which is characteristic female (central) pattern of calcification[17, 18]. Screening ultrasonography of whole abdomen done to rule out other pathologies and demonstrate no evidence of calcification of other organs. Bilateral costochondral calcifications with normal results of other investigations, excludes the secondary causes and was diagnosed as idiopathic calcification of costal cartilage.

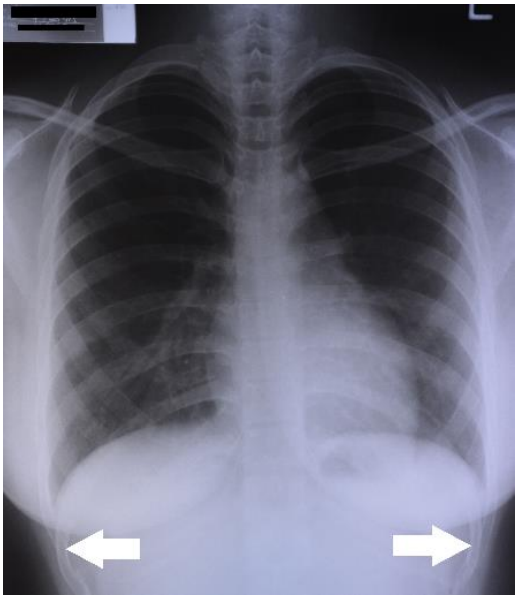

Figure 1: X-Ray Chest P/A view showing bilateral calcification with tongue like protrusion of costal cartilages of 10th, 11th and 12th ribs (arrow).

The patient was treated with nonsteroidal anti-inflammatory drugs and the pain subsided after few days. But she experienced occasional pains which relived by simple analgesics in the 12-months follow-up.

DISCUSSION

The thoracic cage is formed by twelve pairs of ribs which are attached posteriorly to the respective thoracic vertebrae. The upper seven pairs are attached to the sternum directly through their costal cartilages. Costal cartilages of 8th, 9th, 10th ribs are attached indirectly to the sternum through the 7th costal cartilage. The cartilages of the 11th and 12th ribs terminate in the abdominal wall [7]. Costal Cartilages are hyaline cartilage and helps in movement of the thoracic cage by its elasticity and mobility. Calcification increases with age and continues throughout life, reflecting the aging process [7]. In old age, as a result of this calcification, the costal cartilages lose their elasticity.

Calcification of costal cartilages is rare before the age of thirty years [4]. Early onset of costochondral calcification can be associated several endocrine and metabolic diseases, following a trauma, infections, malignancies or due to genetic factors.

Endocrine and metabolic conditions are associated with premature calcifications like with hyperthyroidism [1, 2], Porphyria[1, 4], corticosteroid medication [5]. Costal cartilage calcifications may be due to chondrocalcinosis due to apatite crystal deposition[12] and chondrocalcinosis can be due to several causes like hypercalcaemia, especially hyperparathyroidism, gout, Wilson disease, haemochromatosis,

focal chondrocalcinosis in a traumatised joint, hypomagnesaemia, hypothyroidism, acromegaly, etc.[3] In hyperthyroidism high thyroid hormones increase the bone resorption, alter the linear growth and calcification of bone and cartilage. Due to the fact that cartilage calcification may be occur [2]. Imbalance in calcium metabolism may cause premature calcification of the costal cartilages in Hyperparathyroidism, chronic renal failure. Many tumors elaborate proteins with parathyroid hormone like activity, that alter calcium metabolism by increasing renal reabsorption of calcium and increasing bone resorption[4, 6]. In this patient normal results of LFT, RFT, TFT, serum calcium, phosphorus, alkaline phosphatase, vitamin D, parathormone, caeruloplasmin, ferritin and urinary ALA, PBG excludes the metabolic & endocrine causes of calcification.

Costochondral calcification should be taken into consideration in patient with a history of subcostal region trauma, pulmonary infection or inflammation like Tietze syndrome, etc.[7, 13]. These conditions can cause costochondritis leading to calcium deposition. In those situations radiological findings include chondral destruction, chondral enlargement and cartilage calcification [14, 15].All of these will be unilateral or localized presentation and elevated inflammatory markers. We excluded the above causes due to the bilateral and homogeneous appearance of calcification with normal levels of ESR, CRP and ANA.

Cartilage calcification can be due to rare congenital diseases such as adrenogenital syndrome[8, 9] or Keutel syndrome[10, 11]. "Keutel syndrome" is characterized by cartilage calcification in the ears, nose, larynx, trachea, and ribs; pulmonary artery stenosis, brachytelephalangism (short fingers and nails that resemble drumsticks) and facial dysmorphism. Other associated features include hearing loss, intellectual disability, and short stature [16].

Some authors regard even extensive costal cartilage calcifications as a normal finding or variant[13]. Calcification of the costal cartilages follows gender-related patterns[7]. In the lower ribs males tend to show calcification at the periphery of the cartilage, however females have central, tongue like calcification pattern [17, 18]. Often irregular outline with radiolucent transverse linear zones could simulate fracture. Premature calcification of costal cartilage can also be seen in individuals without any medical problems as considered idiopathic. Idiopathic costal cartilage calcification may occur in children as well as in adults, appears very dense, symmetric, and homogeneous lesions [14].

İn this case, Chest X ray revealed bilateral calcification with tongue like protrusion of costal cartilages of 10^{th}, 11^{th} and 12^{th} ribs, which is characteristic female (central) pattern of calcification[17,18].Other laboratory investigations were evaluated as normal. So the patient was diagnosed as idiopathic calcification of costal cartilage with fractured 12^{th} rib.

Treatment should be directed to the underlying cause of the disease. In this case the patient was treated with analgesic and rest. Pain decreased significantly within two weeks.

CONCLUSION

A case of premature idiopathic calcification of costal cartilage was discussed after excluding possible underlying secondary causes. It is recommended that early onset of costochondral calcification of undetermined cause should be investigated and treated for secondary causes.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

CONSENTS

Written informed consent was obtained from the patient to publish the case with its related pictures. A copy of the written consent is available for review by the Chief Editor of this journal.

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