

## Case Report

# Hypertrophic osteoarthropathy secondary to thymoma: rare presentation in childhood

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Received April 9, 2017; Accepted August 20, 2017; Epub September 15, 2017; Published September 30, 2017

**Abstract:** Hypertrophic osteoarthropathy (HOA) is a group of syndromes characterized by clubbing, polyarthritis, and periosteal reaction. It is usually secondary to thoracic tumors and is extremely rare in children, therefore is easily to be misdiagnosed and delayed. In this study, we present an 11-year-old boy hospitalized because of joint swelling and pain accompanied by obvious clubbing, and was finally diagnosed as HOA secondary to thymoma. Heart Doppler ultrasound and blood gas analysis ruled out the existence of heart and lung function abnormal. Knee and ankle joint MRI supported the diagnosis of HOA. The radionuclide bone scan of the boy presented no other specials except for active bone metabolism on the left upper jaw bone. X-ray showed apparent periosteal reactions, which support the diagnosis of HOA. Thoracic CT showed space occupying lesion in anterior mediastinum and supraclavicular site and biopsy indicated that he was with thymoma (type B2). During the admission, routine symptomatic and anti infection treatment was applied. The parents finally give up further treatment and the patient discharged. Follow-up showed that the boy was died at home six months after left the hospital. To our knowledge, this is the first case of HOA secondary to type B2 thymoma in child. We intend to further improve our understanding of hypertrophic osteoarthritis by studying this case.

**Keywords:** Hypertrophic osteoarthropathy, thymoma, Chinese child, case report

### Introduction

Hypertrophic osteoarthropathy (HOA), characterized by clubbing, polyarthritis, and periosteal reaction has a very low incidence in children [1]. It is often secondary to thoracic tumors such as lung cancer, thymoma, and lymphoma [2-8], Additionally, it is found in some chronic lung infections and heart diseases [9-11]. HOA can be the only clinical manifestations of certain tumors, therefore it is early to be recognized. Active primary disease searching is of great importance to the control of the disease. In the present study, we present a case of HOA child followed by thymoma (type B2), which is very rare in clinical.

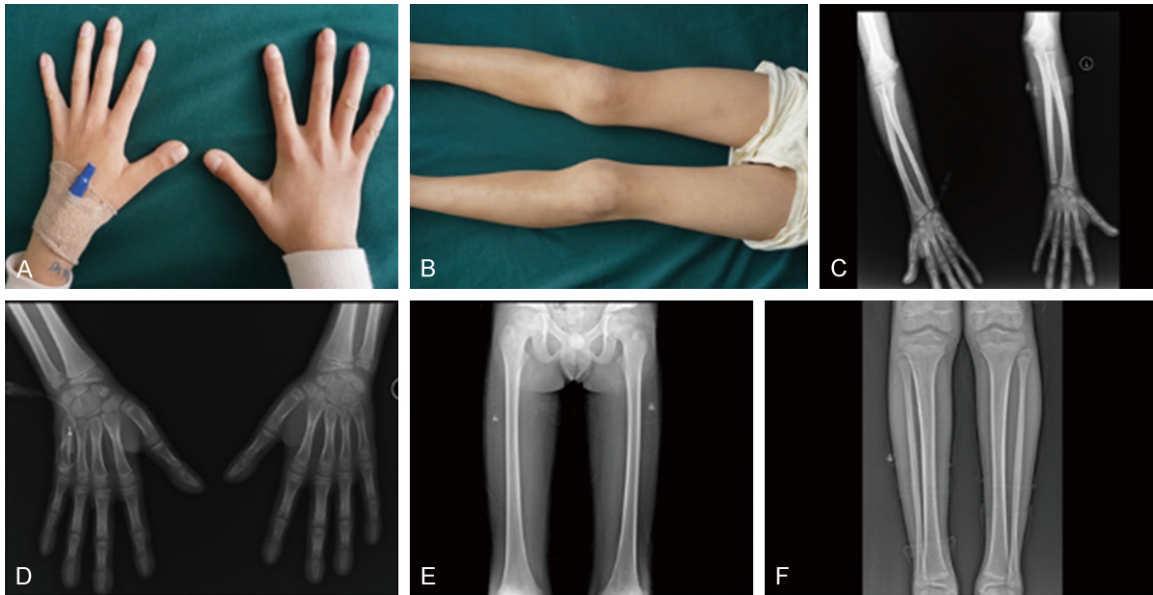
### Case report

An 11-year-old boy was admitted to our hospital because of clubbing and joint swelling for more than half a year. The major clinical symptoms

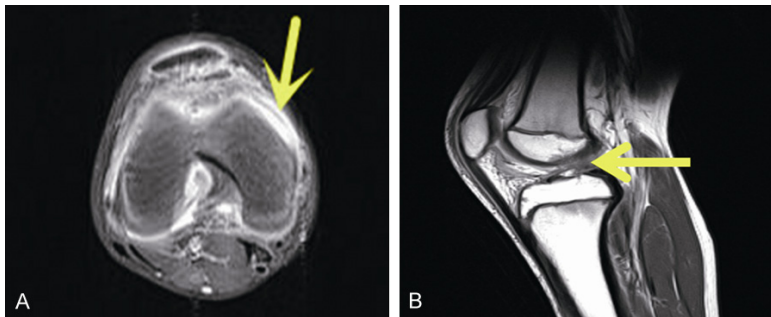
were obvious clubbing fingers (toes) as well as arthroncus with mild pain after activities in knee and ankle. No important limitation of joints, dyspnea, or fever was observed. He had no breathing difficulties, fever, and other discomfort. The kid was otherwise healthy, lacked special medical record and had no specials in personal and family history. This study was approved by the ethics committee of Hunan Provincial People's Hospital, and informed consent was obtained from parents of the participant.

His temperature was 36.8°C. The left thoracic cage appeared to be plump in physical examination. Bilateral breath sounded symmetrical and no rale was heard during auscultation. As illustrated in **Figure 1**, the joints had been changed, with no restraint on mobility or other dysfunctions. He was with obvious clubbing together with the presence of joint disease, therefore, he was firstly considered as disease

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**Figure 1.** Clubbing and bilateral knee joint swelling (A, B) and periosteal reaction on four limbs (C-F).



**Figure 2.** Synovial proliferation and synovitis around knee joint (yellow arrow) revealed by MRI. (A) Coronal section, (B) Sagittal plane.

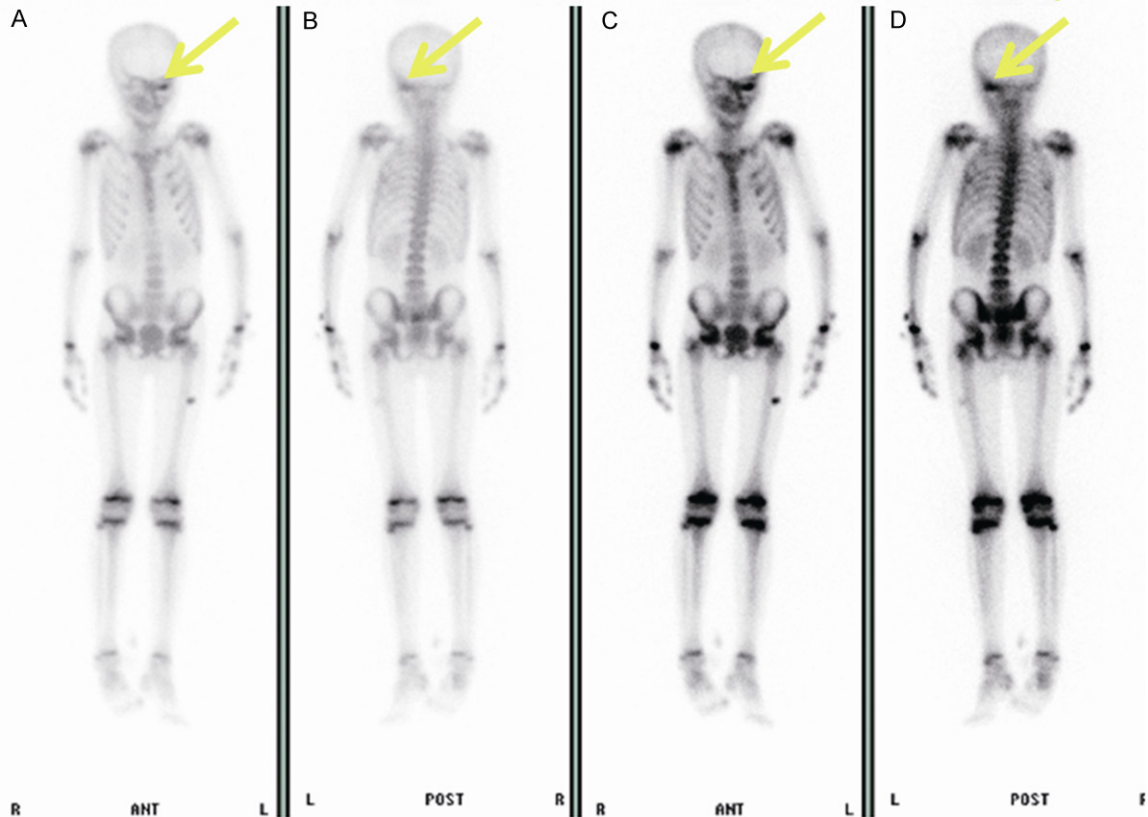
of heart and lung or the possibility of juvenile idiopathic arthritis. After admission, auxiliary equipment inspection was performed. Heart Doppler ultrasound demonstrated no heart abnormal and blood gas analysis showed that the lung function was normal. Accordingly, the results did not support the possibility of hypoxia induced clubbing. Bilateral limbs radiography showed periosteal hyperplasia (**Figure 1**). Combining with joint swelling, clubbing fingers (toes) and periosteal hyperplasia, the boy was diagnosed as HOA.

HOA is likely to present arthroncus and hydrarthrosis, with ankles and knees mostly involved. In addition, it could still affect the elbow and metacarpophalangeal joints, appears as mild pain or anguish felt around the joint [12]. This

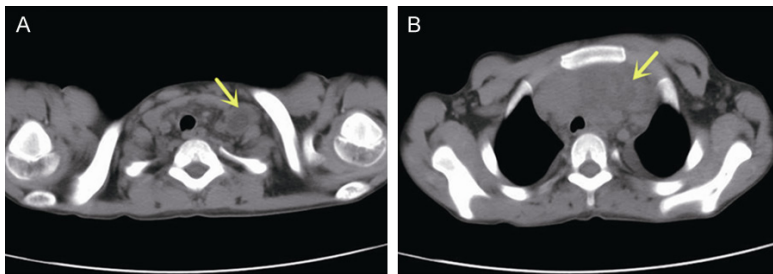
child suffered obvious clubbing fingers (toes) as well as arthroncus with mild pain after activities in knee and ankle. To further confirm the diagnosis, knee and ankle joint MRI was performed. The results illustrated synovial proliferation and synovitis around knee joint (**Figure 2**), indicating synovitis; swollen right infrapatellar fat pad; excess fluid in the right suprapatellar bursa and knee joint; and abnormal strengthening signals in distal phalanx of the right thumb, which supported the diagnosis of HOA.

In order to provide more information for the diagnosis, whole body radionuclide bone scan was performed. It is documented that the features of radionuclide bone scan for patients with HOA can be characterized into 3 types: symmetrical 'double stripes sign' along the long bone, especially the lower limbs; uneven and asymmetric increase on radioactivity of Limbs (particularly the lower part); and symmetrical increase of the radioactivity around joints [12]. The radionuclide bone scan of the boy presented no other specials except for active bone metabolism on the left upper jaw bone (**Figure 3**). There was no trace of the 'double stripes

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**Figure 3.** Three hours after intravenous injection of  $^{99m}\text{Tc}$ -MDP, anterior (A, C, different luminances) and back (B, D, different luminances) scan of the whole body showed active bone metabolism (yellow arrow) on the left upper jaw bone.



**Figure 4.** Thoracic CT the result illustrated space occupying lesion (yellow arrow) in anterior mediastinum (A) and supraclavicular (B) site.

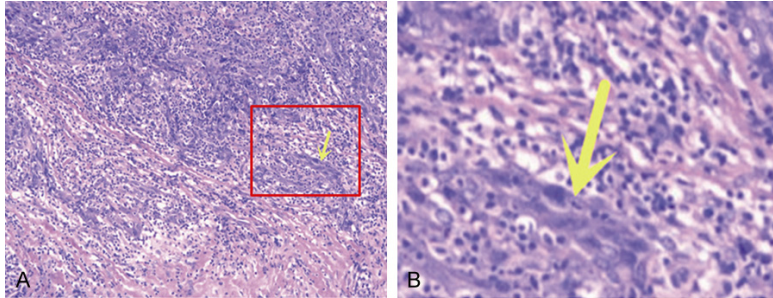
sign' and abnormal nuclide concentration, which could be explained by expired period of active bone metabolism. However, there were apparent periosteal reactions under X-ray, which also confirmed the diagnosis of HOA in this case.

HOA is classified into primary and secondary forms, and the secondary form is more common. The majority HOA cases in children are

secondary to intrathoracic tumors. Therefore, in order to trace the primary focus of this child, thoracic CT was applied and the result showed space occupying lesion in anterior mediastinum and supraclavicular site (**Figure 4**). Biopsy under general anesthesia was undertaken (**Figure 5**), which finally led us to the terminal diagnoses of thymoma (type B2) with

HOA. Immunohistochemistry showed CD3(+), CD20(+), CD45RO(+), PAX-5(+), CD79 $\alpha$ (+), CD10(-), Bcl-6(-), CD21(-), CD30(-), MUM1(-), TdT(-), Ki-67(+, 40%), CD5(+), CD2(+), CD7(+), CK(pan)(+), EMA(+), and CEA(-). During the admission, vitamin C was used to protect the heart, azithromycin was enrolled for prevent mycoplasma infection, and symptomatic treatment like nutritional support was performed. Once he was diagnosed as thymoma, the par-

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**Figure 5.** Biopsy results of illustrated space occupying lesion in anterior mediastinum indicated to thymoma (type B2) (yellow arrow, 100× HE staining). (A) General magnification view, (B) local amplification.

### Disclosure of conflict of interest

None.

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ents gave up treatment because of economic reasons. Follow up showed that he passed away 6 months after discharge.

### Discussion

Thymoma also is a very rare disease in childhood [13] which accounts for less than 1% of children mediastinum tumor. To date, it is reported that there has been about 50 cases of children with thymoma around the world. This is the first reported case of HOA secondary to B2-type-thymoma in children. Notwithstanding that HOA is very rare in childhood, its symptoms are typical, characterized by clubbing fingers, polyarthritis, and periosteal reaction. Combing the clinical symptoms with imaging data, HOA is not difficult to be diagnosed.

HOA is common in thoracic diseases especially the tumors, and it is even the only performance of tumors in thoracic cavity such as the patient of the present study. The most prominent clinical symptoms of this case were clubbing and joint swelling, which were very easy to be mistaken for diseases of heart, lung and juvenile idiopathic arthritis. When we accidentally found that there was periosteal reaction on the X of the limbs in the children, we considered the possibility of HOA. After heart and lung diseases were ruled out, intrathoracic tumors become our focus. Finally, the patient was diagnosed as type B2 thymoma caused HOA. The discovery of thymoma was due to our understanding of HOA, therefore, full understanding about the HOA is helpful for recognizing the early tumors in thoracic cavity. As for unexplained bone and joint lesions, the possibility of malignant tumors should be taken into account, so as to prevent misdiagnosis and delay therapy.

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