Clinical Case Report

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Osteosarcoma in the coracoid process that mimicked an osteochondroma

A case report

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Abstract

Rationale: Osteosarcomas are the most common primary malignant bone tumors in children and young adults; these tumors often affect the metaphyses of long bones such as the proximal humerus, proximal tibia, and distal femur. In contrast, osteosarcoma of the coracoid process is extremely rare.

Patient concerns: Herein, we describe a case of osteosarcoma affecting the coracoid process in a 40-year-old woman. The patient presented with shoulder pain, weakness, and an inability to raise her left arm. She had no previous record of shoulder injury and no significant family history.

Diagnoses: Her C-reactive protein levels were normal, whereas her erythrocyte sedimentation rate and alkaline phosphatase levels were elevated. Imaging studies led to the initial diagnosis of osteochondroma.

Intervention: The patient underwent surgical resection. However, the postoperative pathological results revealed an osteosarcoma. The patient transferred to another hospital for subsequent treatment, and her outcome is unknown.

Lessons: A misdiagnosis or inadequate and/or delayed treatment for a coracoid process osteosarcoma could have grave consequences. Computed tomography and magnetic resonance imaging are essential for a diagnosis, and a biopsy can effectively confirm the diagnosis. Our findings suggest that considering only a single factor, or using incomplete information, can lead to an arbitrary diagnosis.

Abbreviations: CT = computed tomography, MRI = magnetic resonance imaging.

Keywords: coracoid process, osteochondroma, osteosarcoma, pathology, radiography

1. Introduction

Osteosarcoma is the most common type of primary malignant bone neoplasm affecting children, adolescents, and young adults. These tumors usually occur in the metaphyses of growing long bones, such as the humerus, femur, and tibia,[1,2] and mainly result in symptoms such as chronic bone pain and swelling in the arms or legs. By contrast, osteochondroma, the most common type of benign cartilaginous bone neoplasm,[3] can develop in any bone with endochondral ossification; however, the primary locations include the long bones, especially the humerus, femur, and tibia.[3,4] Most osteochondromas are asymptomatic, diagnosed during childhood, and involve the metaphyses of long bones.[5]

The coracoid process of the scapula is an unusual location for any bone tumor.[6] In a series of 243 bone tumors and tumor-like conditions of the scapula, only 18 cases involved the coracoid process,[7] and a literature review revealed only 2 previous cases of osteosarcoma of the coracoid process, reported nearly 2 decades ago.[8,9] In the current study, we describe a rare case of an osteosarcoma that mimicked a coracoid process osteochondroma in a 40-year-old woman.

Shenzhen Hospital of Southern Medical University ethical review committee approved this study, and written informed consent was obtained from the patient.

2. Presenting concerns

A 40-year-old Chinese woman presented to our clinic complaining of a 1-week history of pain, weakness, and difficulty in raising her left upper limb. Her left shoulder pain began 6 months earlier. It worsened over time, radiating throughout the left upper limb. She was diagnosed with cervical spondylopathy and underwent conservative treatment in a local clinic, but experienced no obvious relief and her symptoms exacerbated over the span of a week.

Editor: N/A.

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The authors declare conflicts of interests.

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Medicine (2017) 96:46(e8608)

Received: 11 July 2017 / Received in final form: 18 October 2017 / Accepted: 19 October 2017

http://dx.doi.org/10.1097/MD.0000000000008608

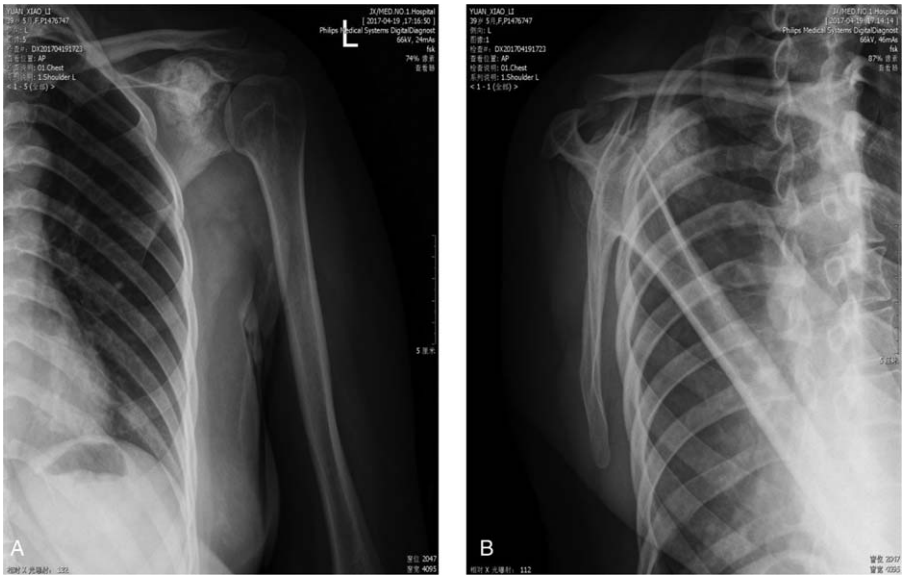

Figure 1. Plain radiographs of the left shoulder: a cauliflower-like calcification shadow arising from the coracoid process of the left scapula.

3. Clinical findings

She had no related history of injury, past medical illnesses, or a significant family history.

4. Diagnostic focus and assessment

A physical examination revealed pain, numbness, and weakness in the left upper extremity, which markedly restricted left shoulder range of motion. A bony, hard, and immobile mass, with unclear margins, measuring 4.1×4.0 cm, was identified on the left-side infraclavicular region. An additional physical examination did not reveal any palpable head, neck, supraclavicular, axillary, or epitrochlear lymph nodes. The erythrocyte sedimentation rate (40 mm/h) and serum alkaline phosphatase levels (135 U/L) exceeded the normal ranges (normal: 0–20 mm/h and 35–100 U/L, respectively), whereas the C-reactive protein level was within the normal range (3.25 mg/L; normal: 0–8 mg/L).

Plain radiographs of the left shoulder revealed a cauliflower-like calcification shadow arising from the coracoid process of the left scapula (Fig. 1). Magnetic resonance imaging (MRI) of the left shoulder revealed an irregular, hypointense shadow on T1-weighted imaging and a diverse shadow on T2-weighted imaging with fat saturation (Fig. 2). Consequently, she was diagnosed with osteochondroma.

5. Therapeutic focus and assessment

After excluding any surgical contraindications, the tumor was excised by experienced bone tumor surgeons. The patient was placed in the supine position under general anesthesia, and a 7 cm

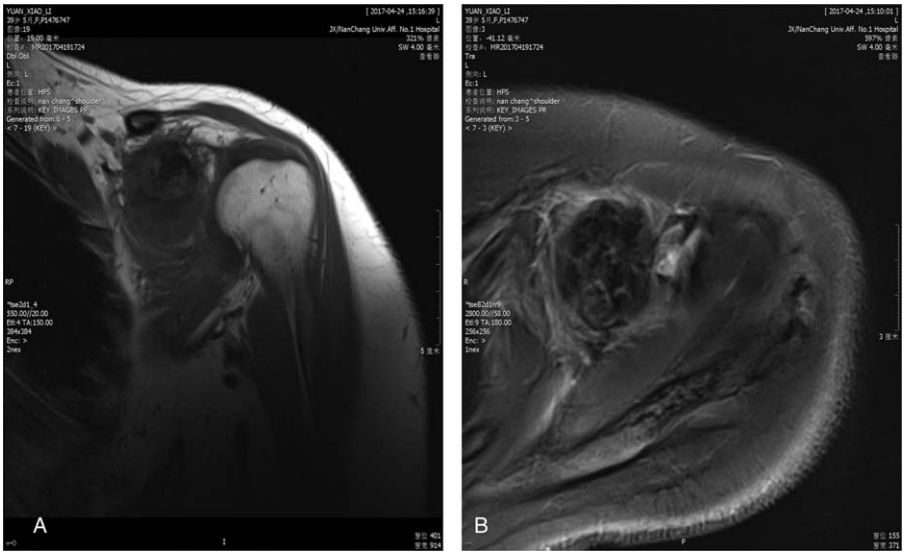

Figure 2. MRI of left shoulder: manifested an irregular hypo-intense shadow on T1 weighted imaging (A) and diverse on T2 weighted imaging with fat saturation (B).

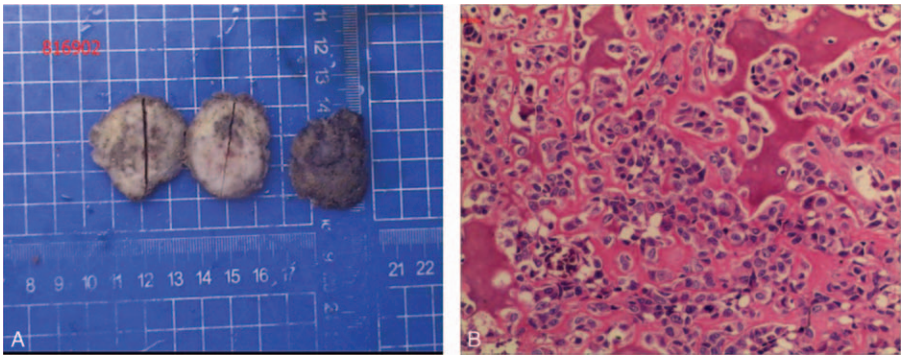

Figure 3. A, A photograph: the removed tumor.B, Hematoxylin and eosin stain: osteosarcoma.

fusiform incision was centered over the tumor. The tissue layers, including the subcutaneous tissue, superficial fascia, and deep fascia, were successively separated, and a portion of the deltoid muscle was removed to expose the tumor. Subsequently, the tumor was exposed via blunt and sharp separation in the deep surface of the deltoid muscle. A bony mass measuring 3.0m × 2.5 cm was observed on the coracoid process of the left scapula. The tumor was completely resected using an osteotome and abrasion drill, and the resected specimen sent for a pathological examination. The remaining area was scraped using a curette, cauterized with a hypercator, and immersed in sterile distilled water to inactivate any remaining tumor cells. Subsequently, a parcel of allogeneic bone was implanted to repair any bone defects. A wound drainage tube was inserted, and each tissue layer was sutured to achieve sufficient hemostasis. The estimated total blood volume was 200 mL, and blood transfusions were not required during the operation.

6. Follow-up and outcomes

A postoperative photograph of the resected tumor is shown in Figure 3. Microscopic examination revealed numerous bony trabeculae lined with actively proliferating osteoblasts arranged in sheets and nests. These hyperactive osteoblasts were larger than normal and contained more atypical mitotic figures. in addition, part of the bony trabeculae had calcified to form woven bone (Fig. 3). A diagnosis of osteosarcoma was confirmed based on these findings.

The patient had been discharged 1 week after surgery and was subsequently informed of the osteosarcoma diagnosis once the pathological results were confirmed. She subsequently transferred to another hospital for treatment, and her outcome is unknown. (Table 1) summarizes the timelin of the patient.

Table 1

Case report timeline.

Complaint/investigations	Details
Presenting symptoms	Shoulder pain, weakness, and an inability to raise her left arm
First investigations	4.1 × 4.0 cm mass on the left-side infraclavicular region
Plain radiographs	A cauliflower-like calcification shadow in the coracoid process of the left scapula
MRI of left shoulder	An irregular hypo-intense shadow on T1 and diverse on T2 with fat saturation
Surgical intervention	Resection; Postoperative pathology: osteosarcoma
Postoperative follow-up	The patient was lost to follow-up

MRI = magnetic resonance imaging.

7. Discussion

Only 2% to 8% of all bone tumors affect the scapula,[10–12] and tumors that involve the coracoid process of the scapula are even more rare.[13–17] In a series of 243 bone tumors and tumor-like cases of the scapula, only 18 affected the coracoid process; of these, 78% were diagnosed histologically as malignant.[8] Primary bone tumors of the coracoid process, including chondrosarcomas, osteosarcomas, lymphomas, osteoid osteomas, giant cell tumors, capillary hemangiomas, aneurysmal bone cysts, and metastatic bone tumors, are sporadically reported.[8,14,17,18] The current study describes a very rare case of osteosarcoma of the coracoid process.

A tumor in the coracoid process might be easily ignored or misdiagnosed because it could mimic nontumorous diseases that cause shoulder pain, such as instability, impingement syndrome, tendinitis, or frozen shoulder.[8,19–21] In the current study, the patient was initially misdiagnosed with an osteochondroma, a type of tumor that manifests symptoms and imaging findings similar to those of osteosarcoma.

A detailed clinical history, careful physical examination, and appropriate imaging examinations are crucial for an accurate diagnosis. However, in approximately 10% of cases, standard anteroposterior radiographs of the shoulder do not reveal a lesion in the coracoid process.[8,19,20,22] An axillary-view radiograph provides better imaging of the coracoid process and might be more useful for identifying a lesion at its base. A 20° posterior oblique film with 20° cephalad angulation can depict the coracoid process morphology and existing bone lesions, if other views are inconclusive. Additional imaging modalities such as computed tomography (CT) and MRI should be considered to rule out tumors or tumor-like lesions if the patient does not respond to conservative therapy.[19,20,22]

In the current case, no initial biopsy was performed, leading to a misdiagnosis of osteochondroma. Consequently, the patient received an inappropriate treatment while appropriate treatment was delayed. Misdiagnosis can have dire consequences and this error could have been avoided if greater care was taken.

In conclusion, although shoulder pain is considered common and straightforward ailment, primary tumors originating in the coracoid process should not be neglected as a potential cause. A range of malignant and benign tumors can occur at the coracoid process, and misdiagnosis or inadequate/delayed treatment can have grave consequences. Both imaging and biopsy studies are

usually effective for confirming a diagnosis of osteosarcoma; however, an analysis based on a single factor (ie, incomplete information) could cause a misdiagnosis. Coracoid process osteosarcoma is extremely rare, and additional case studies are urgently needed to better understand this condition. Finally, we recommend that orthopedic surgeons and radiologists remain aware of the possibility for osteosarcoma presentation in this location.

Acknowledgments

The authors would like to thank the patient and her family for allowing us to use the medical documentation and information that led to the current article.

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