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Monostotic Fibrous Dysplasia of the Eighth Rib in a Young Woman: A Case Report

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Abstract

Introduction: Fibrous dysplasia (FD) is a rare benign fibro-osseous disorder in which normal bone is replaced by fibrous tissue and irregular trabeculae of woven bone. Rib involvement is uncommon, and monostotic forms are particularly rare. This report aims to highlight the clinical presentation, diagnostic approach, and surgical outcome of monostotic fibrous dysplasia of the rib in a middle-aged woman.

Methods: A descriptive case report of a 37-year-old woman presenting with a long-standing, painless right chest wall swelling. Clinical evaluation, radiologic imaging, surgical management, and histopathological findings were documented and analyzed.

Results: The patient presented with a seven-year history of a slowly enlarging, non-tender mass over the right lower chest wall. There was no history of trauma or systemic illness. Imaging showed an expansile lytic lesion with a characteristic ground-glass appearance involving the right eighth rib. Laboratory tests were normal. She underwent surgical excision via costectomy. Histopathology revealed irregular trabeculae of woven bone within a fibrous stroma, consistent with fibrous dysplasia. The postoperative course was uneventful, and she remained symptom-free at follow-up.

Conclusion: Monostotic fibrous dysplasia of the rib is a rare but important differential diagnosis of chest wall masses. Radiologic findings are suggestive, but histopathology confirms the diagnosis. Complete excision through costectomy is both diagnostic and curative, offering excellent outcomes. Increased awareness among clinicians can aid early recognition and appropriate management.

Keywords: Fibrous dysplasia, Monostotic, Rib tumor, Costectomy, Chest wall mass

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Background

Fibrous dysplasia (FD) is a rare, non-inherited, benign fibro-osseous lesion of bone characterized by abnormal differentiation of osteoblasts leading to the replacement of normal medullary bone with fibro-osseous tissue containing irregular trabeculae of woven bone.[1] It was first described by Lichtenstein in 1938 and accounts for approximately 5–7% of benign bone tumours.[2] FD occurs in two main forms: monostotic (involving a single bone) and polyostotic (involving multiple bones), with the rib affected in about 10–15% of cases.[3] It may occur in any bone but the long bones; the skull and ribs are most often affected.[4] Rib involvement is uncommon compared with craniofacial bones, the femur, the tibia, and the humerus .[5] When it does occur, it may present as an incidental radiological finding, a painless mass, or, rarely, with complications such as pain, fractures, or malignant transformation. It can also be associated with aneurysmal bone cysts. Because rib tumors constitute only 5–10% of all bony tumors, and fibrous dysplasia accounts for a small fraction of these, rib FD is considered rare [6].FD of ribs accounts for up to 30% of all benign chest wall tumors, and monostotic forms are about four times more common than polyostotic forms. It is typically present in the third or fourth decade of life as an asymptomatic mass.[7] In ~3% of cases, patients may also have endocrine diseases, skin pigmentation and precocious puberty, which together constitute the McCune–Albright syndrome (MAS).This report describes a case of a middle-aged woman with monostotic fibrous dysplasia of the right eighth rib, presenting as a long-standing painless chest wall swelling.This case contributes to the limited African data on rib fibrous dysplasia, emphasising its benign nature, diagnostic challenges, and favourable surgical outcome. It highlights the need to correlate radiologic and histopathologic findings in managing chest wall swellings, especially in resource-limited settings.

Case Presentation

A 37-year-old female presented with a gradually enlarging swelling over the right lower chest wall. The mass was first noticed seven years earlier and had remained painless throughout its course. There was no history of trauma, chest wall irradiation, chronic cough, previous tuberculosis treatment, or contact with a tuberculosis patient. She had no history of swelling in any other part of the body and no symptoms suggestive of metastatic disease. There was no associated weight loss, fever, or respiratory symptoms such as cough, dyspnea, or hemoptysis. She denied any history of chest pain, night sweats, or bone pain elsewhere. There was no history suggestive of neurogenic, vascular, or soft-tissue tumors, such as changes in limb sensation, pulsations, or bruit over the swelling. She reported no personal or family history of bone disease, metabolic disorders, or endocrine abnormalities. The overlying skin was intact, with no ulceration, discoloration, or inflammatory changes.

On inspection, there was a localized, well-circumscribed swelling over the right lateral chest wall, corresponding to the eighth rib. The mass measured approximately 16 × 4 cm, with normal overlying skin. Palpation revealed a hard, non-tender, non-pulsatile mass fixed to the underlying rib. No regional lymphadenopathy was detected. Chest radiograph revealed an expansile lesion of the right eighth rib with a characteristic "ground-glass" appearance. A computed tomography scan of the chest confirmed a well-defined expansile, lytic lesion involving the right eighth rib without mediastinal extension or pleural invasion. Laboratory investigations, including serum calcium, phosphate, alkaline phosphatase, and liver function tests, were within normal limits.

The patient underwent surgical excision of the lesion via **costectomy** of the eighth rib under general anaesthesia.

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The intraoperative findings revealed an expansile bony lesion confined to the rib, without invasion into adjacent pleura or soft tissue. (Figure 1).

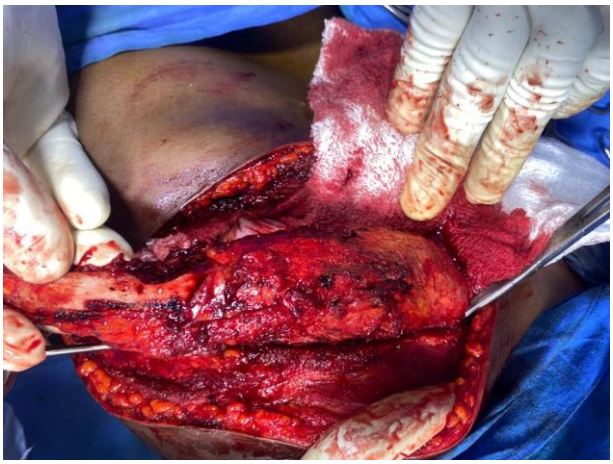

Figure 1: Intraoperative 8th rib with bulbous anterior segment

The resected specimen (Figure 2) was submitted for histopathological evaluation.

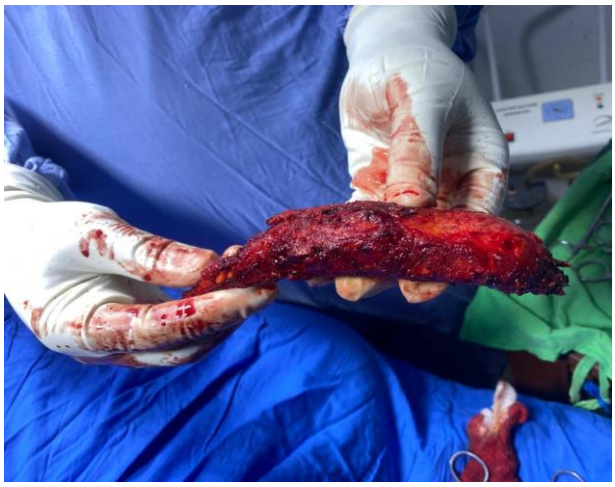

Figure 2: Gross specimen of the excised eighth rib showing an expansile bulbous lesion

Microscopic examination showed fibrous stroma containing irregular trabeculae of woven bone Fibrous dysplasia is a developmental, non-hereditary bone disorder caused by post-zygotic activating mutations in the GNAS1 gene on chromosome 20, resulting in upregulation of cyclic adenosine monophosphate (cAMP). without osteoblastic rimming, consistent with fibrous dysplasia.

Histologic sections showed a tumor composed of irregularly branching and anastomosing trabeculae of woven bone, lacking osteoblastic or osteoclastic activity, and disposed in the characteristic 'Chinese letters' pattern. The intervening fibrous stroma contained bland spindle cells without atypia. No features of myxoid change, fatty metaplasia, or secondary aneurysmal bone cyst-like changes were seen. Overall features were consistent with fibrous dysplasia (Figure 3).

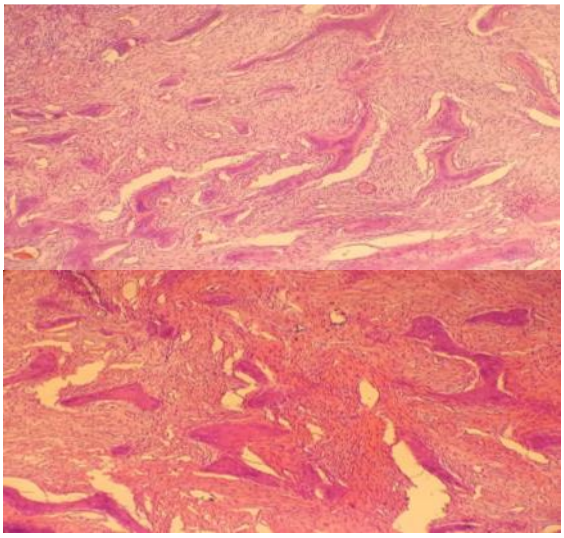

Figure 3: Photomicrograph showing irregularly branching of woven bone disposed in characteristic 'Chinese letters'

The patient's recovery was uneventful. She was discharged on postoperative day three and has remained well during follow-up, with no recurrence or complications.

Discussion

Osteoblasts carrying this mutation show increased proliferation and inappropriate differentiation leading to dysregulated proliferation of fibro-osseous tissue.[8] Clinically, FD presents as either monostotic (about 70–80%

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of cases) or **polyostotic** forms, sometimes associated with McCune-Albright syndrome (polyostotic FD, café-au-lait spots and endocrine dysfunction) and Mazabraud's syndrome (polyostotic FD and soft-tissue myxomas).[9]

Rib involvement occurs in 6-20% of monostotic FD cases.[10] Lesions often remain asymptomatic, being discovered incidentally on imaging, or present as painless chest wall swellings, as in the patient whose case has been reported. Symptomatic cases may present with pain, swelling, deformity, or pathological fractures.[11] Rarely, respiratory compromise or malignant transformation to osteosarcoma, fibrosarcoma, or chondrosarcoma may occur, with an estimated risk of 0.4–4%. [12] African case reports remain rare, making this case valuable in highlighting regional experiences with FD.

The imaging features of fibrous dysplasia (FD) reflect its histopathology. Radiographs and CT usually demonstrate the classic "ground-glass" or "frosted" appearance with variable mineralization, often accompanied by fusiform medullary expansion, cortical thickening, deformity, and increased trabeculation. Radiolucent lesions are predominantly fibrous, while radio-opaque ones contain more woven bone.

Computed tomography is superior for delineating lesion extent, identifying irregular calcifications, and excluding soft tissue invasion, whereas magnetic resonance imaging (MRI) may assist in assessing marrow involvement but is not routinely required.[13] Bone scintigraphy is sensitive for determining skeletal disease extent, especially in polyostotic cases .[5,9]

Differential diagnoses include ossifying fibroma, osteoma, bone cyst, giant cell tumor, and bone malignancies. [2,5]

Definitive diagnosis rests on histopathology, which typically shows irregular woven bone trabeculae within a fibrous stroma.[12]

Histologically, fibrous dysplasia is a well-circumscribed lesion composed of fibrous tissue with bland spindle cells and minimal mitotic activity. Irregular trabeculae of woven bone lie within the stroma in the characteristic "Chinese alphabet" pattern, without osteoblastic rimming.

Malignant transformation is rare, occurring in about 0.5% of monostotic FD.[9] Management of rib FD is primarily surgical. Indications for surgery include symptomatic lesions, diagnostic uncertainty, suspicion of malignancy, cosmetic concerns, or risk of complications.[11]

In asymptomatic patients with small, stable lesions, conservative management with periodic clinical and radiologic follow-up may be appropriate. While bisphosphonate therapy such as zoledronic acid and pamidronate can alleviate pain and slow lesion progression, it does not offer definitive treatment.

Complete excision via costectomy ensures both definitive diagnosis and cure. Conservative management with observation may be considered for small, asymptomatic lesions; however, long-standing lesions such as the one presented in this case report often warrant surgery.[14]

Surgical excision usually results in excellent outcomes with minimal recurrence. Recurrence rates are higher in polyostotic forms and in cases with incomplete resection.[3]

Conclusion

This case highlights a rare presentation of monostotic fibrous dysplasia of the rib in a middle-aged woman, manifesting as a long-standing, painless chest wall swelling. The diagnosis was established through characteristic radiologic findings and confirmed by

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histopathology following costectomy. Complete surgical excision was curative, and the patient remains symptom-free on follow-up. This report underscores the importance of considering fibrous dysplasia in the differential diagnosis of chest wall masses and reinforces that costectomy offers both a definitive diagnosis and an excellent long-term outcome, even in resource-limited settings

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