Extraosseous osteosarcoma in Ibadan: case series over a 20-year period

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Abstract

Extraosseous osteosarcoma (EOO) is a rare form of sarcoma. There have been few reports of cases and outcome from an African population.

Out of 112 cases of sarcomas seen at the UCH, Ibadan between 1986-2005, 5 were EOO. All presented late on account of initial excision without histology and outcomes were poor. EOO occurs in the black population of Sub-Saharan Africa. The outlook for these patients is still bleak.

Introduction

Extraosseous osteosarcoma (EOO) is a malignant mesenchymal neoplasm that produces osteoid, bone or chondroid material and is located in the soft tissue without attachment to the skeleton as determined by imaging modalities or inspection during surgical operative procedure.[1] EOO is a rare type of tumor making up only 1% of all soft tissue sarcomas[2,3] and 4% of all osteosarcomas.[4]

Wilson reported the first case of EOO in 1941[5] and since then fewer than 300 cases have been reported in the English Language literature.[6] The tumor is most common in middle-aged and elderly patients. A previous study showed that EOO is a doxorubicin-resistant lesion with a poor prognosis and a form of soft tissue sarcoma that should be viewed by clinicians as clinically and therapeutically distinct from osseous osteosarcoma.[6]

The single most important criteria for diagnosis of this tumor is the presence of neoplastic osteoid and bone; sometimes with neoplastic cartilage.[1,5] The histological variants of EOO include osteoblastic, chondroblastic, fibroblastic, osteoclastic or giant cell type, telangiectatic, small cell or well differentiated forms. The immunohistochemical profile includes the expression of osteocalcin and osteonectin which are specific for osseous osteosarcomas, but a study by Fanburg-Smith *et al.*[7] showed that osteocalcin is highly sensitive for EOO neoplastic cells.[1] Closely related differentials include calcified hematoma, myositis ossificans, synovial sarcoma, epithelial sarcoma, liposarcoma or malignant fibrous histiocytoma.

Methods

All sarcomas recorded at our institution between January 1986 and December 2005 were compared and extraosseous variety identified. Their charts were selected and reviewed for relevant data. Out of 112 cases of osteosarcoma recorded in our hospital between January 1986 and December 2005, 5 cases were extraosseous. This series presents the 5 cases of EOO recorded at our institution during the 20-year period from 1986-2005 and this includes one patient reported previously by Ogundiran *et al.*[8]

Case Series

Case #1

A 16-year-old male student who presented with a 4-year history of progressive left ankle swelling and pain. He had excision of a mass in his left ankle at a private facility without histological evaluation a year prior to presentation at the University College Hospital (UCH), Ibadan. On presentation at the UCH, examination revealed a 10x7 cm mass over the left lateral malleolus that was tender, differentially warm, with both cystic and solid areas. No significant popliteal or inguinal lymphadenopathy was noted. Laboratory studies were essentially normal.

He had a local excision of the mass and the operative finding was a 10x7 cm multiloculated brownish soft tissue mass over the left lateral malleolus covered with a fibrous capsule with a pedicle arising from the ankle joint. There was associated erosion of the adjoining bone and the histology report revealed soft tissue osteosarcoma. He was lost to follow-up but represented two years later with recurrence.

Case #2

A 70-year-old man who presented with a 1-year history of a painful scalp swelling associated with bleeding. A similar swelling had recently grown on the right temporal region prior to presentation at the UCH. Incisional biopsy and histology of the initial mass at the source of referral revealed an extraskeletal osteosarcoma.

Examination revealed a 15x7 cm left frontoparietal mass with overlying scar. He also had a smaller temporal mass. Both were tender and hemorrhagic. Skull X-ray showed an extensive soft tissue swelling extending from the left frontal to the left parietal region. There was an associated increase in the density of the underlying subcutaneous tissue but no calcifications. Routine laboratory studies were within normal limits. He had radiotherapy but later represented with facial recurrence after two months.

Case #3

A 21-year-old man with a 1-year history of a painful left upper back swelling and 4 month history of progressive weakness of both legs which progressed to paraplegia. He had a biopsy of the mass at a private facility five months before presentation at the UCH but no histological evaluation of the mass was carried out. Examination at the UCH revealed a left periscapular fluctuant mass with overlying hypertrophic scar which was also attached to underlying structures. He also had a T5 paraplegia. Chest X-ray showed a left paravertebral soft tissue mass lesion with evidence of destruction of the 5th rib and left sided pulmonary effusion. Urinary Bence Jones protein was negative, the full blood count was normal but the ESR was elevated. Two pleural aspirates were hemorrhagic and CT myelography showed an isolated left sided isodense lesion

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in the spinal cord with extensive erosion of the ribs as well as infiltration into the left pleural cavity.

Incisional biopsy of the left chest wall lesion revealed osteogenic sarcoma. Chemotherapy was to be administered but the patient could not afford it and he was subsequently lost to follow-up.

Case #4

A 20-year-old man who presented with an 11-month history of progressive soft tissue swelling of the right thigh associated with pain. The soft tissue mass was excised initially at a private facility but no histological evaluation of the specimen was carried out. Examination at the UCH revealed a massively swollen right thigh with multiple areas of ulceration. Biopsy and histology at the UCH revealed extraosseous osteogenic sarcoma. The patient was given a hemostatic dose of radiotherapy but was subsequently lost to follow-up.

Case #5

A 40-year-old housewife who presented with a 20-month history of painful left breast lump which had been excised previously at another hospital without histological evaluation, but recurred eight months before presentation at UCH. Examination revealed a globular left breast mass which was warm, multinodular, fixed to the pectoralis fascia and which measured 20x18 cm. There was associated ipsilateral axillary lymph node enlargement. Other systems were essentially normal.

A clinical diagnosis of locally advanced cancer of the left breast was made. A core needle biopsy revealed an osteogenic sarcoma which was confirmed by the histology of the mastectomy specimen. She was scheduled for post-operative radiotherapy but defaulted and died six months post-mastectomy.

Discussion

The exact cause of EOO is unknown and it is presumed to be mainly an idiopathic condition. Unlike osseous osteosarcoma (OOO), it has not been documented in siblings or in association with hereditary retinoblastoma but risk factors associated with the development of this tumor include previous exposure to radiation, such as X-rays and radioactive thorium dioxide (Thorothrast).[9] Other associated factors suggested in literature in the development of EOO include trauma, the assessment and evaluation of which is difficult and controversial.[10] Some cases have been associated with intramuscular injection[11] while some EOO have been reported to follow myositis ossificans.[12,13]

A common mode of presentation is as a swelling of insidious onset with associated pain in one-third of patients but often the tumor grows to a large size before the patient seeks medical advice.[14] It may ulcerate with growth, but that usually occurs after biopsy or attempts at excision and the tumor usually occurs in middle-aged and elderly patients.[15]

The anatomic location of EOO is usually the muscles of the thigh, which are the most commonly affected; the large muscles around the pelvic and shoulder girdles and the retroperitoneum, though rare locations like the thyroid gland, penis, mediastinum and the kidney are occasionally encountered.[1,12,15,17,18]

At the Memorial Sloan-Kettering cancer center, a review of 48 cases of EOO during 1950-1983 showed a median age at diagnosis of 51 years (range, 6-80 years).[14] The most common primary sites were the thighs and buttocks (54.2%) with preponderance in patients aged 50 years and above and slightly more common in males (58%) than in females.[12] In the report by Chung and Enzinger, EOO occurs principally as a soft tissue mass involving an extremity with a predilection for the thighs (lower extremity 46.6%; upper extremity 20.5%) and the retroperitoneum in 17%. In most cases, the tumor was deep seated and firmly attached to the fascia, but occasionally they are freely movable and confined to the subcutis or dermis. The duration of symptoms prior to presentation ranges from two weeks to 25 years (median six months). Prior trauma to the site was observed in 12.5% and irradiation to the affected site in 5.7% of cases.[12]

Although osseous osteosarcoma (OOO) occurs predominantly in the first two decades of life, EOO are rarely encountered under 40 years of age.[15] However, in this case series, 3 of the 5 patients were aged 21 years and under in keeping with other cases which have been documented in the pediatric age group.[16]

Imaging modalities by either plain conventional radiograph, CT scan or MRI of the soft tissue is essential to rule out any continuity of tumor with bone. If adjacent bone shows radiological changes of involvement by the tumors, it is most likely to be originating from the bone rather than from the soft tissue. A soft tissue mass with spotty to massive calcification without adjacent bone involvement is one of the classic radiographic appearances of this tumor.[15]

EOO is a difficult disease to treat and the optimum therapy has not been fully determined due to the relative rarity of these tumors. Advances in the care of these patients will require disease-specific clinical trials.[6] A wide local excision, with at least 5cm margin of normal tissues should be the treatment of choice.[15] The local recurrence-free survival rate observed in a recent study[6] suggests that patients with extremity EOO can be treated with limb salvage operative procedures. However, if these are not possible due to the anatomic location of the tumor, amputation is recommended.[19]

In a review of 48 cases of EOO and 39 trials of chemotherapeutic agents reported by Sordillo *et al*. they showed that no patient had a major response.[14] The average 5-year survival rate in 5 previous studies ranges from 15-25%[2,9] and the response to multimodality therapy is not as good as for OOO.[14] Tumor size (<5 cm *vs.* ≥5 cm) was the major predictor of patient survival.[13]

Of note, the challenges of managing malignancies and other chronic illnesses in a developing economy like ours is exemplified by these cases. The issues of late presentation, non-submission of biopsy specimen for histological assessment, non-affordability of treatment modality and default from follow-up raise critical issues. These include late presentation, lack of health or social insurance making the patient bear the full cost of their treatment and probably also the ignorance of the initial managing physician regarding the need for histological assessment of all biopsies or their unwillingness to insist on this (as a measure to reduce costs and increase their competitiveness). These factors may all be related to cost of treatment, and patients, therefore, have a significantly long delay before presentation and would usually present in a private facility with a view to reducing the cost of treatment.

Conclusions

In conclusion, the outlook for patients with EOO is grave and the majority of patients with this tumor succumb to metastatic disease within a period of three years after the initial diagnosis.[1] Extraosseous osteosarcoma occur in the populations of Sub-Saharan Africa and the poor prognosis for EOO in our environment is further compounded by the factors earlier highlighted. Since recurrence occurs mostly within two years after surgery, adjuvant chemotherapy and radiotherapy have been found to be beneficial.[15]

References

1. Weiss SW, Goldblum J. Osseous soft tissue tumours in Enzingers and Weiss: Soft Tissue Tumours 4th ed. Pg 1389-1417, Mosby St Loius, 2001.
2. Allan CJ, Soule EH. Osteogenic sarcoma of the soft tissue: a clinicopathologic study of 26 cases and review of the literature. Cancer 1971;27:1121-33.
3. McCarter MD, Lewis JJ, Antonescu CR, et

al. Extraskeletal osteosarcoma: analysis of outcome of a rare neoplasm. Sarcoma 2000; 4:119–23.
4. Van Rojswik CSP, Lieng TG, Kroon HM, et al. Retroperitoneal extraosseous osteosarcoma. J Clin Path 2002;54:77-8.
5. Wilson H. Extraskeletal ossifying tumours. Ann Surg 1941;113:95-112.
6. Ahmad SA, Patel SR, Ballo MT, et al. Extraosseous osteosarcoma. Response to treatment and long term outcome. J Clin Oncol 2002;20:521-7.
7. Fanburg-Smith JC, Bratthauer GL, Miettinen M. Osteocalcin and osteonectin immunoreactivity in extraskeletal osteosarcoma: a study of 28 cases. Hum Pathol 1999;30:32.
8. Ogundiran TO, Ademola SA, Oluwatosin OM, et al. Primary osteogenic sarcoma of the breast. World J Surg Oncol 2006;4:90.
9. Lee WR, Laurie J, Townsend A. Fine structure of radiation-induced osteogenic sarcoma. Cancer 1975;76:1414-5.
10. Fine G, Stout AP. Osteogenic sarcoma of the extraskeletal soft tissue. Cancer 1956; 9:1027-43.
11. Lee JH, Griffith WJ, Bottomley RH. Extraosseous osteogenic sarcoma following an intramuscular injection. Cancer 1977;40: 3097-101.
12. Chung EB, Enzinger F. Extraskeletal osteogenic sarcoma. Cancer 1987;60:1132-42.
13. Bane BL, Evans HL, Ro JY, et al. Extraskeletal sarcoma: a clinicopathologic review of 26 cases. Cancer 1990;65:2762-70.
14. Sordillo PP, Hadju SL, Magill GB, et al. Extraosseous osteogenic sarcoma: a review of 48 patients. Cancer 1983;51:727-34.
15. Lin S-Y, Chen W-M, Wu HH, et al. Extraosseous osteogenic sarcoma. J Chin Med Assoc 2005;68:542-5.
16. Humphrey GM, Brown I, Squire R, et al. Extraosseous osteogenic sarcoma-A rare pediatric malignancy: Case report and review of the literature. J Pediatr Surg 1999; 34:1025-8.
17. Hertel V, Basten O. Extraosseous osteosarcoma of the thyroid gland. Laryngorhinootologie 2006;85:913-6.
18. Dudhat S, Desai S, Borges A, et al. Retro - peritoneal extraosseous osteosarcoma. A case report and review of literature. Indian J Cancer 1999;36:186-9.
19. Lewis RJ, Loiz MJ, Beazley RM. Extraosseous osteogenic sarcoma: case report and approach to therapy. Ann Surg 1974:40: 597-600.