ORIGINAL RESEARCH PAPER

Medical – Radio Diagnosis

# METATARSAL OSTEOSARCOMA WITH LUNG METASTASIS

KEY WORDS:

**Dr. Revin*** Senior Resident, Dept. of Radio diagnosis, PGIMS, Rohtak.*Corresponding Author

**Dr. Devanand** Sr. Consultant, Radiodiagnosis, Fortis Hospital

## INTRODUCTION

Foot osteosarcomas are rare and their presentation is also different as compared to other sites. High-grade osteosarcoma of the foot is treated similarly to those in conventional sites with ablative surgery and neoadjuvant chemotherapy. Here, we report a case of high-grade osteosarcoma of the first metatarsal. This report is being written to create awareness among surgeons regarding this rare entity. Prompt diagnosis and treatment are required in such a case, as the prognosis of the patient is poor. In the discussed case, the diagnosis was delayed resulting in dissemination and increased staging of the disease.

Osteosarcoma of the foot with lung metastasis is a very rare presentation of a rare tumor entity. Bone tumors of the foot have been reported to be rare, of these tumors 23-26% are malignant & only 4% of all osteosarcoma occur in the foot. Osteosarcoma is a malignant tumor characterized by the direct formation of osteoid or immature bone by malignant cells. It usually develops in long bones and rare in short bones. Hence, osteosarcoma of the foot is clinically unexpected and diagnosis is often delayed or initially erroneous, leading to delayed or inappropriate treatment decisions.

The tumor site within the foot was classified by us into one of the three anatomic parts of the foot(phalanges.metatarsal bones & tarsal bones) according to the specific bone involved.

According to the American Cancer Society, if osteosarcoma has spread only to the lungs, the survival rate is closer to 40% but if it has already spread to other organs when it is first found, the 5-year survival rate is about 15%–30%.

## PRESENTATION OF CASE & CLINICAL SPECTRA

A 24-year-old male came to the Outdoor Patient Department,PGIMS Rohtak due to pain& heaviness while breathing. The patient was sent to the radiodiagnosis department for HRCT CHEST.

On HRCT imaging multiple enlarged diffusely distributed varying sized, well defined soft tissue density space-occupying lesion with few of them show foci of internal punctuate calcification seen in bilateral lungs suggestive of bilateral pulmonary metastasis. (Figure 1)

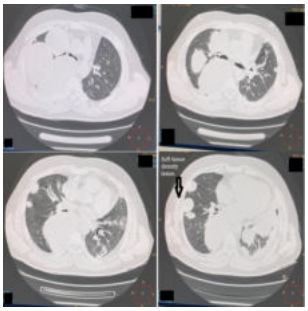

**Figure 1:Soft tissue density space-occupying lesion with foci of internal punctuate calcifications**

On further examination, the patient gives a history of large swelling with pain at the base of 1st metatarsal at the dorsal aspect from the last 6 months for which he consulting a local quack 6 month back and got surgery for the same. He had no history of trauma, weight loss, evening rise of temperature, loss of appetite, or any other medical history. On physical examination, diffuse swelling was palpable around the first metatarsal at the dorsal aspect. It was irregular, firm, and tender. The swelling was tense and showed discoloration& breach of overlying skin.

Imaging of the foot revealed few small osteolytic lesions with cortical break seen in the shaft of 1st metatarsal bone with larger soft tissue component, subcutaneous involvement, and causing displacement of adjacent muscular plane suggestive of osteosarcoma. (Figure 2)

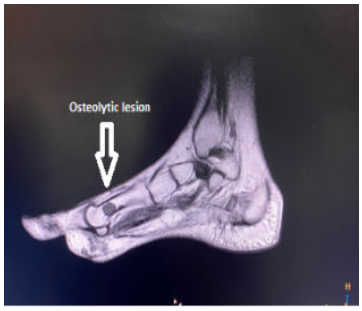


**Figure 2: Smallosteolytic lesion with cortical break seen in the shaft of 1st metatarsal bone.**

Blood parameters like alkaline phosphatase was done and was found to be raised. Other blood tests such as complete blood count, liver function test, and renal function test were within normal limits.

## PATHOLOGICAL DISCUSSION

The patient was then sent to the Pathology Department for histopathological diagnosis. Incisional biopsy was taken which shows atypical chondrocytes surrounded by pleomorphic richly cellular areas showing increased mitosis with fragments of the osteoid by pleomorphic ovoid cells. These features were in favor of chondroblastic osteosarcoma. (Figure 3)

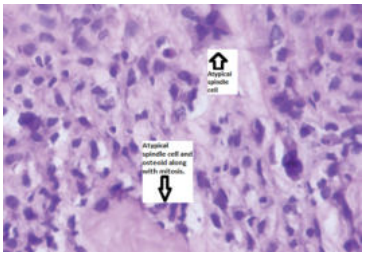

**Figure 3: Histopathological staining shows atypical spindle cells and the formation of osteoid along with quadripolar mitosis.**

## MANAGEMENT

The patient underwent below ankle metatarsal amputation

and received chemotherapy. The amputated specimen was sent for a biopsy which confirmed our earlier diagnosis of chondroblastic osteosarcoma, and now, the patient is under regular follow-up.

## DISCUSSION& PROGNOSIS

A very few cases of osteosarcoma of metatarsal bones have been published in the literature, and together with bilateral lung metastasis is very rare.

Osteosarcoma occurs most commonly in the 10–20 years age group and the seventh to the eighth decade. Before 1970, the prognosis for patients with high-grade osteosarcoma was poor with long-term survival <20%, but advances in adjuvant and neoadjuvant chemotherapy have improved 5-year disease-free survival to more than 60%.[4]

Several epidemiologic risk factors have been related to the development of osteosarcoma, including a history of ionizing radiation exposure, fibrous dysplasia, retinoblastoma, or history of trauma.

The lung is the most common site of metastases with 77%–92% of patients experiencing recurrence at this site.[6]

The patient with osteosarcoma of extremity who presents with lung metastasis has a poorer prognosis than those without metastasis. Nonetheless, with the combination of chemotherapy and complete surgical removal of primary and secondary lesions, the survival of patients with metastases has improved from <5% to >20%. However, when complete excision of all secondary lesions is impossible, the 5-year survival rate becomes extremely low and almost all of these patients die within 3 years from the time of diagnosis.[7]

No single feature on the radiograph is diagnostic. Osteosarcoma lesions can be purely osteolytic, purely osteoblastic, or mixed. Imaging of primary lesion helps in delineating the location and extent of the tumor and is critical for surgical planning. CT of the chest is more sensitive than plain radiography for properly assessing pulmonary metastasis.[8]

On histologic examination of the tumor, two elements are most important; first, the type of tumor can be assessed by the biopsy specimen. Second, the response to treatment can be assessed only by evaluating the tissue resected after chemotherapy. The characteristic feature of osteosarcoma is the presence of osteoid in the lesion, even at the site distant from the bone (e.g., lung). Various histologic subtypes have been described (osteogenic, chondroblastic, fibrogenic) although they are clinically indistinguishable.[9],[10]

## DIFFERENTIAL DIAGNOSIS

The differential diagnosis of osteosarcoma of the foot includes benign conditions such as osteoid osteoma and fibrous dysplasia or desmoplastic fibroma.[2] The clinical finding of bone pain and swelling in overlying soft tissue can result in a misdiagnosis of osteoid osteoma.[11] If the disease presents late, with metastasis, pathological fracture, the inadequate margin of excision, or larger tumor volume, survival is significantly lowered.

## FINAL DIAGNOSIS

The amputated specimen was sent for a biopsy which confirmed our earlier diagnosis of chondroblastic osteosarcoma.

## CONCLUSIONS

Osteosarcoma of small foot bones is a very rare condition and awareness among surgeons of this condition can significantly lower morbidity and mortality from this grave disease. Therefore, early diagnosis and prompt ablative surgery play a major role in improving patient prognosis.

## No conflict interests declaration

All appropriate patient consent forms have been obtained. The patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names or initials will not be published and all efforts to conceal their identity will be taken, but anonymity cannot be confirmed

## REFERENCES


[1] Sur YJ, Kang YK, BahkWJ, Chang DK, Rhee SK. Metastatic malignant tumour in the hand. J PlastSurg Hand Surg 2011;45:90-5.
[2] Okada K, Wold LE, BeaboutJW, ShivesTC. Osteosarcoma of the hand. A clinicopathologic study of 12 cases. Cancer 1993;72:719-25.
[3] Daecke W, Bielack S, Martini AK, Ewerbeck V, Jürgens H, Kotz R, et al. Osteosarcoma of the hand and forearm: Experience of the Cooperative Osteosarcoma Study Group. Ann SurgOncol 2005;12:322-31.
[4] Bacci G, Picci P, Ferrari S, Ruggieri P, Casadei R, Tienghi A, et al. Primary chemotherapy and delayed surgery for nonmetastatic osteosarcoma of the extremities. Results in 164 patients preoperatively treated with high doses of methotrexate followed by cisplatin and doxorubicin. Cancer 1993;72:3227-38.
[5] Abe K, Kumagai K, Hayashi T, Kinoshita N, Shindo H, Uetani M, et al. High-grade surface osteosarcoma of the hand. Skeletal Radiol 2007;36:869-73.
[6] Strauss SJ, McTiernan A, Whelan JS. Late relapse of osteosarcoma: Implications for follow-up and screening. Pediatr Blood Cancer 2004;43:692-7.
[7] Palmerini E, Staals EL, Ferrari S, Rinaldi R, Alberghini M, Mercuri M, et al. Nonresectable multiple lung metastases of high-grade osteosarcoma of the humerus: Stable after twelve years. A case report. J Bone Joint Surg Am 2008;90:2240-4.
[8] MirraJM, editor. Bone Tumors: Clinical, Radiological and Pathological Correlation. Philadelphia: Lea and Febiger; 1989. p. 250-2.
[9] Bacci G, Ferrari S, Bertoni F, Ruggieri P, Picci P, Longhi A, et al. Long-term outcome for patients with nonmetastatic osteosarcoma of the extremity treated at the istitutoortopedico Rizzoli according to the istitutoortopedico Rizzoli/osteosarcoma-2 protocol: An updated report. J ClinOncol 2000;18:4016-27.
[10] Bacci G, Briccoli A, Longhi A, Ferrari S, Mercuri M, Faggioli F, et al. Treatment and outcome of recurrent osteosarcoma: Experience at Rizzoli in 235 patients initially treated with neoadjuvant chemotherapy. ActaOncol 2005;44:748-55.
[11] Ellman H, Gold RH, Mirra JM. Roentgenographically "benign" but rapidly lethal diaphyseal osteosarcoma; a case report. J Bone Joint Surg Am 1974;56:1267-9.
[12] Carsi B, Rock MG. Primary osteosarcoma in adults older than 40 years. ClinOrthopRelat Res 2002;397:53-61.