

OSTEOSARCOMA OF THE METATARSAL BONES

Review of the Literature and Report of a Case

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A case of osteosarcoma affecting the third metatarsal bone is submitted. Below-knee amputation was performed, but the patient developed pulmonary metastases and died 1 year after the operation. The six cases of osteosarcoma in the metatarsal bones published so far are reviewed. The prognosis for cases with this localization does not appear to differ from that for osteosarcoma in general.

Key words: osteosarcoma; metatarsal bones

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In his book "Fractures and Joint Injuries" Watson-Jones (1960) said, speaking of the metatarsal bones, that "sarcoma of this bone has not yet been reported in thousands of years in any country". He thereby wanted to emphasize how absurd an erroneous diagnosis of sarcoma is when march fractures are so common at this site and to stress the serious consequences that such a mistaken diagnosis may entail and has indeed entailed (Dodd 1933).

At any rate, osteosarcomas of the metatarsal bones are extremely rare. Reviewing the literature, we found only six cases. However, this probably does not give a true impression of the incidence, as in many reports on osteosarcoma the exact site of the tumour is not stated. Table 1 lists the materials published so far in which the site has been sufficiently clearly elucidated. It will be seen that metatarsal osteosarcomas make up about 0.5 per cent of the total number of osteosarcomas on record. On the basis of the incidence of osteosarcomas in general (Coley 1949), this corresponds to an incidence of metatarsal osteosarcomas of one case in 20

Table 1. Occurrence of osteosarcomas affecting the metatarsal bones in the materials published so far. Only materials giving sufficient information about the exact location of the tumours are included in the Table

	Number of osteosarcomas	Metatarsal osteosarcomas
Code (1955)	133	1
Coventry & Dahlin (1957)	430	2
Lindbom et al. (1961)	96	1
Lee & MacKenzie (1964)	160	0
McKenna (1966)	258	2
Marcove et al. (1970)	145	0
Jenkin et al. (1972)	62	0
Scranton et al. (1975)	54	0
Price et al. (1975)	125	0
Present material*	49	1
Total	1522	7

* Dissing et al. (In press)

million people.

Among a 10-year material from 1964 to 1973 we found, out of 49 cases of osteosarcoma, one which was localized to a metatarsal bone.

CASE REPORT

In early March 1971 a 22-year-old imbecile man (RH.U. case rec. 20654) noticed a swelling on the dorsum of his left foot. It caused mild pain and difficulty in wearing shoes. When he was first seen 2 months later there was a mass, "half the size of a hen's egg", on the middle of the dorsum of the left foot. Radiography on May 10th showed a tumour in the third metatarsal bone (Figure 1). In spite of the radiological finding, the tumour was diagnosed primarily as a benign osteochondroma, and in the local hospital an *en bloc* non-radical excision of the tumour and the affected metatarsal bone was performed on June 24th. At the operation the tumour was found to be infiltrative, involving the surrounding soft tissues, especially in the sole. The cut surface of the removed tumour was yellowish



Figure 1. Radiography showing a chiefly osteolytic tumour involving the proximal two-thirds of the third metatarsal bone. In the large calcified soft-tissue component of the tumour a spicular pattern can be seen in places.

white and lobulated. Histological examination, as well as subsequent revision of the preparations, revealed a chondroblastic osteosarcoma (Figure 2). The patient was then referred to the Department of Orthopaedic Surgery, Rigshospitalet, University of Copenhagen, where he was admitted in July. At that time there were no signs of dissemination of the tumour; in particular the chest radiography was normal. On July 20th a below-knee amputation was carried out. The amputation specimen contained, in the forefoot, a large residual tumour invading the second metatarsal bone and involving the soft tissues in the sole. Irradiation or chemotherapy were not applied. In April 1972 the patient developed multiple pulmonary metastases and succumbed to his malignancy on July 7th of the same year.

DISCUSSION

It is a fairly common assumption that osteosarcomas affecting the hand and foot have a relatively favourable prognosis (Coventry & Dahlin 1957). Since, however, these sites are extremely rare, the prognostic evaluation must be based upon the fact that in some materials the prognosis is better for tumours localized distally than proximally in the limbs. This is in accordance with the experience of Marcove et al. (1970) in whose material pulmonary metastases occurred fairly late when the tumours were localized distally to the knee and elbow. Moreover, Dahlin & Coventry (1967) and Jaffe (1958) found a better 5-year survival after tumours affecting the tibia than the femur. Jeffree et al. (1975) found relatively few extrapulmonary metastases from tumours in the tibia. Others (Stanley & MacKenzie 1964, Scranton et al. 1975) could not confirm this finding. In any case, the differences found are rather slight, and it was only in Dahlin & Coventry's material that the difference was statistically significant ($P < 0.01$).

However, if there is a relationship, viz., that a more peripheral site affords a better prognosis, metatarsal osteosarcomas would be expected to have a particularly long survival. Reports published so far have not provided any evidence of this kind. Coventry & Dahlin (1957) reported two patients with metatarsal osteosarcoma both of whom died within 5

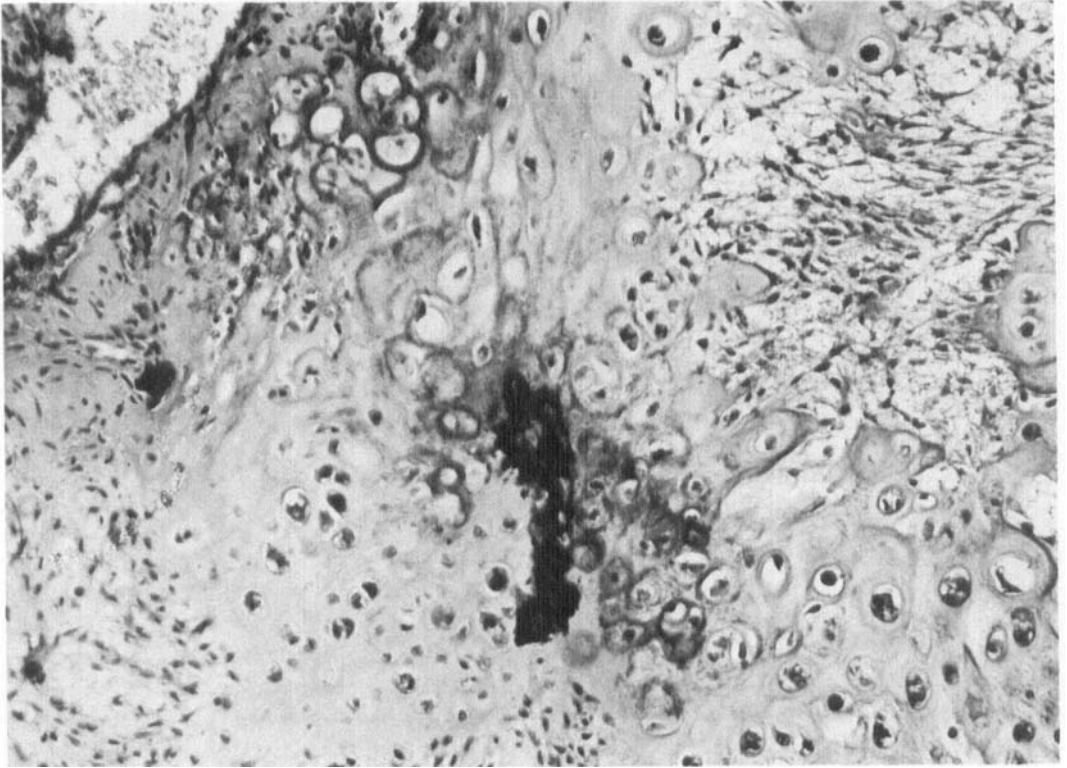


Figure 2. Malignant mesenchymal tumour tissue with a small, central bone formation, surrounded by polymorphous osteoblasts and chondrocytes in a matrix of osteoid tissue and cartilage. Histological diagnosis: Chondroblastic osteosarcoma. $\times 160$.

years, Lindbom et al. one case in the second metatarsal in a 14-year-old girl who died of pulmonary metastases 3 months after the onset of symptoms, and McKenna et al. (1966) two patients with metatarsal osteosarcoma who died within 5 years. To these may now be added our patient who died with pulmonary metastases in 1 year. Only Cade (1955) has reported on a patient who was still surviving after 17 years. This was a 51-year-old man with von Recklinghausen's disease. After radiotherapy, below-knee amputation was carried out. However, Cade included chondrosarcomas and osseous fibrosarcomas in his material, and therefore the tumour in question cannot be classified with certainty as an osteosarcoma.

Thus, out of the seven patients on record six have died of their tumour, while the seventh possibly did not have an osteosarcoma. In

other words, there is no basis for assuming that a metatarsal osteosarcoma has another, or in particular a better, prognosis than osteosarcomas in general. Besides, convincing evidence, let alone definitely significant proof, has never been adduced concerning the theory of an improvement in the prognosis of osteosarcoma according to the distance of the tumour from the trunk. Accordingly, this theory should not be included in the prognostic assessment of individual cases.

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