CASE REPORT

Not all secondary bone tumours are secondaries. Concurrent metastatic breast carcinoma and chondrosarcoma of the femur

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SUMMARY

We present a case of metastatic adenocarcinoma of the breast in a patient who sustained a pathological fracture of the distal femur. Histology of the distal femur lesion excised at the time of endoprosthesis replacement confirmed this to be a primary chondrosarcoma. We have reviewed the literature and identified previously documented cases of concurrent breast carcinoma and chondrosarcoma of bone. A high index of suspicion is warranted and the diagnosis must be first confirmed before rushing to internal fixation (therapeutic or prophylactic) assuming them to be secondary bone lesions from the known primary cancer even in patients with multiple metastases.

BACKGROUND

Orthopaedic surgeons are usually involved when a patient with metastatic cancer sustains a pathological fracture from bony metastases. It is common practice to assume this to be a secondary deposit from the originally diagnosed primary tumour. Management decisions are usually based on this presumption. We present a case of pathological fracture of a distal femur in a patient with known metastatic breast carcinoma, which turned out to be another primary tumour, a chondrosarcoma. We present a review of similar cases from the literature and discuss the significance of this possibility.

CASE PRESENTATION

A 56-year-old woman who was attending for inpatient chemotherapy felt her left knee give way when getting off the toilet. Weight bearing on the leg was not possible due to pain, and radiographs of her knee confirmed a supracondylar fracture of the left distal femur. She had metastatic breast carcinoma with lung secondaries and with ongoing chemotherapy was expected to survive longer than 6 weeks. An MRI scan was arranged to determine the extent of the deposit in the femur, in order to select the ideal fixation. MRI revealed extensive infiltration of the distal femur and this looked unsuitable for internal fixation ([figure 1](#)).

The primary breast tumour, diagnosed 3 years prior to the fracture, was an aggressive, poorly differentiated (grade 3) ductal carcinoma (oestrogen receptor, progesterone receptor and human epidermal growth factor receptor 2 negative; [figure 2](#)). The patient was initially treated with wide local excision and sentinel node biopsy, which showed that the margins were clear and lymph nodes were

negative (T2 N0 M0). She had a right mastectomy for local recurrence and shortly afterwards was found to have pulmonary metastases. She received a number of different chemotherapy regimens. Most lung lesions responded and the remaining resistant nodule required wedge resection 2 years later.

DIFFERENTIAL DIAGNOSIS

The lesion in the distal femur was presumed to be a secondary deposit with a history of metastatic breast carcinoma.

TREATMENT

The regional bone tumour unit was consulted for an expert opinion. The patient was transferred to the bone tumour unit and underwent endoprosthesis replacement of the distal femur. She was able to mobilise on the knee almost pain free for 8 weeks before eventually succumbing to a

Figure 1 T1-weighted MRI of the left femur showing extensive lesion involving the distal femur and pathological fracture.

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Figure 2 Histology of breast adenocarcinoma.

pulmonary embolism in spite of mechanical prophylaxis and enoxaparin in the perioperative period.

OUTCOME AND FOLLOW-UP

Histology from the excised distal femur did not show metastatic breast carcinoma as expected, but identified a primary chondrosarcoma (figure 3). Histology from the previous breast and lung biopsies were reviewed in multiple centres to exclude the possibility of misdiagnosed dedifferentiated chondrosarcoma spreading to breast and lung, and eventually two separate primary cancers were confirmed.

DISCUSSION

Primary chondrosarcoma of the breast, although very rare, has been reported previously.¹ An extensive review of 132 636 cases of breast cancer between 1973 and 1998, in the Netherlands,² identified 34 cases of concurrent breast cancer and cartilaginous tumours. There were 28 osteochondromas in the same group as well but a statistically similar incidence of concurrent

Figure 3 Histology of chondrosarcoma femur.

osteochondromas was observed in patients with lung cancer. Out of the 34 cases, 18 were enchondromas and 15 chondrosarcomas, and involved mostly the femur or humerus (65%). All 34 had histological and immunohistochemical survey performed and cluster analysis did not reveal any associations with known syndromes or genetic traits. Their findings support the existence of a new hitherto unrecognised syndrome, characterised by an increased risk to develop breast cancer and also centrally originating cartilaginous tumours. There have been sporadic reports of concurrent breast carcinoma as well as bone chondrosarcoma in the literature.³ The possibility of an unidentified genetic mutation increasing susceptibility to multiple concurrent tumours cannot be ruled out, but has not yet been proven.³

In patients with metastatic cancer, pathological fractures are assumed to be a secondary deposit from the originally diagnosed primary tumour. Management decisions are usually based on this presumption. In this case, since the femoral lesion was not appropriate for stabilisation with internal fixation and required excision/replacement, we could make a definitive histological diagnosis of a different tumour. Even though this diagnosis has not changed the eventual outcome in our patient, orthopaedic surgeons should be aware of the possibility of two different primary tumours being present at the same time. Chosen surgical strategy should also consider further cancer treatment that may be required, such as radiotherapy, which may delay fracture healing and, of course, the life expectancy of the patient.

Learning points

- ▶ A high index of suspicion is warranted in pathological fractures regarding possibility of a second primary tumour even in presence of multiple metastases.
- ▶ Diagnosis must first be confirmed before rushing into internal fixation, as these tumours may be better treated with wide excision and endoprosthetic replacement.
- ▶ Timely referral to specialist bone tumour units should be considered if there is any clinical suspicion.

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