Delayed diagnosis in metastatic lesions of the foot

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ABSTRACT

INTRODUCTION Pedal acrometastases are a rare complication of disseminated malignancy. To date, there is little in the literature documenting their clinical course.

METHODS Our large orthopaedic oncology database was used to review the clinical course of symptomatic pedal acrometastases.

RESULTS A total of 15 cases of pedal acrometastases were identified from 2,595 patients with metastases. The median age at presentation was 64.5 years (range: 14–83 years) and the median length of foot symptoms (predominantly pain and swelling) prior to diagnosis of metastasis was 16 weeks (range: 6–104 weeks). The median survival following diagnosis was 4.6 months (range: 2.3–104.5 months).

CONCLUSIONS This study suggests that 0.58% of all osseous metastases involve the foot, and that symptoms of foot pain and swelling are often misdiagnosed, leading to delays in treatment. A high index of suspicion is required to diagnose pedal acrometastases early, thereby allowing early treatment so that the patient's quality of life can be maintained prior to death.

KEYWORDS

Foot – Metastasis – Malignancy – Diagnosis

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Skeletal metastases occur in 20–30% of all patients with a malignant disease.^{1,2} Information on acrometastases (metastases to hands or feet) is limited although small reports suggest they occur in only 0.007–0.3% of cancer patients,¹ with pedal acrometastasis accounting for 30–50% of these cases.⁵ They are associated with a poor prognosis⁴ and arise commonly from lung, kidney and colonic primary tumours.⁵ Delays in diagnosis are commonplace as metastasis is often not considered in the differential diagnoses when patients present with foot pain or swelling. Consequently, symptoms are frequently overlooked or misdiagnosed, leading to a delay in treatment. Once the diagnosis is established, treatment ranges from simple analgesia and orthotics to radiotherapy or amputation.

To our knowledge, only one series has been published reviewing pedal acrometastases from a single institution. Hattrup *et al* described the clinical outcome of 17 biopsy proven osseous metastases of the foot from 1947 to 1984.⁵ In their series, they noted that for a significant proportion of patients (9/17, 53%), the presence of the foot metastases was the first presentation of malignancy. They also noted that bronchial, colon and renal tumours were the most common primary tumours. Following diagnosis of their metastases, mean survival was 13.6 months. Given the advances in both oncological diagnosis and subsequent treatment, we hypothesised that survival following diagnosis should have increased. The aim of this study was therefore to use a large musculoskeletal oncology database to

provide a more accurate incidence of symptomatic pedal acrometastasis as well as to review the clinical course and outcomes.

Methods

A retrospective search of a prospective tumour database was conducted to identify all patients treated at our unit with pedal acrometastases. The diagnosis was made under the auspices of a supraregional bone tumour unit after review of the patient's history, radiology and biopsy. Patient demographics were recorded along with the site of their primary malignancy, region of the foot involved and management of their pedal metastases.

Results

A search of our database, which holds prospectively gathered data on over 35,000 patients (including 2,595 patients with metastases), identified 217 patients with a malignant tumour involving the bones of the foot. Fifteen (6.9%) of these were identified as having a metastatic lesion. There were nine female (60%) and six male patients (40%). The median age at presentation with foot metastases was 64.5 years (range: 14–83 years). All cases were referred to our unit for investigation of a suspicious lesion in the foot. All patients presented with intractable, non-mechanical pain while 11 (73%) presented with both pain and swelling of

the affected foot. The median length of foot symptoms prior to diagnosis of metastasis was 16 weeks (range: 6–104 weeks). Twelve (80%) of the metastases were found in the hind/midfoot (8 in the cuboid/navicular and 4 in the calcaneus) with the remainder in the forefoot (metatarsals) (Fig 1).

In 12 of the patients, there was a past history of malignancy but in 3 there was none. The disease free interval from diagnosis of the primary tumour to that of metastasis varied from 7 to 64 months (mean: 19.3 months). In only three patients were there other known metastases.

Ten patients (67%) had infradiaphragmatic primary lesions and only four (26.7%) had primary carcinoma of the lung. Three patients (20%), who presented to our unit without a prior history of malignancy, were diagnosed subsequently with metastatic carcinoma following biopsy of

their suspicious foot lesion. In 12 patients (80%), the foot metastasis was the only metastasis clinically apparent at presentation. Nine (60%) received palliative radiotherapy, three (20%) underwent amputation and three (20%) were treated expectantly. The median survival following diagnosis of pedal metastases was 4.6 months (range: 2.5–104.5 months), with a mean survival of 20.1 months (Table 1).

Discussion

The aim of this study was to use a large database of patients from a busy orthopaedic oncology unit to consider the proportion of malignant foot tumours that are attributable to metastases and to review their clinical course. In our experience, 6.9% of all malignant tumours involving the foot are metastatic and we have demonstrated that the incidence of pedal acrometastases is 0.58% of all metastases seen at our unit.

However, if metastatic disease is not in the list of differential diagnoses of a patient presenting with foot pain, the diagnosis can often be overlooked. It is not uncommon for patients with foot pain to be misdiagnosed as suffering from a benign condition such as gout,^{6,7} rheumatoid arthritis,^{8,9} Paget's disease,¹ ligamentous sprains¹⁰ or osteoarthritis. Furthermore, estimates of pedal acrometastases are probably low owing to the common practice of excluding the distal extremities from metastatic skeletal surveys or whole-body computed tomography.⁵ In addition, little effort is made at postmortem examination to detect occult, metastatic lesions in the distal limbs.⁵

Healey *et al* reported 29 cases of metastasis of the hand or foot, with metastasis being the first manifestation of

Table 1 Patient demographics, treatment and survival

Case	Age / sex	Primary tumour	Clinical presentation	Length of symptoms	Other metastasis at presentation	Treatment	Survival
1	77 F	Uterus	Pain, swelling	20 wks	–	–	2.3 mths
2	52 F	Breast	Pain, swelling	20 wks	Clavicle, chest wall	Radiotherapy	35.5 mths
3	75 F	Bladder	Pain, swelling	40 wks	–	Radiotherapy	5.9 mths
4	64 M	Lung	Pain, swelling	6 wks	–	Radiotherapy	11.5 mths
5	77 M	Melanoma	Pain, swelling	26 wks	–	Below-knee amputation	26.9 mths
6	64 M	Kidney	Pain	36 wks	–	1st ray amputation	104.5 mths
7	67 M	Melanoma	Pain, swelling	24 wks	–	–	3.1 mths
8	83 F	Bladder	Pain, swelling	104 wks	–	Below-knee amputation	32.1 mths
9	40 F	Lung	Pain, swelling	52 wks	–	Radiotherapy	18.2 mths
10	14 F	Rhabdomyosarcoma	Pain, swelling	104 wks	Inguinal nodes	Radiotherapy	12.9 mths
11	64 F	Vagina	Pain	12 wks	–	–	4.1 mths
12	77 M	Lung	Pain	8 wks	–	Radiotherapy	16.7 mths
13	82 F	Anus	Pain, swelling	36 wks	–	Radiotherapy	7.2 mths
14	81 M	Lung	Pain	24 wks	–	Radiotherapy	13.6 mths
15	52 F	Breast	Pain, swelling	12 wks	Ribs, liver	Radiotherapy	6.9 mths

occult malignancy in 4 cases.¹ In our series, 3 patients had no prior diagnosis of malignancy, with 12 having no other documented metastasis at presentation. It is clear that foot pain may be the only presenting feature of a disseminated malignancy. In particular, hind/midfoot pain should alert the treating physician to the potential of a metastatic lesion and it should be investigated promptly.

Bronchogenic cancer has been implicated in other studies as accounting for 50% of acrometastases^{11,12} while the case review by Libson *et al* suggested that only 15% of pedal metastasis resulted from a bronchogenic primary tumour.¹⁵ The majority of primary malignancies in our series were of infradiaphragmatic origin, highlighting that most primary cancers should be considered as having the potential to metastasise to the foot. This is in itself unusual as less than half the primary sites in this series were the usual ones that metastasise to bone (ie lung, kidney, breast, thyroid and prostate).

With cancer patients experiencing increased longevity, it is becoming more common for metastases to develop throughout the body.¹ Acrometastases are generally a late manifestation of malignancy and are associated with a poor prognosis.⁴ It has been reported that the diagnosis of an osseous metastasis of the foot is often delayed for between 1 and 24 months,⁵ with the average length of survival following diagnosis reported as 9.9–14.7 months.^{1,5,14} Our series confirms that patients often have to suffer with protracted pain and swelling prior to the establishment of the correct diagnosis. The overall mean survival in our series is 20.1 months. Even accounting for the one patient with metastatic renal carcinoma who survived 104.5 months after diagnosis, the adjusted mean survival time remains substantial at 14.1 months. As prolonged survival is possible, early diagnosis and treatment of pedal acrometastases can improve patients pain and, consequently, their quality of life.

Individualisation of treatment is required to maintain mobility, relieve pain, and avoid unnecessary hospitalisation and surgical morbidity.⁵ Patients must be included in the decision making process, and it should be made clear that the goal is palliation with an aim to control local symptoms and preserve function. Radiotherapy can provide symptom relief in some patients while others require anal-

gesia only, with possible casting or brace immobilisation as an adjunct. If significant longevity is anticipated or if non-surgical measures fail, amputation may be offered as a means of obtaining adequate local control. With earlier diagnosis, however, this can usually be avoided.

Conclusions

A high index of suspicion is needed to diagnose pedal acrometastases early, particularly in those patients with protracted symptoms of hind/midfoot pain and with a prior history of malignancy. As these lesions signify terminal disease, a decreased time to diagnosis and consequent treatment is important in improving the patients quality of life for the remainder of his or her life.

References

1. Healey JH, Turnbull AD, Miedema B, Lane JM. Acrometastases. A study of twenty-nine patients with osseous involvement of the hands and feet. *J Bone Joint Surg Am* 1986; **68**: 743–746.
2. Clain A. Secondary malignant disease of bone. *Br J Cancer* 1965; **19**: 15–29.
3. Madjidi A, Cole P, Laucirica R. Digital acrometastases: a rare initial sign of occult pulmonary squamous cell carcinoma. *J Plast Reconstr Aesthet Surg* 2009; **62**: e365–e367.
4. Daly B, Granata J, Mayerson J. Acrometastasis: first metatarsophalangeal joint pain due to metastatic lung cancer. *JBJS Case Connect* 2012; **2**: e4.
5. Hattrup SJ, Amadio PC, Sim FH, Lombardi RM. Metastatic tumors of the foot and ankle. *Foot Ankle* 1988; **8**: 243–247.
6. Bevan DA, Ehrlich GE, Gupta VP. Metastatic carcinoma simulating gout. *JAMA* 1977; **237**: 2,746–2,747.
7. Vaezy A, Budson DC. Phalangeal metastases from bronchogenic carcinoma. *JAMA* 1978; **239**: 226–227.
8. Jacox RF, Tristan TA. Carcinoma of the breast metastatic to the bones of the foot: a case report. *Arthritis Rheum* 1960; **3**: 170–177.
9. Katten I, Bartfield H. Bronchogenic carcinoma simulating early rheumatoid arthritis. *JAMA* 1962; **179**: 162–164.
10. Cross AB. Bronchogenic carcinoma presenting as an injured thumb. *Arch Emerg Med* 1985; **2**: 93–96.
11. Wu KK, Guise ER. Metastatic tumors of the hand: a report of six cases. *J Hand Surg Am* 1978; **3**: 271–276.
12. Chung TS. Metastatic malignancy to the bones of the hand. *J Surg Oncol* 1983; **24**: 99–102.
13. Libson E, Bloom RA, Husband JE, Stoker DJ. Metastatic tumours of bones of the hand and foot. A comparative review and report of 43 additional cases. *Skeletal Radiol* 1987; **16**: 387–392.
14. Bunkis J, Mehrhof AI, Stayman JW. Metastatic lesions of the hand and foot. *Orthop Rev* 1980; **9**: 97–101.