Metastatic bone disease: the requirement for improvement in a multidisciplinary approach

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Abstract The purpose of this study was to assess the referral system, clinical notes and radiographs of patients presenting with metastatic disease of long bones. The study demonstrated that 93% of oncologists did not use a reliable scoring system to assess risk of pathological fracture, and 60% felt an improvement in communication was required. Notes and radiographs were reviewed for 37 patients presenting with femoral metastatic lesions. Sixteen patients had a Mirels' score of greater than 8. Four patients were referred for an orthopaedic opinion. Twelve patients with a score of greater than 8 were not referred; seven of these patients suffered a pathological fracture. Sixteen patients had a Mirels' score of less than 8; none of these patients were referred for an orthopaedic opinion. No pathological fractures occurred. In conclusion, the majority of patients who score above 8 in the Mirels' scoring system are at risk of fracture and do require prophylactic surgery. In keeping with the British Orthopaedic Association (BOA) guidelines, "Metastatic Bone Disease: A Guide to Good Practice", we would recommend a multidisciplinary approach and the use of a recognised scoring system.

Résumé Le but de cette étude est d'évaluer et de mettre en place un système de référence clinique et radiographique concernant les patients présentant des métastases des os longs. 93% des oncologistes n'utilisaient pas de scores

fiables permettant d'évaluer le risque de fracture pathologique, néanmoins, 60% souhaitent avoir des informations plus importantes sur ce problème. Les observations cliniques et radiographiques de 37 patients présentant des métastases fémorales ont été revues pour cela. 16 patients avaient un score de Mirels supérieur à 8, 4 nécessitaient un avis orthopédique. 12 patients avaient un score supérieur à 8 et n'ont pas été évalués sur le plan orthopédique mais 7 sur 8 présentaient une fracture pathologique. 7 patients avaient un score de Mirels inférieur à 8 aucun de ces patients n'a nécessité un avis orthopédique et n'a présenté de fracture pathologique. En conclusion: la majorité des patients qui ont un score supérieur à 8 ont un risque de fractures et nécessitent une chirurgie prophylactique. En se reportant au référentiel de la BOA sur les métastases osseuses, un guide de bonnes pratiques doit être recommandé avec une approche multi disciplinaire et l'utilisation d'un système de classification reconnu.

Introduction

Metastatic bone disease is becoming an increasing issue in trauma and orthopaedic surgery as well as in oncology centres. It has been suggested in the British Orthopaedic Association (BOA) guidelines that there are approximately 20,000 cases per year in the UK, with the majority of ~9,000 cases in relation to breast cancer. The remaining cases are usually related to prostate, lung, thyroid and kidney [3].

There is little evidence in the literature regarding palliative treatment and stabilisation for metastatic disease of the femur. A joint publication by the BOA and the British Orthopaedic Oncology Society (BOOS) concluded that there was a sufficient volume of data and clinical

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experience to produce guidelines for the treatment of metastatic bone disease [3].

The majority of patients with bone metastases will respond to a low palliative course of radiotherapy with good pain relief [2]. A proportion of these patients with metastatic bone disease will appear in the trauma department with a pathological fracture requiring stabilisation. Several methods have been suggested to assess the risk of pathological fracture in these patients. The most common were published by Fidler [1] and Mirels [4] in 1981 and 1989, respectively. Mirels' scoring system (Table 1 in Appendix 1) remains the most frequently used amongst orthopaedic surgeons and is recommended by the BOA and BOOS in their guidelines. Some more recent papers have been critical of the Mirels' scoring system and feel it is insufficiently specific [5]. An important additional recommendation of the guidelines was the establishment of a multidisciplinary approach to the management of bone metastases with the regular input of an orthopaedic surgeon to advise on patients' requiring stabilisation. Following prophylactic fixation Ward et al. showed reduced hospital stay, 5.6 days compared to 7.8 days, a greater likelihood of discharge home and improved mobility [6].

This audit was designed to assess the use of an objective scoring system in relation to metastatic disease of the appendicular skeleton amongst oncologists and to assess the effectiveness of the referral pathway to the orthopaedic department. An audit of the outcomes of treatment of patients with femoral metastatic lesions and their outcomes is included.

Patients and methods

A questionnaire (Appendix 2) was sent to all oncology consultants and specialist registrars in a regional oncology centre. The questionnaire was designed to assess the radiographic and clinical factors that would alert the physician with regard to impending pathological fracture in a patient known to have metastatic bone disease. The questionnaire assessed whether oncologists routinely used a scoring system to predict the risk of pathological fracture and then went on to assess whether the present referral system to orthopaedics was adequate and if any improvements could be made to the pathway.

Patients referred for palliative radiotherapy over a 1-year period to a regional radiotherapy centre were identified from the database. Thirty-seven patients who had undergone radiotherapy for metastatic femoral lesions where the notes and radiographs were available for review were identified from the regional centre. All patients were scored retrospectively according to Mirels' system using the radiograph taken prior to radiotherapy and also on the

clinical assessment noted in the medical record. The notes were also reviewed to assess whether the patient had been referred to the orthopaedic department in respect to prophylactic fixation. All future radiographs and notes were reviewed for a further year after the radiotherapy to assess the frequency of pathological fracture.

Results

Of 30 questionnaires sent to the oncology medical staff by e-mail and by post 28 were returned (93%). The majority of the oncologists responding (68%) reported that they treated in excess of ten patients per year with metastatic bone disease. The radiographic features that would concern the oncologist with regard to possible impending fracture were cortical erosion (93%) and lytic lesions rather than sclerotic (46%). In only six questionnaires was it mentioned that a lesion in the intertrochanteric region of the hip would raise significant concern. The clinical features that would raise concern included pain at rest (71%), pain on mobilising (86%) and a decline in mobility as a result of pain (50%). Twenty-three of the oncologists did not routinely use a scoring system, with four using Fidler's and one using Mirels' system.

The majority of the oncologists expressed an interest in improving the referral pathway between the oncology and orthopaedic departments and the importance of a multidisciplinary approach in the management of these often complicated patients.

Thirty-seven patients were identified from the database as having received radiotherapy to the hip or to the femur.

The distribution of primary tumours found was similar to that previously described in the literature with breast, prostate and renal being the most common. Mirels' score was calculated for the patients (Figs. 1 and 2) and the patients were placed into one of three groups. There were 16 patients scoring less than 8, 5 with a score of 8 and 16 with a score of greater than 8. The figure also demonstrates

Fig. 1 Mirels' score and number of patients referred for orthopaedic opinion

Fig. 2 Outcome in relation to Mirels' score

the numbers of patients in each group referred for an orthopaedic opinion. The graph demonstrates that no patients with a score of less than 8 were referred for an opinion. Only 1 of the 5 patients (20%) with a score of 8 and 4 of the 16 patients (25%) with a score greater than 8 were referred for an orthopaedic opinion.

In the follow-up period after either radiotherapy or surgery it was found that none of the 16 patients who had a score of less than 8 suffered a pathological fracture. In the group of five patients with a Mirels' score of 8, four patients remained fracture free with the one patient who was referred receiving prophylactic stabilisation followed by radiotherapy (no pathological fractures). In the 16 with a score of greater than 8, 5 patients remained fracture free and 7 of the patients sustained a pathological fracture requiring operative stabilisation. Four patients were referred prior to radiotherapy and these were all prophylactically operated on with post-operative radiotherapy

Conclusion

This study has highlighted an opportunity to improve the present referral system and assessment of this group of complex patients. The study demonstrated that the majority of oncologists assess and treat patients with metastatic bone disease on a regular basis. The reasons for referral to an orthopaedic surgeon vary from clinician to clinician and at the time of this study the use of a scoring system to assess the risk of pathological fracture was not routinely used and there were no regular meetings between oncologists and orthopaedic surgeons to discuss cases. The questionnaire did show a desire to improve communication between the two specialities and to move towards a multidisciplinary approach to management.

The audit has demonstrated that Mirels' scoring system does appear to predict the risk of pathological fracture. None of the patients with a score of less than 8 subsequently went on to develop a fracture. Of the 16 patients with a

score over 8, 4 were prophylactically nailed and of the remaining 12, 7 patients went on to fracture (58%). This fracture rate is similar to that predicted by Mirels' scoring system [4].

In order to improve the overall care of patients with bone metastases, orthopaedic units in every centre should be raising the issue of prophylactic surgery to oncologists. There are many who would benefit from a multidisciplinary approach between oncologists and orthopaedic surgeons to ensure an improvement in pain relief and mobilisation in the patient with metastatic bone disease.

Appendix 1

Table 1 Mirels' scoring system

Variable	1	2	3
Site	Upper limb	Lower limb	Pertrochanteric
Pain	Mild	Moderate	Functional
Lesion	Blastic	Mixed	Lytic
Size	<1/3	1/3–2/3	>2/3

Appendix 2: Questionnaire

Metastatic disease in long bones

- Do you treat patients with long bone metastatic lesions?
Yes/no
If yes: 0–5 per year
6–10 per year
>10 per year
- What radiographic changes would concern you with regard to possible fracture?

- What clinical features would concern you with regard to possible fracture?

4. Do you routinely use a scoring system for impending pathological fracture?

Yes/no

If yes, which scoring system do you use?

5. What could be done to improve links between orthopaedics and oncology?
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-
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-
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Thank you.

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