EDITORIAL

DIAGONOSING MALIGNANT BONE TUMOURS

The treatment of malignant bone tumours has changed radically in the past 15 years with chemotherapy now offering the prospect of over 50% survival at five years for both osteosarcoma and Ewing's sarcoma (Goorin, Abelson and Frei 1985; Simon and Nachman 1986; Wilkins et al 1986; Souhami and Craft 1988). In conjunction with these advances, limb salvage surgery is now frequently used in specialist centres in place of amputation, thereby improving the quality of life both for the survivors and for those who eventually succumb to their disease.

Early diagnosis and prompt referral would undoubtedly be in the patient's best interest; however, it is an unfortunate fact that many patients with malignant bone tumours still present late with extensive lesions, jeopardising salvage of the limb and survival of the patient. A survey of 70 cases referred over a one-year period to the Birmingham bone tumour treatment service has highlighted some of these problems.

The initial symptoms are remarkably consistent, regardless of the tumour. The majority of patients will first notice an ache in the involved part which gradually increases in severity and duration until it becomes a pain. The pain is often present at night and is not affected by activity. At first it fluctuates in severity, but eventually it becomes constant and is only partially relieved by simple analgesics. In half the cases pain is accompanied by swelling, but in a few there is no pain and swelling alone is the initial complaint. When progressive pain and swelling are combined at the end of a long bone a tumour must be high on the list of differential diagnoses. Aches and pains are of course very common in general practice, but the duration and progressive nature of the symptoms should alert the clinician to the possible underlying pathology.

It surprised us how long patients endured their symptoms before going to see a doctor; an average of six weeks for patients with osteosarcoma, 16 weeks for patients with Ewing's sarcoma, and 21 weeks for patients with chondrosarcoma. What was even more concerning was the time taken after the initial consultation for a diagnosis to be made and treatment started - a further seven weeks for patients with osteosarcoma, 31 weeks for those with Ewing's sarcoma, and 30 weeks for chondrosarcomas.

The cause of this delay was usually a low level of suspicion. When a tumour was suspected at the initial consultation, the radiograph usually led to the correct diagnosis being made immediately. When the diagnosis was not suspected, a variety of treatments were employed which were of no benefit and simply delayed the making of the right diagnosis.

Tumours of the pelvis proved particularly difficult to diagnose, taking an average of 61 weeks from the start of symptoms to the start of treatment. This long delay probably arose because the symptoms may mimic either spinal or abdominal disorders. Careful examination would usually have elicited bony tenderness or the presence of a mass, either of which should prompt immediate further investigation.

In all patients, plain radiographs eventually led to the correct diagnosis, but in 13 out of 70 cases neither the clinician nor the radiologist detected the tumour on the initial radiograph, although the evidence was present on retrospective review.

Factors which led to the tumour being missed included poor quality of the radiographs and failure to demonstrate the whole of the lesion. Tumours of the distal femur were a typical example of this, 22% being missed on the initial radiograph. The radiological signs of tumours, though well known, are easily overlooked. They include ill-defined areas of lucency or sclerosis, subperiosteal new bone formation, cortical destruction and adjacent soft-tissue swelling (de Santos and Edeiken 1985).

The suspicion of any of these abnormalities on a radiograph should prompt the clinician to consider the possibility of a sarcoma and to order further investigations. If in doubt, a radiograph of the opposite side for comparison is easily arranged and always helpful. If suspicions remain a radio-isotope bone scan is the investigation of choice; a normal scan effectively rules out a primary sarcoma, though not necessarily a myeloma; an abnormal scan should lead to further urgent investigation. By this time a primary neoplasm will be.
high in the list of differential diagnoses but other possibilities such as infection, stress fracture and metastasis must all be kept in mind (Davies, Evans and Grimer 1988).

Once the possibility of a tumour is raised, the lesion should be properly staged to assess its extent, both locally and systemically (Enneking, Spanier and Goodman 1980). Staging requires either CT or MRI scanning of the tumour itself and a CT scan of the chest to exclude metastases. Surgeons should resist their natural enthusiasm to obtain tissue for histological diagnosis until this staging process is completed.

Planning the biopsy requires considerable thought to ensure that any subsequent procedure is not prejudiced by some unforeseen complication. The correct part of the tumour must be sampled with as little violation of normal tissues as possible. The site of the biopsy must permit later excision of its track without compromising the results of later conservative surgery. Meticulous haemostasis must be achieved and the use of surgical drains avoided if possible. The CT or MRI scans will distinguish most clearly the normal from the abnormal structures, and allow a route for the biopsy to be planned which satisfies the principles mentioned above.

Our experience suggests that biopsies are frequently performed in the wrong way. About half the patients studied were referred to our unit prior to biopsy. In all these cases it was possible to choose a biopsy site which did not compromise subsequent surgery, and in only two were minor problems related to the biopsy encountered. However, among those who had their biopsies performed elsewhere, only 40% were completely satisfactory. In many cases the biopsy was carried out by a junior surgeon and with little regard for the subsequent procedures. In some an attempt had been made to do an excision biopsy of a mass that had not yet been staged; the surgeon could have had no concept of what he was trying to achieve.

The complications resulting from biopsy included infection of the track, transgression of an adjacent joint, inconvenient sitting for subsequent excisional surgery and, in several cases, dissemination of the tumour into previously uninvolved tissue compartments. Two patients had inadequate samples taken and required a further biopsy. There were six instances in which the histology was misinterpreted by an inexperienced pathologist. Any of these complications can delay the start of treatment or prejudice what would have been the optimum treatment.

We have emphasised the errors of the biopsy because they are being continually repeated. Mankin, Lange and Spanier (1982) found that problems occurred three to five times more commonly if the biopsy was carried out in the referring centre. Our study has shown that problems are almost ten times as common when biopsies are carried out before referral to a tumour treatment centre. Placing the biopsy at an inconvenient site where the track cannot be excised in continuity with the main tumour has proven prognostic implications. Cannon and Dyson (1987) found that the rate of local recurrence was 7% if the biopsy track was excised at the time of definitive surgery, compared to 38% if the biopsy track could not be excised, usually in cases where the biopsy had been carried out by a different surgeon to the one who eventually performed the definitive resection. At a National Institute of Health conference held in 1985 the conclusion was reached that biopsies "should only be carried out by a surgeon if he is also prepared to carry out definitive surgery". We wholeheartedly endorse this advice.

The significance of delays in reaching the diagnosis and commencing treatment are difficult to quantify. It might be thought that the longer the tumour has been in the body, the more likely it is that metastases will have developed, and that the prognosis will therefore be worse. This has not been borne out by our survival figures, so far. Indeed, Bentzen et al (1988) have recently demonstrated that, for osteosarcomas, a long duration of symptoms prior to diagnosis may be a favourable prognostic sign. They postulated that tumours which take longer to be diagnosed may be less aggressive than those which present early. There is little doubt, however, that for Ewing's sarcoma the volume of the tumour at the time of diagnosis is one of the most important prognostic factors, and that any delay in diagnosis is likely to prejudice the patients' survival (Hayes et al 1989).

There can be no doubt that delay in diagnosis allows the tumour to increase in size, making limb salvage less probable. The longest delays occurred in those who had had their initial radiographs erroneously reported as normal. The resultant false sense of security caused further delay, from two to 40 weeks, before a second radiograph revealed the diagnosis. In this group of patients, 58% required amputation or were found to be inoperable, compared with 15% of those whose initial radiographs were correctly interpreted.

It is not uncommon for patients to be resentful of the long delays they underwent before the diagnosis was made, particularly if they have eventually to undergo amputation. It is no comfort for them to know that the majority of patients with such tumours have experienced similar delays. By drawing attention once again to some of the more common pitfalls we hope to reduce the delay in the future and thereby improve treatment.

We believe that, as soon as a patient is suspected of having a bone tumour he should be referred to a bone tumour treatment service. We appreciate that the diagnosis cannot always be certain until after the biopsy and that surgeons will have to be willing to refer some patients with only a provisional diagnosis. If the lesion proves not to be a tumour then no harm has been done and suitable treatment can be arranged locally. If in any doubt about the appropriate line of management, the surgeon should contact a bone tumour treatment service for advice before carrying out a biopsy.
Referral to a bone tumour treatment service should ensure speedy and appropriate treatment, with preoperative staging and biopsy performed by the surgical team which will carry out the elective procedure. All of this will ultimately be in the best interest of the patient.

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R. J. Grimer
R. S. Sneath

R. J. Grimer, FRCS, FRCS Ed (Orth), Consultant Orthopaedic Surgeon
R. S. Sneath, FRCS, Consultant Orthopaedic Surgeon
Royal Orthopaedic Hospital, The Woodlands, Northfield, Birmingham B31 2AP, England.

REFERENCES


