tissue rather than forcing it into the systemic circulation. However, perhaps more importantly for major centres, it offered an effective potential treatment for endosteal osteomyelitis and a ready source of bone graft. The company often cite the lower endosteal pressures as a safety argument for the use of RIA in standard intramedullary nailing. However, until now there has been no evidence to either refute or deny this claim. We were delighted to see this randomised controlled trial from **Toronto (Canada)**, reporting the outcomes in terms of emboli detectable on transoesophageal echocardiogram (TOE) during reaming of the endosteal canal.[8] The study team recruited 22 patients to the study who were all monitored via TOE during their surgery. Eleven were randomised to the RIA group and 11 to standard reaming. The main outcome measures reported were the duration, size, and severity of emboli during canal instrumentation. The authors reported what they termed a "modest reduction" in the total emboli score in the RIA group when compared with standard of care (5.30 vs 4.05) and during nail insertion (SR 5.09 vs 4.25). However, although statistically significant, the authors were not able to correlate these changes in emboli score to any meaningful physiologic parameters and, as such, it seems likely that this was not clinically significant.

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Oncology

Osteosarcoma follow-up: chest radiograph or CT?

Nothing, as they say, spoils results like follow-up. One area where follow-up is a potential hot potato is in osteosarcoma where it really is important. A team from **Bologna (Italy)** present their series of patients from the Rizzoli Institute treated over a 23-year period, with the results flying in the face of the recent work.[1] The authors pose the question, 'does intensive follow-up lead to earlier diagnosis of metastases and therefore better outcomes?'. Their study included patients with lung metastases as their first pattern of recurrence for inclusion in the study, and the authors compared those followed up with CT with those followed up with plain radiography. The authors set out to establish what the 'treatment effect' was of CT in terms of long-term disease-free survival. They report the outcomes of 215 patients, with chest radiographs detecting lung metastasis in 100 patients, and CT detecting in 112, with three being diagnosed on symptomatic presentation. At odds with some recent work, these authors established that those patients followed up with a plain radiograph protocol had a 60% complete remission rate, while those in the CT scanning group achieved an 88% complete remission rate. It is easy to see how CT scanning and the attendant earlier diagnosis should lead to a better outcome and this was reflected in the five-year overall survival rates of 35% for the radiograph group and 60% in the CT group. While this would seem to be a 'no brainer', chest CT scans do have a significant radiation exposure and, in younger patients particularly, there is a risk of induced tumours. This, coupled with the conflicting results, makes us wonder whether a large randomised controlled trial of follow-up protocols might be appropriate.

Limb salvage or amputation in osteosarcoma

A question that one would hope to have an answer to by now is the one of limb salvage *versus* amputation in patients presenting with osteosarcoma of the lower limb. Although we had high hopes for this meta-analysis from **Jiaxing (China), on closer inspection** we have some reservations.[2] On the surface, this is a convincing paper that sets out to undertake a meta-analysis of randomised trials comparing amputation to limb salvage surgery (LSS) in osteosarcoma. The authors were able to identify ten studies reporting the outcomes of 1343 patients, all with osteosarcoma treated with LSS or amputation. The review team were able to establish that LSS was as safe as amputation in this meta-analysis, however, we are concerned that, given the differences in five-year survival (in favour of the limb salvage), the patient cohorts may not quite have been a matched series. We are always concerned when there appears to be a significant difference in baseline characteristics, as found here, which may not have been adequately accounted for in the meta-analysis.

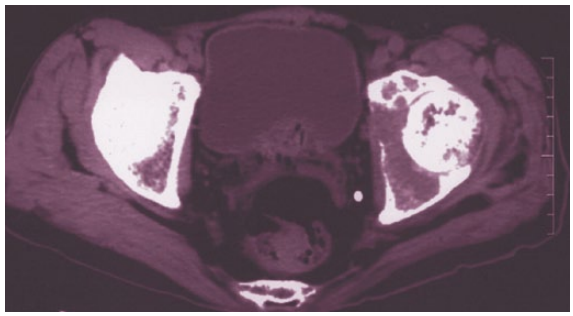
Extraskeletal osteosarcoma: chemotherapy of likely benefit

Treatment of rare tumours is always somewhat difficult: with little reliable data, the surgical team and oncologist are often using 'best guess' treatment based on a few case series, or perhaps sporadic experience of their own coupled with experience with similar tumours. This can be the case with extraskeletal osteosarcoma (ESOS), a high-grade mesenchymal tumour consisting of osteoblastic, chondroblastic and fibroblastic cells that produce osteoid, neoplastic bone or chondroid matrix. Patients usually suffer a clinically aggressive course and there is little data up to this point upon which to base treatment decisions.This paper from the **European Musculoskeletal Oncology Society** far outstrips previous studies in that it reports the outcomes of 266 of these rare lesions, and, due to the number of included patients, the authors were also able to comment on factors that might influence outcomes.[3] The research network was able to identify 274 patients between 1981 and 2014 with a diagnosis of ESOS across the 16 centres, of which 266 were included in the study. The overall five-year survival rate

was 47%, and 18.7% of patients had metastases present at diagnosis, the single biggest poor prognostic sign, giving a survival outcome of just 27% at five years. There were 211 patients who were classified as 'complete remission' following their initial surgery. Survivals were slightly better at 51.4% overall and 43% disease-free at five years. There was a favourable trend for osteosarcoma-type adjuvant or neo-adjuvant chemotherapy in these patients, even when taking into account tumour and patient factors. The evidence from this large series is suggestive of a benefit from chemotherapy in ESOS patients, and underlines the poor five-year survival rates seen in this problematic tumour.

Needle biopsy in cartilage tumours?

■ Cartilage tumours are tricky to diagnose and grade, and excision of tissue via biopsy is central to reaching a diagnosis and prognosis and, most importantly, to informing a treatment plan. There are a number of potential strategies to get the required tissue diagnosis and, given the location of some chondral lesions around the pelvis and in inaccessible areas of long bones, the potential to use needle biopsy is therefore of interest. However, the question has always been, how accurate is such a biopsy? Surgeons in **Buenos Aires (Argentina)** set out to compare the accuracy of their fine needle biopsies performed for cartilaginous tumours with the definitive diagnoses reached following histopathological examination.[4] The authors are able to share the results of 126 patients, all with chondrosarcoma treated at their centre over a 17-year period. There was a mixture of diagnoses, with 41 pelvic chondrosarcomas and 85 long-bone chondrosarcomas. The pre-operative biopsy and the final histological grade were not terribly well matched. There were some differences between the pelvic and



long-bone chondrosarcomas. The weighted kappa coefficients were higher in the long-bone chondrosarcoma (0.63) than the pelvic chondrosarcoma histological grade (0.63). There are clearly some difficulties in taking a biopsy of these lesions, and the take home message from this paper is that the image-guided needle biopsy in the hands of a specialist pathologist is really only useful on long-bone chondrosarcomas, while the information yielded about pelvic chondrosarcomas should be treated with somewhat less certainty.

Ewing's sarcoma of the pelvis: local control and survival in the modern era X-ref

■ Although a relatively small series, this paper from **Rochester, Minnesota (USA)** deals with the awkward problem of local control in Ewing's pelvic sarcoma.[5] The Mayo clinic treated 48 patients over a 22-year period, all with Ewing's sarcoma of the pelvis. Just over half of the patients presented with metastatic disease and, as such, the survival was, unsurprisingly, far from ideal with 73% overall five-year survival and 65% event-free five-year survival. This was also reflected in the cumulative five-year incidence of recurrence, with a 19% incidence of recurrence overall. What was quite marked was the survivorship differences seen between subgroups, with local recurrence rates of 26% for those patients treated with radiation, 13% for surgery, and 0% in those treated with both. Clearly, with a relatively small group and some loss to follow-up, this kind of subgroup analysis suffers from low numbers in each group. However, the authors were able to establish that patients treated with a larger cumulative radiation dose of $\geqslant$ 5600 cGy were significantly less likely to suffer local recurrence. The overall survival for these patients are good considering the previously fatal nature of such a diagnosis, and there are few who would argue with these five-year survival rates. Although not a massive series, there are useful messages here and we would agree with the authors who conclude that local control remains problematic, and that surgery and radiation with a definitive radiation dose are associated with the lowest incidence of local failure and should be considered the gold standard of treatment in these patients.

Concordance with appendicular skeleton cartilage tumours

■ In this edition of *360*, we have already covered some of the complications associated with reaching a definitive diagnosis in cartilaginous tumours. Another paper which crossed our editorial desks and is probably worthy of discussion is this one from **Santiago (Chile)**.[6] The difficulty the authors identified prior to undertaking their study was distinguishing between benign enchondroma and a low-grade chondrosarcoma. The study was designed to determine what the rates of inter- and intra-observer error were when cases were presented to a panel of international experts for them to evaluate the outcomes. The authors presented the panel with case vignettes describing 39 patients, all with intramedullary cartilaginous neoplasms of the appendicular skeleton, and asked each of ten experienced orthopaedic oncologists to categorise the malignancy as benign, low-grade malignant, intermediate-grade or high-grade. In short, the agreements were only fair or poor, with regard to both grade (κ = 0.44) and treatment plan (κ = 0.21). It is well known that the diagnosis of cartilaginous tumours in particular is difficult, but the poor level of agreement, even among an international panel of experts, is somewhat surprising. The findings of this interesting paper may explain the rising incidence of so-called chondrosarcoma grade 1 and the very high cure rates with conservative management: many may in fact be enchondromas!

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