

on treatment, surgeons in **El Paso (USA)** have focused on the sacral fracture and specifically the use of the iliosacral screw.⁷ As perhaps might be expected, the authors were able to assemble a very small series of just 11 paediatric patients presenting with sacral injury. They were all treated with one or more iliosacral screws, with ten of the 11 patients achieving stable fixation and healing. The technique in this series was feasible in children as young as six years old, with overall good stability and minimal complication rates.

Treating the contralateral SUFE X-ref

■ Opinion still remains very divided about whether to treat the asymptomatic hip in patients who present with a slipped capital femoral epiphysis for the

first time. Presenting often as part of the general trauma ‘take’, it is difficult to know what proportion of patients are acute, chronic, or acute-on-chronic. A retrospective study (**Edinburgh, UK**) reviewing 86 patients treated over a ten-year period considered outcome and cost in two groups of patients treated in different ways.⁸ Prophylactic contralateral fixation was performed in 36 cases, and the results of these were analysed for cost effectiveness against a larger group where no procedure was performed initially (n = 50). If no prophylactic fixation was undertaken, the rate of secondary slip was 46%, giving an overall cost of the quality-adjusted life year QALY gained at £1431 for prophylactic fixation. This is clearly on the side of cost effectiveness and has resulted in significantly fewer complications,

better health measure scores (SF-12) and, in longer-term follow-up, no visible radiographic cam lesions. It certainly seems that the evidence is accumulating in favour of prophylactic pinning.

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Oncology

X-ref For other Roundups in this issue that cross-reference with *Oncology* see: [Trauma Roundup 3](#).

Amputation may not be the best option

■ Limb salvage has become the norm as survival rates with modern adjuvant therapies have become similar to those following amputation, with the tantalising thought of better function. However, the question is: do amputations for tumour really do that badly? Tumour surgeons in **Birmingham (UK)** have set out to establish the functional results following amputation for tumour using a prospective cross-sectional national survey.¹ Prospectively, 250 patients were approached to take part in the study and 100 responded, all of whom had undergone amputation for soft-tissue sarcoma. Collated outcomes included functional scores, pain and quality of life (QOL) scores. The entire range of amputations was included in the survey, including patients who had undergone hemipelvectomy, hip disarticulation, transfemoral amputation,

knee disarticulation, transtibial amputation, toe amputation and rotation-plasty. Outcomes were assessed using the Toronto Extremity Salvage Score (TESS), and the key determinants of outcome with this measure were poorer results for higher amputation levels, older patients and those with phantom limb pain. This paper really does highlight the poor function and problems faced by amputees following tumour surgery. The next step will be to show that limb salvage surgery really does give better outcomes as previous studies have shown no difference in QoL between them – although many of these were historical series.

Growing golf balls bad news!

■ We like clear messages here at 360, and we like them even more if they are simple. This paper presents a very clear message - if your lump is bigger than 4 cm, “think sarcoma”. The relative rarity of sarcoma as a primary diagnosis makes picking them up very difficult. Authors in **Birmingham (UK)**, noting that one, or fewer, in 100 soft-tissue

lumps seen in primary care are malignant, designed a study with the aim of establishing the best criteria for referral to a specialist centre.² They generated a Bayesian Belief Network to estimate the likelihood of malignancy based on characteristics at initial presentation in an 11-year cohort of patients, all referred with suspicion of a soft-tissue sarcoma. Their cohort consisted of around 3000 patients, roughly divided 50:50 between benign and malignant conditions. The study team used potential covariates of growing size, age, size of lump and duration of symptoms, and the model had an impressive 0.77 area under the curve for prediction of malignant sarcoma. In a rather pithy take-home message, the study team concluded “If your lump is bigger than a golf ball and growing, think Sarcoma”.

How close is safe? Radiotherapy and surgery

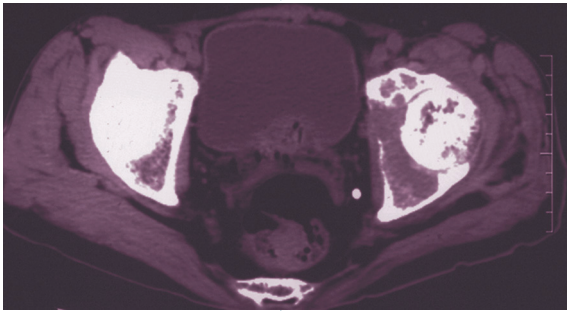
■ The development of modern radiotherapy protocols has improved outcomes significantly in terms of

survival in soft-tissue sarcoma. However, it does beg the question (given the excess surgical complication rates, particularly wound breakdown and infection), how close to the completion of radiotherapy (RTx) is it realistically reasonable to undertake surgery? There is little evidence as to when is the optimum time for surgery. This helpful study from **Toronto (Canada)** reports the outcomes of 798 soft-tissue sarcoma patients, all with extremity tumours managed with synchronous radiotherapy and surgical excision.³ The effectiveness of surgical timing was assessed with a primary outcome of surgical complications within 120 days of surgery. Surgery was performed on average 41 days following RTx, with a complication rate of around a third. There were no significant differences in rates between early (pre-three weeks) and late (post-three weeks) surgical complications. There has been an increasing trend to give pre-operative RTx for many soft-tissue sarcomas, and in light of this paper, it does appear that there is little

difference in surgical complications between the timing of surgery following radiotherapy.

Lymphocyte: monocyte ratio in osteosarcoma

■ Cancer conferences are full of papers concerning the potential applications of immunotherapy. The concept that lymphocyte responses may be a predictor of the patient's ability to mount an immunological



response to a tumour, and hence improve survival, has been hypothesised for many malignancies. Surgical oncologists in **Anhui (China)** have jumped aboard the immunotherapy bandwagon with their investigation of 327 patients, all of whom required surgical treatment of an osteosarcoma.⁴ They investigated survival outcomes (both overall and event-free) and their relationship to the lymphocyte: monocyte ratio (LMR). The study team established that a low LMR was associated with both poorer event-free and overall survivals, even when correction for known confounders was applied. The use of LMR as a potential prognosticator for survival, and as a target for potential immunotherapies, is an exciting prospect in osteosarcoma care.

Are borderline cartilage tumours really borderline?

■ Exactly what constitutes a low-grade chondrosarcoma continues to provoke debate. Many 'borderline' cartilage lesions will be aggressively treated in some units, but simply observed in others. Part of this

dichotomy is the lack of reasonable evidence on prognosis and some decidedly grey areas in the diagnostic criteria. Researchers in **Münster (Germany)** set out to establish the outcomes of 255 patients with a primary diagnosis of stage 1 bone chondrosarcoma.⁵ Follow-up was achieved to a median of 80 months and the study reported overall and event-free survival. The survivals

presented here are encouraging, with 95% survival at five years and 92% at ten years, although the 14 patients who did suffer metastases had a five-year survival rate of just 27%. The good survival rates reported by this study are encouraging, but there may well be an element of overdiagnosis and this may not be representative of results worldwide. A better diagnostic tool is needed for these low-grade cartilage tumours.

Boosting algorithms improves survival estimates X-ref

■ Being able to predict the survival of a patient with bone metastasis is essential for the planning of treatment. The decision to stabilise, excise or treat symptomatically is informed by a combination of risk assessment and clinical judgement. A study from **Boston (USA)**⁶ is interesting for two reasons. The investigators trod the now familiar path of development of a prognostic score using a wide range of potential covariates and a large sample (in this case, 927 patients who underwent surgery for bone metastasis) with known

outcomes. This study adds low BMI and comorbidity status to those factors already identified in older scores (such as the Bauer score): older age, multiple bone metastases, the presence of visceral metastasis, a more aggressive tumour and low Hb. Perhaps more interesting is the authors' use of different algorithms to assess the accuracy of prediction in a typical prognostic score. These come in a variety of different methodologies, but essentially what they allow for is the non-linear relationship between different portions of prognostic scores to be included in the prognostic model. The commonly used nomograms are one method for making this adjustment, as is the 'boosted algorithm' method. Both of these methods had comparable outcomes in terms of accuracy of prediction, and were significantly more accurate than the traditional method.

CT better than Mirels? X-ref

■ The venerable Mirels score has stood the test of time. Designed to predict in a simple manner the likelihood of pathological fracture of a limb, Mirels hit on the golden combination of simplicity and applicability, and his score is used the world over as an easy method of risk scoring patients for pathological fracture. A research team in **New York (USA)** report the outcomes of a Musculoskeletal Tumor Society-sponsored prospective multicentre study aiming to assess the applicability of CT-derived structural rigidity analysis as a predictor of fracture, and evaluate its utility against the Mirels score.⁷ They undertook the study in patients with femoral metastatic lesions, all of whom underwent CT rigidity analysis using CT scans of both femurs. The study team were able to base their report on 125 cases of femoral metastasis in six institutions, of which 78 did not have stabilisation and, as such, form the basis for this study. The authors undertook Mirels scoring

and CT rigidity analysis on all patients and used ROC analysis to establish the relationship between sensitivity and specificity in this cohort. In their study, the CT method was superior to Mirels scoring with respect to sensitivity (100% vs 66.7%) and specificity (60.6% vs 47.9%), and using the ROC analysis the CT method was superior to the Mirels method at all potential threshold values on ROC analysis. This could well be a great leap forward in predicting fracture risk, however, before entering widespread clinical use, the CT method would need to be validated in other bones. The great advantage to the Mirels score is that it is applicable to all bones in the appendicular skeleton.

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