

X-ref For other Roundups in this issue that cross-reference with Trauma see: *Hip & Pelvis Roundups 1, 3 & 5; Foot & Ankle Roundups 4 & 6; Wrist & Hand Roundup 7; Shoulder & Elbow Roundups 1 & 5; Spine Roundup 1; Children's orthopaedics Roundups 2 & 3.*

"Obesity paradox" holds true for patients with hip fracture: a registry-based cohort study **X-ref**

■ It is well known that hip fractures are associated with longer-term mortality and reduced postinjury quality of life. Several studies have reported that older obese patients have improved survival rates in some chronic diseases, a phenomenon named the "obesity paradox". In this study from **Stockholm (Sweden)** the investigators examined the association between body mass index (BMI) and survival after hip fracture with the probability of returning to living at home after hip fracture.¹ The investigators studied data from a prospectively maintained national registry of patients with hip fracture. They studied just over 17 756 patients aged 65 years or more who were treated for hip fracture from 2013 to 2016 and followed up until the end of 2017. The patients' BMI was calculated at hospital admission, comorbidity was measured with the American Society of Anesthesiologists (ASA) score, and the date of death was retrieved from a national database. Patient supplied self-reported data on living arrangements were assessed on admission and four months after fracture. The investigators then went on to use multivariable regression models to estimate the associations between these variables. The investigators found that the "obesity paradox" appears to be true for hip fracture patients aged 65 and older. Obese patients had the highest one-year survival, while patients with a BMI of < 22 kg/m² had the lowest survival rates, despite having similar ASA scores. When examining the chance of returning to living at home, there was no advantage for obese patients, but patients with a BMI of < 22 kg/m² had worse odds compared with patients who were of normal weight, overweight, or obese. The investigators emphasized that attention should be given to underweight patients and those with malnutrition, rather than to those with overweight status or obesity when developing the orthogeriatric care.

Cemented or cementless hemiarthroplasty for femoral neck fracture? Data from the Norwegian Hip Fracture Register **X-ref**

■ Displaced hip fractures are common and pose significant challenges to patients, adversely affecting their quality of life. The surgical approach for arthroplasty carries greater risks and also higher mortality than fixation. The most common operation, certainly in the developed world, and despite a move towards lower thresholds for total hip arthroplasty, is a hip hemiarthroplasty. The method of fixation remains a source of some controversy. Cemented implants have been shown to cause less pain than cementless implants postoperatively. However, there has been considerable concern regarding bone cement implantation syndrome, particularly in the older patient with cardiovascular risk factors. Nonetheless, the National Institute for Health and Care Excellence (NICE) and the American Academy of Orthopedic Surgeons (AAOS) recommend the use of cemented fixation, although these guidelines are not consistently followed around the world. This is the first large registry study to determine whether the method of fixation is associated with a risk of reoperation (any secondary procedure performed after index surgery), mortality rate, and patient-reported outcome measures (PROMs). Following exclusions, these investigators from **Bergen (Norway)** reported a total cohort of 30 178 bipolar hemiarthroplasties who were considered for the study; of these, 7539 were cementless and 22 639 cemented.² The mean age of the patients was 84 years and 71% were women. Median follow-up was two years. Allowing for possible confounding factors, this study showed that there was a higher risk of reoperation in patients who underwent a cementless hemiarthroplasty (hazard rate ratio (HRR) 1.5). Specifically, there was a higher risk of periprosthetic fracture (HRR 5.1), infection (HRR 1.2), and aseptic loosening (HRR 3.9). There was no overall difference in the one-year mortality between the two groups. However, patients in the cementless group did have a lower mortality at days 0 and 1 compared with the cemented group and from day 2 to 7. There were no differences noted in terms of pain and quality of life scores (EQ-5D-VAS) one year after surgery. This study is the largest of its kind and adds to the findings from smaller randomized studies that reported cemented hemiarthroplasties having

significant advantages over cementless implants in the elderly population. While bone cement implantation syndrome should not be overlooked, there are certain precautions that can be taken by both the surgeon and anaesthetist to mitigate this phenomenon. One interesting observation by the authors was that there was a higher rate of reoperation for periprosthetic fractures in the uncemented group. While the risk of periprosthetic fracture was lower in the cemented group, this can vary amongst cemented implant designs. More reoperations have been noted in other studies in the polished taper-slip designs compared with the matte straight and anatomic composite beam stems. The other interesting observation was that the infection rate was higher in the cementless group; perhaps this is due to the antibiotic contained within the cement mantle of cemented implants conferring some protection against infection. The message from this large study is clear, there is no advantage in cementless hemiarthroplasties for the elderly population with a displaced hip fracture. With careful cementing techniques, the risk of bone cement implantation syndrome can be significantly mitigated and outcomes following a cemented hemiarthroplasty are better.

Social deprivation and fragility fracture of the distal radius

■ There is rarely an edition of *360* that goes by without a paper discussing the optimal management of distal radial fractures. These papers are usually operative studies evaluating the benefit or otherwise of operative interventions. However, a paper from the team at **Leicester (UK)** has taken a slightly different approach to the ever more complex problem of distal radial fracture management.³ Over a one-year period the investigators prospectively recorded details concerning all distal radial fractures attending their regional unit treating distal radial fractures occurring in the locality. The authors specifically sought to determine the impact of social deprivation on fragility fractures of the distal radius, and therefore only included patients over the age of 50 years. A questionnaire pack was sent to all included patients that included questions regarding place and mechanism of injury, comorbidity assessment, falls risk assessment tool, and fracture risk assessment (FRAX). The FRAX tool is a freely available online tool that calculates the 10-year probability of hip fracture or a

major osteoporotic fracture. It is approved by the National Institute for Health and Care Excellence (NICE) and calculates the risk based upon age, sex, height and weight, previous fracture, parental hip fracture, smoking status, glucocorticoid steroid use, rheumatoid arthritis, secondary osteoporosis, and alcohol use. Social deprivation was assessed using the Index of Multiple Deprivation 2010 (IMD 2010). This is a tool available in England that geographically divides the country into small areas. These areas have a mean population of 1500. Deprivation for each area is scored across seven domains. These scores are then ranked and can be divided into five equal quintiles, with quintile one being the most deprived. Postcode data can assign individual patients to one of these geographically defined areas, and thus to a social deprivation quintile. A total of 553 patients aged 50 years and over sustained a distal radial fracture during the one-year study period. Of these, 20 were from outside the region or could not be subsequently traced via a postal address, and 12 patients died during the study period. This left 521 eligible patients, all of whom were sent a questionnaire pack. Patients were reminded twice with further questionnaire packs if they had not responded. The questionnaire packs were completed by 333 patients (279 female, 54 male) giving a response rate of 64%. There were no identified differences between the characteristics of responders and nonresponders. There were no observed differences between completion rate in the most and least socially deprived quintiles, nor between the sexes. This suggests that the responders were representative of the distal radial fracture sample assessed. The rate of distal radial fracture was higher in the deprived quintiles, with more fractures seen than would be expected based upon the size of the population at risk: 124.2 distal radial fractures per 100 000 patients/year in the most socially deprived *versus* 86.6 distal radial fractures per 100 000 patients/year in the least socially deprived. Regarding the mechanism of injury, a lower proportion of falls occurred in the home in the more socially deprived patients, compared with occurring outdoors in the road or street. Most falls across all quintiles were from a standing height. Overall, there was no difference in the reported FRAX scores. Independent models were then created to assess the impact of sex and age (not used in determining the FRAX score) but clearly important as risk factors in distal radial fractures. Increasing age was significantly associated with higher FRAX scores in both sexes. Smoking, as a component of the FRAX score, was more common with greater social deprivation. The mean number of falls risk factors was significantly

higher in more socially deprived quintiles and with increasing age. This paper identifies a specific sub-population at risk. Increasing age, the presence of osteoporosis, and smoking status are recognised risk factors. However, it seems that social deprivation is independently related to fracture risk from some of these variables and may well be a driver. The risk of falls, often routinely addressed by the inpatient therapy teams when managing proximal femoral osteoporotic fractures, also increases with both age and worsening social deprivation. Given the outpatient treatment that most patients with distal radial fractures experience, the authors have identified several risk factors that may not routinely be addressed in this patient group. While this paper cannot make any firm assumptions regarding the impact of addressing social deprivation, falls risk or bone health improvements in preventing distal radial fractures, it should serve as a reminder that these factors should be considered at the fracture clinic where possible.



Femoral shaft nailing: the optimum entry point?

■ In this systematic review, the authors from **Chandigarh (India)** raised the question, is greater trochanter (GT) entry for antegrade femoral nailing superior to the piriformis fossa entry (PE) for shaft femur fractures in adults?⁴ The authors undertook a relatively extensive literature review using three indices (PubMed, EMBASE, and SCOPUS) and included all articles that directly compared GT with PF entry points for femoral shaft fracture nailing in adults. There were nine studies suitable for inclusion in the review and, given the relatively new design of the trochanteric entry point, these were all published since 2011. These were retrospective in five cases and four prospective studies;

just three were randomized. The total number of reported patients was 256 in the GT group and 460 in the PE group. The authors undertook evidence synthesis using a meta-analysis for a range of outcomes including operation time, fluoroscopy exposure, and abductor weakness. For those outcomes reported, all significantly favoured the GT entry over PE. The evidence as reviewed suggests that, on meta-analysis, GT nailing is associated with lesser operation time, standard mean difference, lesser exposure to fluoroscopy, lesser incidence of abductor weakness, and better functional outcome.

Tibial plafond nonunion: fix the medial column

■ Tibial plafond nonunion is a relatively rare occurrence; however, it does occur and can be a difficult problem to treat, requiring either complex replating with grafting or circular frame treatment. This paper from **Salt Lake City, Utah (USA)** was set up to establish the risk factors for nonunion, with the idea that prevention is better than cure.⁵ The authors drew their results from a series of 740 patients with tibial plafond fractures, all partial or complete articular types. There were 518 patients who completed follow-up to just over two years. Of this subgroup, 72 patients (14%) were found to have gone on to develop a nonunion. The authors collected all potential covariates that could be deemed as a risk for nonunion in an attempt to unpick the risk factors. Potential cofactors were screened using multiple univariate analyses, followed by an analysis for confounders. The take-home message from this sizeable study is that significant independent risk factors are: complete articular fractures (OTA 43C odds ratio (OR) 4.43), bone loss, and open fracture (OR 1.96). From a treatment perspective, locking plates were twice as likely to result in nonunion (OR 1.97), failure to treat the medial column (with either screw or plate), and tobacco use (OR 2.02). This is one of few papers to describe in any great detail the risks of nonunion in tibial plateau fractures. Clearly there are significant advantages of locking plate fixation in the proximal tibia, with lower rates of metalwork failure. The take-home messages here are to perhaps have a lower threshold for fixation of the medial side, in addition to paying attention to those at higher risks with more severe fractures or those with an open fracture.

Supplemental mini-fragment plates

■ There is an increasing use of supplemental mini-fragment plate (MFP) fixation in addition to the main fixation (be that plate or nail)

in long bone fracture surgery. The advantages cited are the facility to maintain and hold an accurate reduction without increased periosteal stripping. While the premise is clear, there is little evidence other than a few small case series to establish what the biomechanical effects of these supplemental small plates are. We were delighted to see this published report of a very timely investigation undertaken by researchers in **San Francisco, California (USA)**.⁶ The authors designed and reported a biomechanical study with the express intention of evaluating the influence of MFPs on the four-point bending and torsional stiffness of long bone transverse and simple wedge fracture fixation constructs. The study involved the use of a simple biomechanical model consisting of composite bone cylinders that were cut in a standardized fashion to produce transverse (AO-OTA classification 12-A3) and simple wedge (AO-OTA classification 12-B2) fracture models. These were then reconstructed using a standard locking compression plate (LCP) plate with or without an additional MFP. The MFPs were applied in three different potential orientations. MFPs significantly increased the bending stiffness for wedge fracture constructs when MFPs were positioned both orthogonal and opposite to the LC-DCP. The results of this study are not really that surprising and mimic earlier work looking at 90:90 plating and the use of cortical strut grafts in long bone fixation. However, they do serve as a timely reminder that the use of even MFPs can have a dramatic effect on the fixation of these plates.

A new approach to lateral clavicle fractures? X-ref

■ There are high rates of complications associated with lateral clavicle fixation. The injuries themselves are associated with a high rate of complications, such as nonunion when treated conservatively. The difficulty is that operative treatment is also associated with a significant complication rate. Use of plates on the lateral clavicle is associated with high pull-out rates without sling or suture reinforcements to the coracoid. Bridging options, such as the hook plate are associated with cuff pathology and erosion of the lateral acromion. Overall, there is no perfect treatment. In the specialist shoulder trauma world, a range of techniques involving a suspensory device with reconstruction of the coracoclavicular ligaments and then reinforcement of the lateral clavicle fracture are being used. This group, from **Edinburgh (UK)**, have been proponents of their own particular technique, where open reduction and use of a tunnelled suspensory device (ORTSD) has been used.⁷ The purpose of their current study was to evaluate the medium-term results of this approach in a larger series of patients treated using this technique. They reported 67 patients all treated with ORTSD for a lateral clavicle fracture in a single unit. Outcomes were reported using the Disabilities of the Arm, Shoulder and Hand (DASH) score and Oxford Shoulder Score (OSS) at regular intervals to 12 months of follow-up. Complete follow-up data was available for 55 of the patients, with three deaths and the remainder lost to follow-up. Outcomes were overall good with a mean OSS of 46.4

points and DASH score of 2.4 points at 12 months. These were stable to final follow-up of 64 months. There were two patients who developed a symptomatic nonunion requiring a reoperation, and two patients developed an asymptomatic fibrous union. The authors report an overall five-year survival using implant-related complications of 97.0%. This well-thought-out report demonstrates a low rate of complications and very satisfactory outcome measures at medium-term follow up.

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Oncology

X-ref For other Roundups in this issue that cross-reference with Oncology see: *Children's orthopaedics Roundup 7*.

Proximal versus distal location in limb osteosarcomas

■ A group from **Oslo (Norway)** has conducted the first nationwide study of its kind, investigating a national cohort of all high-grade osteosarcomas (OS) in limb long bones.¹ Their study spanned all cases in Norway between 1982 and 2009 and is one of the most complete musculoskeletal tumour studies of its type. The authors aimed to establish the prognostic factors and outcomes of OS lesions located in proximal versus distal long bones. As a

relatively rare diagnosis, this cohort consists of 221 patients, all with OS of the appendicular skeleton. Univariate analysis did not identify any significant differences in survival between patients with OS in the proximal long bones (101 cases) and patients with OS in the distal part of these bones (120 cases). As one might expect, proximal femoral and primary metastasis were both independent adverse prognostic factors for sarcoma-specific survival in multivariate analyses. In terms of other factors, the authors have established that elevated lactate dehydrogenase and secondary OS were poor prognostic factors and were associated with a lower rate of event-free survival. The team concluded that OS of the proximal femur had an unfavourable outcome

in comparison with OS in other anatomical locations in limb long bones, unlike several prior studies that found poorer outcomes for proximal over than distal OS.

Osteosarcoma around the knee and limb salvage surgery

■ This interesting study from **Shanghai (China)** looked at how treatment-related factors influenced prognosis in 182 patients being treated for osteosarcoma around the knee with limb salvage surgery between 2004 and 2013.² The tricky question remains of how best to undertake limb salvage for patients with lesions in the proximity of the knee where amputation is likely to be above the knee.