

ROUNDUP³⁶⁰

Hip & Pelvis

X-ref For other Roundups in this issue that cross-reference with *Hip & Pelvis* see: *Knee Roundup 9, 10; Wrist Roundup 1; Trauma Roundup 1; Oncology Roundup 7; Paeds Roundup 6; Research Roundup 2, 3, 4, 5, 6, 7.*

Vitamin E infusion helpful in polyethylene

■ In the early days of arthroplasty, macroscopic and microscopic polyethylene wear was the most significant problem faced in arthroplasty design, and an extremely common reason for revision after total joint arthroplasty. After decades of refining the production of implants, development of new bearing surfaces and developments in tribology, wear is no longer the predominant cause of early failure in modern implants. However, the ongoing push for the 'everlasting' arthroplasty has driven development of further technologies for reducing oxidative wear, such as vitamin E-infused polyethylene. Researchers in **Mölndal (Sweden)** have designed an early implantation study with the aim of establishing the volumetric wear characteristics of two different types of polyethylene (vitamin E and highly crosslinked polyethylene) using radiostereometric analysis with a relatively short follow-up of two years. While there was observed wear with the vitamin E polyethylene at two years, we do wonder how clinically relevant this was. The observed wear rates were potentially clinically comparable (0.06 mm vs 0.10 mm). In a real world setting with a polyethylene

thickness of 5 mm, the survival of polyethylene would be 83 and 50 years, respectively. It now seems far more likely, with such good surface technologies, that other factors contribute to both overall wear and determination of what leads to total hip arthroplasty revisions. Given that it is not just the surface technology alone, this difference is unlikely to be clinically relevant after all.¹

Hip replacement in fracture and arthritis

■ In research terms it can be said that the Canadians get everywhere, but even with the volume of research crossing the editorial desks at 360, we were surprised to see this Canadian paper from **Hamilton (Canada)** reporting on four years' worth of outcomes from France!² The paper utilises the French national hospital discharge database over a four-year period, to report on 690 995 patients aged over 45, undergoing hip surgery across the whole of France, either for elective hip replacement (371 191 patients) or treatment of neck of femur fracture (319 804). As perhaps would be expected, the hip fracture cohort tended to be older, more predominantly female, with a prevalence of medical comorbidities (as defined using ICD-10) and demonstrating longer time to discharge following surgery – no surprises there. What is perhaps of more interest is that the authors then subjected their data to a matching process for age, sex and medical comorbidities. The two matched cohorts they were able to generate consisted of 117 157 patients each. Between these

matched cohorts, there was still a significantly higher risk of mortality (RR 5.80) and significantly higher in-hospital complications (RR 2.50) in the hip fracture cohort. The authors point out that it is widely assumed that the higher morbidity and mortality rates seen after hip fracture surgery are largely attributable to the higher age and increased prevalence of pre-operative comorbidities. However, they have demonstrated that these complications are still more likely to occur even after adjusting for these confounding variables from the dataset. They suggest that this results from intrinsic aspects of the physiological response to the trauma of the hip fracture itself, with associated pain, bleeding and immobility. This would certainly seem to further support the already widely-held perception that expeditious surgical treatment of such fractures is probably more important than prolonged optimisation of pre-operative medical comorbidities. The alternative explanation, of course is equally interesting: that traditional comorbidity adjustment may not in fact be adequate, and that this kind of matching process may underestimate comorbidity in many populations and diagnoses.

Non-surgical treatment for arthritis X-ref

■ Although arthroplasty surgeons are all aware of the principle that patients presenting with hip or knee osteoarthritis ought to undergo a proper trial of non-operative treatment before being channeled towards surgery, in reality this often

does not happen. In a more patient-centred and patient-driven health system, the patients will often attend their surgeon with a clear idea of what treatment they want (usually arthroplasty) and the attraction of advice, weight loss, analgesia and physiotherapy is not as great as healthcare policy makers would wish. A study team in **Leiden (The Netherlands)** centres around two cross-sectional internet questionnaires used to sample 195 patients and 482 orthopaedic surgeons. The questionnaires focussed on the use of non-operative treatments and included all surgeons undertaking arthroplasty procedures in the Netherlands. The response rates for patients and surgeons were 89% and 36%, respectively, and the prevalence and usage of the different components of the Dutch stepped-care strategy (SCS) were assessed (this is a guideline for non-operative treatment). The authors found that, amongst patients, although 80% reported having been offered at least one non-operative treatment modality (the commonest being paracetamol), only 33% had received all components of stage 1 of the SCS, and 6% had received all of stages 1 and 2. Similarly, only 56% of surgeons reported prescribing all aspects of SCS stage 1, and 10% reported prescribing stage 2 (stage 1 comprises education/paracetamol/general advice/education; step 2 adds in NSAIDs/dietary advice/physiotherapy).³ Although this project did not attempt to evaluate the efficacy of non-operative treatments, and

allowing for the fact that all patients sampled ended up having surgery, thus introducing strong bias, nevertheless the authors make a valid point that non-operative treatments are not being used as consistently as they might.

Cost and approach in hip surgery

■ Authors from **Ottawa (Canada)** have reopened the can of worms surrounding hip approaches. They have attempted to quantify the potential health economic cost benefit of two different surgical approaches: the Hardinge, and their own alluringly-named approach, 'SuperPath' (supracapsular percutaneously assisted total hip). The last time this topic was visited with MIS in hips, reams of paper were written, dozens of articles published and when it all came out in the wash, there was no benefit to the new approaches. This particular paper compares two cohorts of 50 and 49 patients operated on over the same time period by two surgeons, using the modified Hardinge and SuperPath approaches, respectively. The SuperPath is a relatively new technique initially described by the same group⁴ and is undertaken via an incision superior to the greater trochanter, approaching the hip joint between the gluteus medius and gluteus minimus to allow preparation of the femoral shaft prior to cutting the femoral neck with the head *in situ*. The group's previous work in this area has shown that – in their hands, at least – early outcome measures, complication rates and radiographic assessment of implant positioning using the SuperPath are within acceptable limits when compared with other surgical approaches. This paper, however, specifically looks at in-hospital costs as the primary outcome measure, and suggests that, in this series, described costs were 28.4% higher for the Hardinge cohort, which they attribute to higher transfusion rates, longer lengths of stay (which they break down into food, room usage,

physiotherapy etc), and greater requirement for social services. Sadly, however, the methodology is not robust; the mean age of the Hardinge cohort was five years older, there were two different surgeons, no randomisation and no long-term follow-up data.⁵ Given the inherent limitations in this paper, and that it would be a dark day when surgical approaches were chosen on the basis of cost implication rather than on concrete clinical outcomes, here at 360, we will not be adopting this approach just yet! Nevertheless, it is always interesting to hear of new surgical techniques potentially reducing soft-tissue trauma, and equally, in this day and age it would be naïve to think that espousal of potential money-saving modifications to any aspect of patient care can be completely ignored.

Who does well in FAI surgery? X-ref

■ Decision-making in femoroacetabular impingement surgery is complex. Although the radiographic criteria are well-defined, it is far from clear which radiographic appearances correlate to which outcomes. Surgeons in **New York (USA)** have attempted to shed some light on potential prognostic radiological features for expected outcomes through a comprehensive literature review.⁶ Notwithstanding the paucity of strong evidence in particular to support open or arthroscopic debridement, the authors acknowledge that the theoretical advantages of arthroscopic approaches may be proven with more mature studies. The parameters that they were able to conclude resulted in a poor prognosis are largely predictable, and include established OA (Tönnis grade 2/3, or joint space < 2 mm), acetabular dysplasia (lateral

centre-edge angle < 20°), and incomplete femoral neck osteoplasty (α -angle persistently > 40°). Together, these suggest a higher likelihood either of poor PROMS, or a need for repeat intervention (either arthroscopic or eventual progression to total hip replacement). One of the



most interesting findings is the relative lack of data in an area that is expanding widely in terms of resource allocation and numbers of cases being undertaken. While absence of evidence certainly should not be confused with

evidence of absence, nevertheless we would counsel caution at the very least as regards patient selection – some proper RCTs are urgently needed in this area to take hip preserving surgery forward.

AAOS Thromboembolism guidelines X-ref

■ Thromboembolic events are relatively commonplace following total joint arthroplasty, and despite the controversy surrounding its use, most national associations have issued guidance supporting the use of chemical prophylaxis in an attempt to reduce the morbidity and mortality associated with venous thromboembolic (VTE) events. The American Academy of Orthopaedic Surgeons (AAOS) published guidelines in 2009 for VTE prophylaxis and, to date, no large study has assessed the utility of the first-generation AAOS guidelines in the prevention of VTE. The arthroplasty team in **Farmington (USA)** reported their experience of these guidelines in 3289 consecutive patients, all of whom underwent hip or knee arthroplasty.⁷ All patients were mobilised on post-operative day one, and a pneumatic foot pump compression device was used throughout their hospital stay.

In this cohort, 36 VTE events were diagnosed by Doppler ultrasound or CT angiography within 90 days of surgery. The authors found that first-generation AAOS guidelines resulted in a 90-day incidence of VTE of 1.1% at their institution, suggesting that the slightly more liberal take on the topic followed by the Americans yielded a similar VTE rate to other more aggressive policies used in other healthcare systems.

Thromboprophylaxis and periprosthetic joint infection X-ref

■ Perhaps the most devastating complication of all to the arthroplasty surgeon is that of periprosthetic joint infection. While much has been made of the potential for bleeding complications associated with thromboprophylaxis, there has been little evidence to date to support the worry surgeons have surrounding rates of periprosthetic joint infection and thromboprophylaxis. Theoretically, poorly healing wounds, ongoing ooze and a higher rate of haematoma formation should predispose to infection, and the incidence of these complications is known to be linked to the type of thromboprophylaxis regime. In a relatively carefully-reported retrospective study, investigators in **Philadelphia (USA)** reported the outcomes of over 3000 patients who received mixed thromboprophylaxis regimes following total joint arthroplasty.⁸ In all, 1456 patients received aspirin and 1700 patients were administered warfarin over a six-year period. Overall infection rates were acceptably low, however, patients in the aspirin group had a significantly lower incidence of PJI compared with those in the warfarin group (0.4% vs 1.5%, $p < 0.05$) when combined with a lower rate of post-operative PE (0.1% vs 0.3%) and a decreased length of stay (2.6 vs 2.8 days). This does seem to make aspirin an attractive option. While using warfarin may be more effective VTE prophylaxis for those patients deemed high-risk, the authors found that the use of aspirin in low-risk patients results in a lower incidence of PJI,

therefore, the authors suggest using aspirin in low-risk patients to decrease the risk of infection. We would apply a hint of caution to these results.

Although presented as a comparative case series, all of the patients with aspirin prophylaxis were in the latter half of the series and it is certainly possible that other factors such as change in pathway may also have had a role to play.

Fluid collections not limited to metal-on-metal THR **X-ref**

■ One of the pathognomonic (we thought) features of an adverse metal reaction is the presence of fluid collections visible on metal artefact reduction sequence MRI scanning. Described in association with aseptic lymphocyte dominated vasculitis-associated lesion and often termed 'pseudotumours', these large fluid-filled collections have been associated with high rates of soft-tissue destruction and loss of muscle function, and consequently many of the poor results described after revision for

ALVAL are attributed to these so-called pseudotumours. In a study that challenges our understanding, here at 360, of what is going on with metal-on-metal (MOM) hips, researchers in **Arnhem (The Netherlands)** have asked the question 'is it just MOM hips that are associated with fluid collections?'⁹ Methodologically, this is a strong study, being a secondary analysis of a randomised controlled trial, and reports the outcomes of patients receiving either a resurfacing arthroplasty (n = 36), 28 mm MOM THR (n = 28) or conventional 32 mm ceramic hip (n = 33). All patients underwent cross-sectional imaging with a MARS sequence MRI scan. Follow-up was to 55 months, and the results were not quite what we expected. There were periprosthetic fluid-filled lesions in 13 patients; six of these were in the ceramic group, with six in the resurfacing group, as might be expected, and just one in the MOM hip arthroplasty group. Clinical scores were also presented

for all patients, but there was no apparent correlation between these and the incidence of periprosthetic fluid collections, which is not too surprising given the small size of the study. This finding of fluid-filled collections surrounding ceramic hip replacements requires urgent investigation – is our understanding of the process of ALVAL misdirected?

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Knee

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Albumin and complications in knee arthroplasty

■ While assessing patients who are undergoing elective primary total joint arthroplasty, surgeons strive to stratify risks and thereby optimise outcomes for patients. Much thought has been given to body mass index (BMI) as a predictor of both outcomes and complications, with some surgeons and healthcare systems using an upper BMI threshold to deny surgery due to the risk of increased post-surgical complications. A study team in **Philadelphia (USA)** set out to establish if there is a more subtle predictor of complications than the

blunt tool that is BMI.¹ However, this study of more than 77 000 patients importantly points out that other parameters such as serum albumin are arguably more important for assessing patients. Low serum albumin (< 3.5 mg/dL) was associated with increased surgical site infections (all levels), and many other major complications such as pneumonia, unplanned intubation, progressive renal insufficiency, cardiac arrest, and septic shock. Interestingly, morbid obesity was not associated with increased transfusion rates, while low albumin was. This does beg the question: is it the obesity itself or the often associated nutritional issues that are the most important determinant in outcomes in the obese?

Tantalum: a knee fixation for all seasons?

■ As candidates for arthroplasty are becoming younger and younger,

and living longer, the burden of revision surgery will increase into the future. Durable fixation in revision situations with poor bone stock is likely to be one of the major challenges of the next few decades. One of the responses of the implant industry to this challenge has been the development of porous metal implants, most commonly tantalum. An arthroplasty group in **New York (USA)** has been using tantalum cones in the proximal tibia to address revision-related bone defects in proximal tibial metaphysis.² There are a number of short-term series but no longer-term outcome studies relating to these implants, therefore their report of five- to eight-year follow-up is of interest. Although these authors report just 18 knees at this longer stage of follow-up, the results themselves are promising.

The authors report a combination of radiological outcomes and clinical outcomes (Knee Society Score) for this cohort of revision knee arthroplasties undertaken for both septic and non-septic indications. In total there were 26 individual tantalum cones: 13 each of tibial and femoral implanted for five cases of aseptic loosening, and 13 reimplantations for deep infection. There were two long-term failures requiring reoperation, both for infection, and the rest of the implants showed no evidence of loosening or migration of any kind with excellent improvement in post-operative results (31 points to 77 points). While these are clearly early and limited results, some inferences can be drawn from them. We would advise caution when using tantalum cones in septic revision scenarios, as patients have a higher likelihood of