ROUNDUP360

Hip & Pelvis

X-ref ***For other Roundups in this issue that cross-reference with Hip & Pelvis see:*** *Children's Orthopaedics Roundup 1; Trauma Roundup 6; Knee Roundup 7, 8; Research Roundup 7, 8.*

Cracking dysplastic hip arthroplasty X-ref

■ There is increasing interest in publishing studies that have long term follow-up, and this is all the more important when interventions are being undertaken in young patients expecting a long and active life following surgery. Focussing on the outcomes following total hip arthroplasty (THA) in patients with Crowe Type-II dysplasia, the team at the **Mayo Clinic, Rochester (USA)** have been able to report the outcomes of their cohort at 36 years.[1] When performing THA, there is an erroneous concept that, particularly in dysplastic patients, raising the hip centre is in some cases necessary to achieve full coverage of the femoral head, or that reducing the hip to the anatomic hip centre may result in limb length discrepancy or neuropraxia from overlengthening as the loss of superolateral acetabular coverage results an eccentrically placed femoral head. This study reports the outcomes of 145 THAs undertaken in 117 patients, all with Crowe Type II dysplasia. The authors aim to establish the outcomes of total hip arthroplasty at follow up at a mean of 36 years. As would be expected over such a long follow up period in a young and active cohort, significant numbers of patients required revision, with 32% of acetabular cups requiring revision and 21% of femoral stems over that time period. The authors were able to fairly effectively establish that placement of the acetabular component within the true acetabulum resulted in a significantly lower incidence of revision, when compared to superior placement. The effect was also seen with femoral loosening, although the excess of revisions in this case was only seen with femoral head centres of rotation placed more than 35 mm superior to the inter-teardrop line. Given what is known about the biomechanics of force transfer, abductor balance, and the excessive forces that can be expected to be dissipated across the hip joint with a non-anatomic placement of the centre of rotation, this is perhaps not a surprising study. The take home message is that compromise on fixation in favour of normal biomechanics is best.

Metal-on-metal in the longer term

■ As the metal-on-metal debate continues to run, definition of what exactly is an acceptable outcome continues to ping-pong back and forth between supporters and detractors from the metal-on-metal (MOM) camp. This, the most recent study from **Oxford (UK)**, is a further report from one of the most publicised series in the orthopaedic literature. With the longest follow-up published to date, the Oxford group have reviewed the outcomes following revisions after metal-on-metal hip resurfacings (MoM HR).[2] This series really does make grim reading. The reasons for failure following MoM arthroplasty are well documented, with certain designs reporting ten year revision rates of between 10%-13%. In total, 53 MoM HRs underwent revision with a mean patient age of 55 years,62% of whom were women. The most commonly revised implant was the Birmingham Hip Resurfacing (BHR) (55%) at a mean post-implantation interval of 1.6 years. The leading indications for revision were pseudotumour formation (30%) and femoral neck fracture (40%). Less commonly, cases of aseptic loosening, infection and recurrent dislocation were also revised. The majority of revisions were performed through a posterior approach, and both components were revised to a non-MoM bearing the majority (62%) of the time. All femoral stems were cemented and all acetabular components were uncemented. In the remaining 38%, only the femoral stem was revised for fracture, loosening or head collapse, for example. The femoral stem-only revisions were performed pre-2008 before complications with large head MoM THA bearings were known. A total of 24 patients (45%) undergoing MoM HR revision surgery sustained a complication and 20 patients (38%) underwent re-revision. Re-revisions were performed at a mean of 3 years following index revision and were most commonly for pseudotumours (40%), recurrent dislocation (20%) and deep infection (20%). The ten-year survival free from re-revision for all revised MoM HRs was just 63%. From the results of this study it was clear that those patients who had revisions for pseudotumours had inferior patient-reported outcomes compared with other revision indications, and the authors freely accept that the results of the femoral-only revisions were adversely affected by the use of large-diameter MoM bearings which have the worst implant survivorship. Like all retrospective cohort studies, the data should be taken with a small pinch of salt. Small numbers in subgroup analyses, surgical learning curves and not inconsiderable selection biases all have their roles to play here. However, this is the first long-term follow-up study of its kind, which gives it a certain significance and challenges some of the early studies reporting on the short-term results and patient-reported outcomes after MoM HR revision which suggested outcomes were comparable to conventional THA.

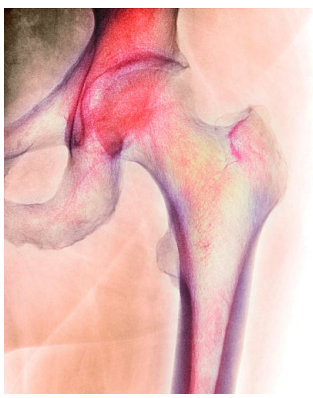
Hip injection – just what is the risk?

■ Any casual conversation in the theatre coffee room will clearly establish that different periods of time between an intra-articular steroid injection and a total hip arthroplasty (THA) are allowed by different clinicians. Intervals ranging from six weeks to 12 months could all be described as routine practice. Hip injections with local anaesthetic and steroid or viscosupplements can be both useful therapeutically to provide pain relief in hip arthritis, but also diagnostically if the patient has additional lower back pain as well as hip pain. However, there is always the concern that we may be increasing patients' risk for a periprosthetic joint infection (PJI) when performed

pre-operatively. It is therefore with great interest that we read this article at *360* – one of the few that cross the editorial desks with the capacity to change practice instantly. The authors in **Charlottesville, Virginia (USA)** set out to establish what a safe interval was following injection into the hip and THA without increasing the risk of infection.[3] The difficulty of course, given the low event rates here, is the massive numbers needed to inform the study. The authors reviewed a total of 34 597 records of patients who underwent THA. These patients had been identified from an insurance-based database in the USA. These patients were then divided into three groups; THA within three months following an ipsilateral hip injection (829 patients), THA between three and six months after ipsilateral hip injection (1379 patients) and THA between six and 12 months (1160 patients) after ipsilateral hip injection. In addition, there was a control group of patients (31 229 patients) who had a THA but had never had an ipsilateral hip injection. There were no significant differences between the cohorts in all but one of the patients' demographics, with a statistically significant higher percentage of female patients in the 0-3 month group compared to the control group. The incidence of infection after THA at three months and six months was significantly higher in patients who underwent hip injection within three months before THA compared with the controls. There was no significant difference in infection rates in patients who underwent THA between three and six months or six and 12 months after an ipsilateral hip injection compared with the controls. The literature to date has produced some conflicting evidence. There are a number of studies demonstrating no association between pre-operative hip injection and PJI after THA, but also similar numbers demonstrating higher rates of PJI. The biggest problem with all of these studies is the low numbers of patients involved, resulting in them being inadequately powered. Accepting the limitations of the study design, the quality of data extracted from the database and coding inaccuracies, this is the first study of this size that has given some clear guidance on when it is safe to proceed with a THA after an ipsilateral hip injection. Bottom line: wait at least three months.

Optimal evaluation of pincer type impingement

■ It is widely recognised that pelvic motion is a dynamic thing, and that pelvic tilt can affect positioning of the acetabulum and hence may impact on impingement. Authors



from **Pasadena , California (USA)** undertook plain film evaluation of the pelvis in both standing and supine positions.[4] The authors undertook radiographs on all new patients being evaluated for hip pain under 60 years of age. They then formally calculated the usual measures for femoroacetabular impingement, specifically intrapelvic distances (sacrococcygeal to symphysis [SC-S] and coccyx tip to symphysis [T-S]), crossover sign, LCE angle, inclination, and ischial spine sign. There were 46 paired radiographs suitable for inclusion in the study, and radiographs were evaluated by two independent observers. Pelvic tilt reduced from sitting to standing, with reduced T-S and SC-S distances. When evaluating both views there were no real differences in CE angle; however the ischial spine and crossover signs were seen significantly less frequently in the standing images. While films in the standing position are potentially more reflective of function, another consideration is that supine images are more reliably obtained by radiographers. There is certainly however food for thought here, as it does appear that at least a proportion of measures such as the crossover sign are in fact artefactual.

Can pre-operative hygiene reduce infection?

■ In the early days of arthroplasty, surgical patients were supervised in taking a pre-operative bath by the ward sister to ensure that they were appropriately clean for theatre. In these days of high turnover, same-day admissions and accelerated recovery pathways, there has been some loss of focus in many units on the basics such as perioperative hygiene. In patients with MRSA, or a high MRSA risk, there is a focus on pre-operative skin preparation, and surgeons in **Brooklyn, New York (USA)** have asked the question: would a preadmission chlorhexidine skin preparation reduce peri-operative infection? Their paper describes the outcomes of over 3500 patients, 998 who used chlorhexidine cloths pre-operatively and 2846 who did not.[5] Subsequently a direct notes review was undertaken to establish which patients then went on to develop post-operative infections. There was a significantly higher infection rate in the 'control' group (1.6% *vs* 0.6%), however when the study team then went on to stratify the patients based on NHSN risk of infection characteristics, there were no differences between groups. This is a promising intervention – although the stratified analysis did not find any differences, it is important to remember the event rate in the intervention group is only 0.6% (equating to six patients). When subcategorising this by three risk groups, it becomes unsurprising that there were no tangible differences in event rates between the cohorts.

Femoral neck stress fracture X-ref

■ Stress fractures of the femoral neck are a well-described entity and are relatively more common in endurance athletes and military recruits. Often diagnosed on MRI scan, the difficult call with these injuries is not making the diagnosis, but deciding on the management. When exactly are patients with a stress fracture of the femoral neck safe to return to sports? Sports doctors in **Charlestown, Massachusetts (USA)** report on a consecutive cohort of 24 patients presenting with 27 stress fractures of the femoral neck, diagnosed with MRI scan.[6] The authors reviewed the scans to grade the stress fractures with the Arent score, and in addition information on patient demographics and return to sports time were collated from the patient records. An adjusted analysis was undertaken with the aim of eliminating the effects of age, bone mineral density and body mass index with the primary end point of return to running time – a fairly subjective end point. There was a roughly linear correlation between the Arent grade and return to running time (Grade 1 – 7.4 weeks; 2 – 13.8 weeks; 3 - 14.7 weeks and 4 – 17.5 weeks). Survival analysis suggested that fracture grade had a significant effect on return to running time, with a significant hazard ratio. For compression side fractures treated non-operatively, patients with low Arent scores returned to running earlier than those with higher scores, and multivariable analysis established that BMI was an independent factor, with low BMI delaying return. It is difficult however to be certain there isn't a bit of chicken-and-egg going on here – we have no outcome data presented and essentially all that this paper proves is that with higher-grade fractures, both clinician and patient were more cautious. Alas, though first described by Michael Devas in 1965, stress fractures are often missed [7] and to make matters worse, very low BMI (anorexia) can confuse the MRI appearance, because the bone marrow contains very little fat.[8]

Ameliorating the systemic response to surgery? X-ref

Any major surgery carries with it the risk of systemic inflammation and an unwanted stress response to the injury. Whilst a certain amount of immune modulation happens naturally, and additional corticosteroids are warranted in patients with adrenal dysfunction, there has been little research in recent years into the benefits or otherwise of systemic corticosteroids. Tried extensively in the 1980s and abandoned due to excess side effects, we were interested to see the results of this pilot study in total hip arthroplasty, undertaken in **New York (USA)**.[9] Reasoning that the interleukin 6 (IL-6) driven stress response may have the unwanted adverse effects of deep vein thrombosis and other medical complications, the authors devised a pilot study undertaken in 27 patients who were randomised to either 20 mg of oral prednisolone and then 2 IV doses of hydrocortisone or placebo. The stress response was measured with regular IL-6, prothrombin and fibrinolysis markers. In addition, visual analogue scale (VAS) pain scores, patient-controlled analgesia (PCA) use and progress with physiotherapy and stair climbing were also recorded. Patients all underwent a unilateral uncemented total hip arthroplasty. The steroid group had the effect of lower IL-6 levels, although there were no differences in any of the coagulation markers measured. The pain scores were lower in the intervention group. This interesting pilot study does raise some interesting questions surrounding the effects of systemic steroids around THA. The inflammatory response was lower in the intervention arm and pain was also better controlled. What we want to know is what the side effect profile is, and specifically whether it increases infection and ulcer risk. A larger study is required, although care would clearly be needed to establish a safety profile, perhaps with an internal pilot phase.

Rationing based on national registry data? X-ref

There is a complete lack of understanding in many corners about the use of hip and knee outcome scores. Which is puzzling as it is in the title 'outcome score'. Despite this and a complete lack of data to support the use of clinical scores as a threshold for arthroplasty, it appears that managers, funders and now clinicians continue to do some. In a very alarming paper from **Dunedin (New Zealand)**, the authors set out to compare the New Zealand Orthopaedic Association (NZOA) score with other clinical scores for the express purpose of establishing if it would be suitable as a tool for rationing.[10] Here at *360* we feel the need to point out that this is a dangerous and damning thing to do. You cannot validate one score against another for a purpose for which the initial score has not been validated. It is simply not good enough to say our score is as good as this unvalidated score for making treatment decisions. The difficulties of course arise when journals publish these kinds of papers without heed for the potential political and health rationing consequences. For what it's worth, this paper does attempt to establish the differences between those patients passed on for arthroplasty, listed as urgent and returned to the GP. However without any attempt to establish thresholds using a suitable method such as receiver operating characteristics (ROC), minimal clinically important differences (MCIDs) of the scores post-operatively based on pre-operative values or any attempt to establish responsiveness to change of the score, this is essentially a useless paper with a message that could be potentially very destructive.

Assessing outcomes in total hip arthroplasty

Perhaps brought into sharper focus by the metal-on-metal difficulties - although this paper applies to all branches of arthroplasty - researchers in **Oxford (UK)** have undertaken a systematic review with the express intention of establishing what constitutes the surrogate markers of long-term outcomes in hip arthroplasty.[11] With improvements in longevity and rising numbers of patients requiring intervention, failure itself may not be sensitive enough during the introduction of novel technologies to allow for the additional safety and monitoring that seems appropriate in the light of some high-profile failures. So, what is the gold standard of surrogate outcome measures in 2016 for monitoring changes to existing technologies or introduction of new arthroplasty technologies? The authors undertook an extensive review of the current literature and were able to identify 1082 studies, of which 115 were reviewed in full as fulfilling the inclusion criteria. The authors report on the findings of 17 papers, describing three approaches to surrogate outcome measures, and were able to conclude that there was enough evidence to describe both radiostereometric analysis (RSA) and Einzel-Bild-Röntgen-analysis (EBRA), both of which are able to measure both migration and wear as 'validated'. The authors identified five RSA studies (one systematic review and four case series) and four EBRA studies (one RCT and three case series) supporting their use as surrogate outcome measures. However, the use of patient-reported outcome measures was not felt by the review authors to be suitable, as although potentially promising, they were not validated against longer-term outcome measures.

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