ROUNDUP360

Hip & Pelvis

X-ref ***For other Roundups in this issue that cross-reference with Hip & Pelvis see: Knee Roundups 4, 6 & 9; Children's orthopaedics Roundup 3; Research Roundups 1 & 5.***

Liner and head exchange: worth doing?

The aim in revision hip surgery, when tackling polyethylene (PE) wear, is to address the patient's pain, restore bone stock through bone grafting any osteolytic defects, and, ideally, remove the source of the PE debris causing the osteolysis. It is not uncommon to retain a well-fixed, modular uncemented acetabular component in the presence of PE wear, and replace the liner and the femoral head. A 'tyre change' if you like. There is some controversy regarding the retention of the acetabular component in the presence of liner wear and osteolysis, with a reported increased risk of dislocation and subsequent acetabular revision. The authors of this study from **Rochester, Minnesota (USA)** explored long-term implant survival and risk factors for failure following isolated acetabular liner and femoral head exchange for PE wear.[1] Despite the impressively large registry at the Mayo Clinic, this series consists of a total of 116 hips in 110 patients with a mean follow-up of 11 years (2 to 23) following liner and head exchange. Interestingly, there were 23 patients who underwent surgery for radiological evidence of PE wear and osteolysis, but were clinically asymptomatic. In around half (59 hips), the locking mechanism was damaged, or the component was non-modular, then a new PE liner was cemented into the acetabular shell. There was a total of 22 second revisions and survivorship-free second revision was 91% at five years, 81% at ten years, and 69% at 15 years. Osteolysis around the acetabulum was a predictor for aseptic loosening, while the use of highly crosslinked PE liners appeared to be protective for subsequent wear, although this did not reach statistical significance. There was clinically relevant and significant improvement in Harris Hip Score and reduction in postoperative pain in the majority of patients. In terms of complications, the most common problem was dislocation (16%), also a common cause for repeat revision at 6%. The only risk factor that the authors could identify was the patients' age, with older patients being at higher risk of dislocation. Other causes for further revision was aseptic acetabular loosening and recurrent wear of conventional PE. Unsurprisingly, severe periacetabular osteolysis was a significant risk factor for subsequent failure and highly crosslinked PE was not associated with any further surgery for recurrent PE wear or osteolysis. The advantages of performing a 'tyre-change' are obvious when the acetabular shell is well fixed and there is minimal osteolysis. This study suggests that clinical outcomes can be improved significantly; however, careful assessment of the periacetabular osteolysis and implant fixation, as well as a thorough assessment of the component position, should be made to help reduce the risk of additional morbidity for patients and a subsequent further revision. In addition, where possible, a highly crosslinked PE liner should be utilized.

Two-stage revision is associated with a high rate of dislocation

The management of prosthetic joint infection is an important issue in arthroplasty surgery. The majority of patients with a chronic or resistant infection following a total hip arthroplasty (THA) are managed with a two-stage revision despite the recent interest in single stage and debridement, antibiotics, and implant retention (DAIR) procedures. While the prevalence of dislocation following revision for aseptic causes has been well documented, the risk factors associated with dislocation after second-stage revision for infection has not. In this second paper from **Rochester, Minnesota (USA)** the study team undertook a retrospective review of 502 patients (515 hips) following a two-stage revision for chronic infection.[2] In terms of follow-up, 91 were at less than two years and 411 patients had a mean follow-up of five years (2 to 15). The cumulative dislocation rate was 8.9% at one year after the second stage. From the 52 hips that dislocated, 30 did so more than once. The only preoperative risk factor that was statistically significant for dislocation was female sex, while a dual-mobility construct at second stage was more than three times less likely to dislocate. There was a statistically significant higher risk of dislocation in patients with trochanter/abductor deficiency (30 times) and those who had a megaprosthesis (six times). Of the 52 hips that dislocated, 41 hips underwent a further 99 additional operations; 11 hips had a closed reduction only and 12 hips required a revision. Of the 99 reoperations, 58 were for instability and 41 were for other reasons such as recurrent infection, periprosthetic fracture, and aseptic loosening. This is compared with 61 of the 463 hips that did not dislocate, undergoing a total of 111 further operations following the second-stage surgery. Of the 463 hips that did not dislocate, 17 underwent revision. One powerful statistic from this study revealed that hips that dislocated were 121 times more likely to undergo further surgery than those that did not. In addition, hips that dislocated postoperatively were 13 times more likely to undergo revision surgery. In summary, this is an extremely helpful study when facing a dislocation following second-stage revision THA. The identification of risk factors predisposing to dislocation is particularly helpful and may inform the surgeon as to implant selection at the time of the second-stage, such as the use of increasingly constrained acetabular constructs in the presence of trochanter/abductor deficiency.

Cemented *versus* cementless femoral component in elderly patients

The age-old argument of cemented *versus* cementless total hip arthroplasty (THA) in the elderly patient continues in modern day orthopaedic literature. Concern has been raised about the 'evils' of cement and has been termed 'bone cement disease', which is regarded by some as the primary cause of prosthesis loosening in cemented THA's. Some have argued that cementless THAs

should help resolve this phenomenon with its biological fixation, but prosthesis loosening and bone dissolution still occur in this group. In the elderly ectatic femur there are concerns that the 'fit and fill' type femoral component may not integrate in older osteoporotic femora. This is one of the more recent studies that addresses this issue and highlights some important points for the modern day orthopaedic surgeon. These authors from **Guangzhou (China)** report their retrospective study of 366 consecutive patients with osteoporosis who underwent a primary cemented (184 patients) or cementless THA (182 patients).[3] The mean age of both groups was 71 years and the mean follow-up was 75 months (65 to 86). There were no statistically significant differences in postoperative mortality between the two groups. At one month after surgery there was no significant difference in functional outcome between the groups, but from three months after surgery to the final follow-up, the cemented group had consistently higher Harris Hip Scores. Of the cementless group, 32% complained of hip pain in the resting state, increasing to 47% in the active state. This compared to 21% of the cemented group who described no or mild pain in the resting state and 36% in the active state. More patients in the cementless group complained of severe pain. Radiological review revealed loosening rates in the cementless group of 26.4% compared to 16.8% in the cemented group at a minimum of five years. More of the uncemented THAs had early revisions at the final follow-up (14.8%) compared with the cemented group (7.6%), which was a statistically significant difference. While this study was not without its flaws, it echoes the results from previous studies that cemented THA has certain advantages over cementless THA in the elderly, osteoporotic population. It continues to be a reminder that modern day cementing techniques have improved significantly. Vacuum centrifugal mixing, pulse irrigation, the use of a cement gun, and utilizing fourth-generation principles of cementing ensures an optimal bone cement-implant interface, with bulk filling of macroscopic bone defects between the implant and bone and microscopic interlocking with the bony trabeculae. The reason for early failure in uncemented THA has often been attributed to insufficient initial stability of the interface. This inability to attain adequate 'press-fit' in an uncemented THA could be multifactorial. Osteoporotic femurs tend to be shaped like a stove pipe, and not the tapered shape seen in younger patients. Trying to get a 'wedged-shaped' stem to get an adequate 'press-fit' in a cylindrical femur can be a significant challenge. There is then a conflict between the surgeons need to attain a good press fit without fracturing the thin walled stove pipe femur. This study was also interesting in that the surgeons used the direct anterior approach. This approach is associated with more of a technical challenge in exposing the femoral canal to accept the femoral rasp. To overcome this, implant designers have come up with a double-handled rasp, rather than the straight-handle rasp used in other surgical approaches to the hip. This double angle lessens the force generated when rasping the femur. This may result in under-rasping the femur and therefore under-sizing the femoral stem, which may also result in early loosening in the cementless THA. With more and more THAs being performed in the elderly, osteoporotic population for both arthritis and hip fractures, studies like these are important in shaping modern day thinking of cement *versus* cementless THAs. There is an enormous divide between North America, which favours cementless stems and Europe, primarily the UK, which favours more cemented stems in this population. When the consequences of getting it wrong are so significant for the patients and the health economy at large, more robust studies are needed, with large numbers, that are well designed and, ideally, multicentred.

Hip osteoarthritis progression and femoral head collapse after hip injections

■ It is not uncommon to inject an arthritic hip with a combination of steroid and local anaesthetic. This may be performed as a diagnostic injection or it can be also used for its therapeutic benefits. There has been considerable evidence in the literature supporting its use for the correct indication. However, there has also been some evidence suggesting that intra-articular steroid injections may accelerate the progression of the arthritis or result in the development of osteonecrosis. In a valuable study from **Boston, Massachusetts (USA)**, a total of 70 hip injections were included in this comparative study and were compared with a control group of 70 patients who did not receive a steroid injection, and a further control group was used of shoulder patients who also received an injection but into another joint.[4] There was a statistically significant progression of arthritis in the hip injection group compared with the control hip group. The hip injection group also had more patients with femoral head collapse (17%) compared with the control hip group (1%) and the shoulder injection group (2%). This difference was statistically significant. In addition, patients without evidence of osteoporosis confirmed on a DEXA scan did not develop femoral head collapse following hip injection but 30% of the osteopaenic patients and 33% of the osteoporotic patients did. As the authors point out, while they have demonstrated an association between hip injection and progression of arthritis and femoral head collapse, the cause of this relationship is not known. Importantly, the patients were not randomized either to have an injection or not, although to their credit the assessors were blinded to whether the patients had an injection or not – those patients receiving injections are logically likely to be those with more pain in the hip – so the groups are unlikely to be matched. This paper certainly does add to the current literature on the topic of injection of steroids into the hip joint. It emphasizes that this is not a benign procedure and patients need to be carefully counselled as to the risks and benefits of the procedure including the risk of arthritis progression and femoral head collapse.

Single dose antibiotic prophylaxis in total joint arthroplasty X-ref

■ When the Centers for Disease Control and Prevention (CDC) released guidelines that only one dose of preoperative antibiotics was needed prior to clean surgeries, such as total joint arthroplasty, the reaction from the orthopaedic community was swift. The risk of prosthetic joint infection (PJI) seemed to far outweigh the problem of antibiotic stewardship. The CDC criteria were not drawn up without evidence; in fact, there is ample evidence to support a single dose of antibiotics. However, these are drawn from clean contaminated surgeries and not from those in which an arthroplasty is being implanted. In this 'big data' retrospective study from **Philadelphia, Pennsylvania (USA)** the authors have attempted

to see if the use of a single-dose of antibiotics is equally efficacious to the multiple-dose regimens previously used in prevention of implant associated infection.[5] This is a retrospective study of 20 682 procedures undertaken over an 11-year period. There were 4523 who received a single dose of prophylactic antibiotics and 16 159 who received multiple doses. The overall PJI rate was 0.60% in the single dose group compared with 0.88% in the multiple dose group. The authors went on to develop a propensity score matched analysis, which again did not show a difference between regimes (odds ratio (OR) = 0.746). An analysis of multiple doses did not demonstrate any additional benefit for patients with a high preoperative risk of PJI. This retrospective study seems to confirm the CDC's guidelines that one dose of antibiotic prophylaxis may be enough in all patients, regards of comorbidities. An ongoing prospective randomized study may further demonstrate this or refute these findings.

Hepatitis C and the outcomes of total joint arthroplasty?

There are certain diseases that will always be under the spotlight due their chronic long-term health risks and the ability to contract them via the blood borne route. One of these conditions is hepatitis C, which carries significant medical comorbidity and long-term disability. In some parts of the world, up to 8% of those undergoing joint arthroplasty are hepatitis C positive. Yet, despite this, there is little known about the potential impact of hepatitis C on the outcomes of joint arthroplasty. This meta-analysis from **Tianjin (China)** aims to draw together the various publications referring to outcomes following joint arthroplasty in the hepatitis C population.[6] Their initial search identified 28 articles potentially identifying outcomes following joint arthroplasty for those patients with hepatitis C. Once the final reviews had taken place, six articles reporting ten studies were felt suitable for inclusion in this review. In this analysis, there was a higher rate of complications in the hepatitis group (hazard ratio (HR) 1.55). The current evidence base also suggests a higher revision rate for total hips (HR 2.21) and infection rate across all joint arthroplasties (HR 1.29). While this is perhaps an intuitive result, putting numbers to risks such as these does help with counselling of patients and risk stratification for surgeons.

International Hip Outcome Tool 12: reliability, validity, and responsiveness in Japanese

While only of interest to our international colleagues in Japan, we are including this paper from various centres around **Japan**.[7] Little work has been done on outcome measures and, in particular, the conversion of validated tools into international native language versions. Although International Hip Outcome Tool 12 (iHOT 12) is a useful evaluation method for young active hip joint disease patients, it is not available for Japanese centres. The authors of this study were able, with just 51 patients, to undertake reliability measures and validation of the iHOT 12 Japanese Language version.

REFERENCES

1. **Petis SM, Kubista B, Hartzler RU, Abdel MP, Berry DJ.** Polyethylene liner and femoral head exchange in total hip arthroplasty: factors associated with long-term success and failure. *J Bone Joint Surg [Am]* 2019;101-A:421-428.
2. **McAlister IP, Perry KI, Mara KC, et al.** Two-stage revision of total hip arthroplasty for infection is associated with a high rate of dislocation. *J Bone Joint Surg [Am]* 2019;101-A:322-329
3. **Yang C, Han X, Wang J, et al.** Cemented versus uncemented femoral component total hip arthroplasty in elderly patients with primary osteoporosis: retrospective analysis with 5-year follow-up. *J Int Med Res* 2019;47:1610-1619.
4. **Simeone FJ, Vicentini JRT, Bredella MA, Chang CY.** Are patients more likely to have hip osteoarthritis progression and femoral head collapse after hip steroid/anesthetic injections? A retrospective observational study. *Skeletal Radiol* 2019. (Epub ahead of print) PMID: 30840099.
5. **Tan TL, Shohat N, Rondon AJ, et al.** Perioperative antibiotic prophylaxis in total joint arthroplasty: a single dose is as effective as multiple doses. *J Bone Joint Surg [Am]* 2019;101-A:429-437.
6. **Wei W, Liu T, Zhao J, et al.** Does the hepatitis C virus affect the outcomes of total joint arthroplasty? A meta-analysis of ten studies. *J Orthop Sci* 2019. (Epub ahead of print) PMID: 30686688.
7. **Watanabe N, Murakami S, Uchida S, et al.** Exploring the validation of a Japanese version of the International Hip Outcome Tool 12: reliability, validity, and responsiveness. *J Orthop Sci* 2019. (Epub ahead of print) PMID: 30638690.

Knee

X-ref ***For other Roundups in this issue that cross-reference with Knee see: Hip Roundup 5; Sports Roundups 1 & 2; Research Roundups 1 & 5.***

Is the robot helpful in early rehab following unicondylar knee arthroplasty?

Unicondylar knee arthroplasty (UKA) for medial compartment osteoarthritis has recently been widely publicized, both in the medical literature and the national press. The advantages have been well documented, including the ability to preserve the patients' own kinematics leading to better functional outcomes. However, this is balanced against the increased risk of implant failure and reduced survivorship compared with total knee arthroplasty. Some of these failures are due to poor surgical technique, which is often associated with lower-volume surgeons. While robotic-assisted surgery should never be seen as a replacement for surgical experience and training, it can help reduce intraoperative surgical errors. As such, robotic-assisted surgery is being used in specialist low-volume arthroplasty procedures such as unicompartmental knee arthroplasty. In addition to the potential benefits from a component alignment perspective, the authors of this paper from **London (UK)** proposed that robotic technology may also help preserve the periarticular soft-tissue envelope, and therefore aid a more rapid period of early postoperative rehabilitation.[1] This series reports the outcomes of patients undergoing either conventional jig-based UKA or robotic-arm assisted UKA. A total of 146 patients (146 knees) were included, with 73 consecutive patients undergoing the conventional UKA followed by 73 consecutive patients undergoing the robotic-assisted technique. All patients received a standardized postoperative care programme including patient-controlled analgesia (PCA) with additional oral paracetamol and ibuprofen was prescribed as required. The PCA was then stopped 24 hours after surgery and converted to oral medication. Patients undergoing the robotic-assisted surgery had significantly less pain than the conventional group with opiate usage also significantly lower in this group. Form a functional perspective, the robotic group were able to achieve a straight leg raise significantly quicker than the conventional group, and achieved greater knee flexion at discharge, requiring fewer physiotherapy sessions. Mean time to discharge was also statistically quicker in the robotic group. The results from this study were somewhat surprising. A reduction in surgical errors in implant