Having your cake and eating it? The outcomes of ERAS X-ref

In the era of bundled payment in the majority of Europe and the United States, the focus of healthcare systems is moving from a 'quality' agenda to a 'value' agenda. One of the best methods for cost containment which has become more and more popular in hospitals worldwide is the 'enhanced recovery programme'. These pathways aim to decrease hospital length of stay without compromising patient outcome. Most focus on perioperative anaesthetic optimisation, physiotherapy and planned stays. Although minimally invasive surgery was lauded as a potential benefit, multiple studies have shown that this does not affect the length of stay. In this study conducted at the **Royal Infirmary of Edinburgh (UK)**, the authors implemented pre-operative physiotherapy and occupational therapy, provided patient literature, and a periarticular local anaesthetic injection was utilised in order to reduce length of stay.[7] Unusually, the authors report not only their outcomes in terms of resource use, but also their outcomes in terms of functional scores, 18 months post-operatively. The study team report the effect of their programme on a serial cohort of 1161 patients, all undergoing total hip arthroplasty with and without an enhanced recovery programme. The study reports the outcomes of 611 treated without the enhanced recovery programme and 550 treated with the programme. The study team undertook multivariate analysis to adjust for confounders and were able to report that implementing this programme resulted in a decreased hospital stay of 1.5 days. Mortality and dislocation rates were similar between groups, while the Harris Hip Score and SF-36 score improved. Utilising an enhanced recovery programme is clearly beneficial after total hip arthroplasty for both the patient and the hospital system, and without compromising longer-term outcomes.

Hip dislocation due to 'silent' trunnion corrosion

It is always tempting when things don't quite work out, and the patient suffers a complication, to find a reason or excuse as to why this might have happened. We can admit to being slightly cynical here at *360* on encountering this report on 'silent' trunnion corrosion being responsible for late hip dislocation. However, in what is a short paper describing ten cases of hips revised in **Vancouver (Canada)**, the authors make a fairly compelling argument that pseudotumour formation can be seen in metal-on-polyethylene hips, and that this can present as a late dislocation.[8] The authors present a case series of ten MoP THAs with delayed dislocation, and demonstrated that pseudotumour is an infrequent (and often unsuspected) but important contributor to delayed instability following MoP THA. In their series, the patients presented at around five years following primary hip replacement, and in all cases there was histological confirmation of adverse local tissue metal reaction. The authors make the valid point that pseudotumour formation, due to its rare incidence in MoP hips, is often not on the list of differential diagnoses, however, malaligned components can result in increased trunnion forces and fretting corrosion, just as they can at an articulating surface. It is clearly better to establish this diagnosis prior to revision, as the rates of complications are high and a revision of this nature would ideally be undertaken by a surgical team experienced in the management of adverse metal reactions.

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Knee

X-ref ***For other Roundups in this issue that cross-reference with Knee see:*** *Wrist & Hand Roundup 5, Trauma Roundup 5, Research Roundups 1, 3, 4, 5, 6, 7.*

Patient-specific instrumentation no good in UKA

As with all joint arthroplasties, there is good evidence to support the idea that correct positioning of the unicompartmental knee arthroplasty (UKA) implant is vital to ensure both good function and implant survivorship. Despite the potential innovations of computer-assisted surgery and robotics there is little evidence to support their use, and there are ongoing concerns regarding cost and the additional surgical times. Patient-specific instrumentation (PSI) is now commonplace and available in many institutions. An MRI-based imaging protocol is used to print 3D bespoke cutting blocks to guide the frontal and sagittal cuts on the tibia and the distal femoral cut. These authors from **Aix-Marseille University, Marseille (France)** designed a randomised controlled study with 60 patients divided into two groups using either the PSI technique or the conventional technique, and outcomes were assessed using gait analysis and component positions.[1] There were no reported statistical differences between the two groups in terms of gait analysis at one year, nor in component alignment or functional scores at three months and one year after surgery. There have been some commentators (including a letter to the Editor[2]) suggesting that, given the lack of difference in outcomes between the two templating approaches, PSI would benefit a relatively inexperienced surgeon. However, here at *360* we would interpret the data differently. Surely we should be careful of advocating PSI as a replacement for experience? The PSI technique is not infallible and to make the most of PSI, the surgeon surely needs a good understanding not only of the technique and how the instrumentation works, but of the

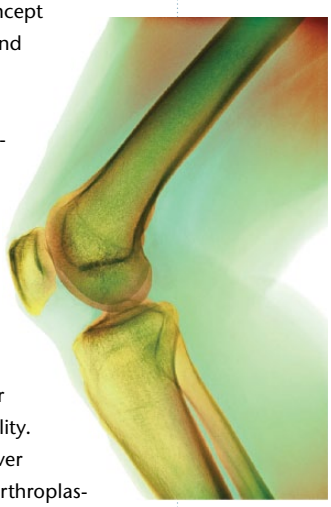
system itself. Bespoke instrumentation and cutting blocks remain a viable option, however, the benefits are far from proven.

Epidemiology: competing risks X-ref

■ Among the 'lies, damn lies and statistics' found smattered across research in orthopaedics, we tend to recognise common patterns in statistical analysis and assume these to be correct. This leads to the standard and oft-used statistical tests monopolising the reporting of the majority of studies. However, statistics itself is of course its own scientific discipline, and things do tend to move on. The venerable Kaplan-Meier curve has been used to report everything from the age of the universe (looking at stars going supernova) to the chances of a hip or knee replacement becoming infected. Although the Kaplan-Meier method is excellent for reporting cohorts with variable follow-up and a binary outcome, it is somewhat limited when it comes to reporting patients' outcomes and there is the possibility of failure for other reasons – a so-called 'competing risk'. Epidemiologists have been working with statisticians to produce competing risk models for reporting the likelihood of various population-based risk models, and revision arthroplasty is no exception. This much more accomplished approach has been applied to revision of tibial implant types, with death accounted for as being a competing risk by the clever chaps at the **Mayo Clinic, Minnesota (USA)**. The authors report the outcomes of 22 864 primary TKAs performed at the Mayo Clinic and followed up for a mean of 7.8 years (0.1 to 26.3 years),[3] and they were able to compare risk estimates using the two methods. The authors established that due to the size of the competing risk of death (four times more likely than revision), there was an overestimate of revision by 3% at five years, 14% at ten years, 32% at 15 years, and 57% at 20 years. This study confirms what would be expected, namely that if a competing risk model is not used then the Kaplan-Meier method may overestimate implant failure in arthroplasty, and this should be taken into consideration for other studies in the orthopaedic literature.

Catching up with the Europeans? Rehabilitation in the US under the spotlight X-ref

■ Traditionally, healthcare providers in the US have lauded the 'rehabilitation facility' as a suitable alternative to care in an acute hospital environment. The step down to a rehabilitation environment certainly has a significant attraction, and for years insurance companies and healthcare providers have been attracted to the concept of faster recovery and reduced total cost. There is increasing evidence that accelerated discharge pathways and discharge directly home may have some significant advantages, removing the requirement for a rehabilitation facility. The outcomes of over 14 000 large joint arthroplasties were used as the basis of this three-year retrospective study conducted in **Cleveland (USA)**. The authors used a fairly complex Bayesian hierarchical regression model to account for the complexities of the data and attempted to unpick the effects of surgeon and hospital factors on discharge location.[4] The authors established that a rapid recovery protocol increased the chances of being discharged home, with a 45% increase in likelihood if one were in place. This can clearly result in cost savings to the provider, as well as a better environment for the patient.



How do unicompartmental knees do in revision? X-ref

■ One of the fundamental differences between unicompartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA) (at least if you listen to the proponents) is the ease of revision. It has even been said by prominent surgeons that a revised UKA is akin to a primary total knee rather than a revision operation, both in complexity of surgery and longevity of the implant. There is now some evidence to suggest that at least some of this statement isn't quite correct. The complexity of revision of a unicompartmental to a total knee can be quite high, often requiring stems and wedges on the tibial side at least. An arthroplasty group in **Haukeland University Hospital, Bergen (Norway)** have set their minds to the second part of the question regarding how well they do.[5] From a patient's perspective, is a revision UKA similar to a revised TKA in terms of longevity? The authors demonstrated a similar outcome when UKAs were revised to TKAs, compared with when TKAs were revised TKAs. Overall survivorships were similar between the two groups, though the risk of re-revision was much higher in the TKA to TKA group. The group report on a huge number of revised prostheses from the Norwegian Arthroplasty Register, reporting the EuroQol-5D, KOOS score and the longevity of 768 failed primary TKAs and 578 failed UKAs. This is a somewhat confusingly reported study, and the overall message should be the primary outcome measure – patients with a revision knee, whether the primary was a TKA or a UKA, have broadly similar outcomes in terms of survival and functional scores. There are some subtle differences if one starts to look at the detail of the data, with deep infection roughly twice as likely in the TKA group (probably due to the added complexity of the surgery and operative time) and re-revision is more common in the TKA group in the over 70-year-olds. It certainly appears that in Norway at least, the outcomes of a total knee revision are similar to a unicompartmental knee revision.

The complication of revision X-ref

■ While it is widely accepted that revision arthroplasty is a risky business and that the risk of adverse events is much higher than in primary joint replacement, there have been few studies quantifying the risks, specifically in comparison with primary joint replacement. As part of the American College of Surgeons' quality improvement programme, a two-year audit of patients undergoing hip and knee arthroplasty was undertaken. This report from **Rush University Medical Center, Chicago (USA)** aims to compare the rates of complications and adverse events between primary and revision joint replacements.[6] With the effect of adverse events on reimbursement systems becoming increasingly prevalent, the authors aimed to determine the adverse events that are more likely in revision arthroplasty. The dataset included over 48 000 knee replacements and 70 000 hip replacements, with around 10% of procedures being revision surgery. The authors demonstrated that patients undergoing revision procedures had higher rates of systemic sepsis (relative risk (RR) 3.5), deep infection (RR 4), and organ/space infection (RR 7), but that DVT and PE rates were similar between primary and revision arthroplasty. The relative risks of complications were broadly similar between hip and knee subgroups. A clear understanding of adverse event rates is essential in providing a clear benchmark against which to measure performance and set reimbursement rates. In these days of public accountability and benchmarking, this kind of paper is essential to set the expected standard.

Stemmed knee arthroplasties in the obese?

Patients with an increased body mass index are at greater risk of complications following total knee arthroplasty (TKA), specifically early failure and worse clinical outcomes. Although there is plenty of research surrounding the relative benefits or otherwise of surgery for this difficult group of patients, it is clear that not only do these patients benefit greatly from arthroplasty, but also that the obesity problem isn't going away anytime soon. While some studies report successful TKAs in patients with increased BMI, other studies suggest patients with an increased BMI are at an elevated risk for a variety of complications including infection, early failure, lower knee scores and decreased function. What we have almost singularly failed to do is to establish if there are any modifications in operative technique that could be made to improve outcomes in this group of patients. A research team in **Sainte-Marguerite Hospital, Marseille (France)** have set out to establish if additional tibial fixation during primary arthroplasty should be used in patients with increased BMI,[7] with the rationale that this might improve load distribution and thereby prevent early failure and improve clinical outcomes. They undertook a randomised trial of 120 patients, all with a BMI > 30 and randomised them based on a BMI stratification to either a stemmed or standard cemented tibial component. Follow-up was only to two years post-surgery, however, during the follow-up period, patients with a stemmed tibial component had better outcomes than those with the standard implant. However, the difference was small and not clinically important, and therefore the authors do not advocate stemmed tibial components given the difficulty if the patient needs a revision. We would encourage the authors of this study to perform a longer-term evaluation on this group, however. We are hardly surprised that there are no clinically significant differences in terms of clinical outcomes here at *360*. Where we think there is most likely to be a difference is in the rates of later loosening due to the increased mechanical stresses on the tibial base plate. If there is a difference here, it won't become apparent until five or ten years of follow-up.

An effect of medial UKA on the lateral side?

Medial unicompartmental knee arthroplasty (UKA) is an excellent surgical option for the right patient. In patients with isolated medial compartment osteoarthritis and functioning ligaments, the results are excellent. Studies show a greater than 90% survival rate at ten years with good clinical outcomes, however, critics question the progression of lateral osteoarthritis, given that it remains the leading indication for revision. This is the first study from **Weill Cornell Medicine, New York (USA)** to evaluate the effect of medial UKA on the lateral compartment.[8] The authors report the results of 174 UKAs at six weeks of follow-up and compare the results with 41 healthy knees, utilised with a novel software-based method to measure joint space congruence following UKA. The results of this study are really quite surprising, with medial UKA improving congruence and joint space width in the lateral compartment. It is not unreasonable to conclude that this in itself may reduce the rate of lateral compartment osteoarthritis progression.

Can corticosteroid injections address pain after TKA?

While total knee arthroplasty (TKA) is, for the most part, considered to be among the most successful of operations in orthopaedic surgery, it can on occasion leave patients with intractable pain. Around 5% of patients suffer anterior knee pain which can be severe, and management of these patients in recent times has involved a focus on multimodal pain management and specifically the use of periarticular injections. Researchers in **Nekoyama Miyao Hospital, Niigata (Japan)** have noted that the use of periarticular injections to control pain after TKA has gained wide acceptance, but that the use of corticosteroid injections remains somewhat controversial, to say the least.[9] The balance of the profound anti-inflammatory effects and the benefit it may have on synovitis must inevitably be weighed against the marked immunomodulatory effects and increased risk of deep infection. The authors created their own double-blinded, randomised controlled trial which was designed to establish the safety and efficacy of corticosteroid injection in controlling pain after a TKA. The study team successfully recruited 77 patients who were randomised to injection with or without corticosteroid. Outcomes were assessed as pain at rest during the first 24 hours, with secondary outcomes of complication rates including surgical site infection. While there was no difference in the rate of complications, there was a significant improvement in the perceived pain scores over a 24-hour period. The corticosteroid group experienced a significantly lower cumulative pain score (139 *vs* 264). While future studies are still needed to confirm the safety of corticosteroid in periarticular injections, in the longer term it is clear from the data presented here that a periarticular injection with corticosteroid significantly decreases pain in the early post-operative period following TKA.

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