

ROUNDUP³⁶⁰

Hip & Pelvis

For other Roundups in this issue that cross-reference with Hip & Pelvis see: [Knee Roundup 6, 7](#); [Trauma Roundup 8](#); [Oncology Roundup 3](#); [Paeds Roundup 8](#); [Research Roundup 1, 2, 3, 4](#).

Smoking and complications in arthroplasty

x-ref Knee

■ In the era of bundled payments for complex interventions such as hip and knee arthroplasty, minimising potential complications after total joint arthroplasty is of utmost importance. Smoking is a modifiable risk factor that can be controlled prior to surgery, but the association with non-anaesthetic complications remains unproven. This study undertaken by a group in **Iowa City (USA)** set out to establish the link between smoking and complication in large joint arthroplasty. The research team designed their study using the NSQIP database to follow patients for 30 days with the aim of assessing morbidity and mortality.¹ The study population consisted of 78 191 patients who had undergone primary hip or knee arthroplasty between 2006 and 2012 and whose outcomes were recorded on the NSQIP dataset. The patients were stratified by smoking status: non-smokers (81.8%), ex-smokers (7.9%) and current smokers (10.3%). Current smokers had the highest rate of wound complications (1.8% vs 1.1%). Multivariate analysis suggested that smoking status was an independent risk factor for wound complications

including deep infection. What is interesting about this study is that former smokers had the highest rate of total complications, which correlated to increased pack-year history. Thus, quitting smoking may not reduce a patient's total risk of complication after total joint arthroplasty, but it at least reduces the likelihood of wound complications. Since wound complications may result in readmission and reoperation, encouraging patients to quit smoking prior to surgery may be beneficial.

Smoking cessation beneficial in arthroplasty

x-ref Research, Knee

■ Smoking and arthroplasty has been under the 360 spotlight this edition with this, the second of two papers exploring the potential peri-operative risks of smoking. We would also draw the attention of 360 readers to a rather older paper that is worth a brief mention in passing, given the new complications data. Taking a rather robust approach to the problem, a research team in **Copenhagen (Denmark)** set out to establish if smoking cessation advice conveyed any benefit in the peri-operative period. Their randomised controlled trial consisted of 120 smokers undergoing primary hip or knee arthroplasty. Participants were randomised to either standard care or smoking counselling and nicotine replacement therapy. The study team undertook an intention-to-treat based analysis and

established complications as the primary outcome measure. In their study, overall complication rates dropped from 52% to 18%, with the largest drop being seen in wound-related complications.⁶ The findings of this intervention-based study would suggest that a smoking cessation consultation eight weeks or so prior to surgery is very much to the patient's benefit.

Intermediate care and arthroplasty

x-ref Knee

■ Healthcare economics are increasingly affecting the way we practice medicine. The costs associated with peri-operative spells (the hospital episode) and super-spells (the healthcare episode) are under increasing downwards pressure. The widespread use of rehabilitation facilities (or intermediate care) is one potential way to save precious 'healthcare dollars'. In a fascinating study from **Philadelphia (USA)**, researchers evaluated the healthcare costs associated with discharging patients to rehabilitation facilities and skilled nursing homes. The study team evaluated the super-spells of 50 886 primary hip and 107 675 knee arthroplasties. At the time of the study around half of the patients had care in an intermediate care facility, and while the reimbursement for hospitals, surgeons and implant costs fell, the physiotherapy costs actually rose throughout the study period.² This paper demonstrates the

costs of these kinds of rehabilitation facilities to be staggering. Over time, however, we have utilised fewer of these facilities and have discharged more patients to home, with home health care. With improved anaesthesia and pain management, it is feasible to discharge patients to home where there is less risk of infection. With more discharges to home, fewer patients are staying in the hospital for three days as per Medicare rules. Subsequent studies have demonstrated that the Medicare 'three day rule' does not reduce complication risks in total joint arthroplasty patients.

Do we still need cell salvage?

x-ref Knee

■ There are a number of studies, randomised and otherwise, that demonstrate the utility of cell salvage systems in hip and knee replacement. Cell salvage systems, however, are only of use if enough is salvaged to retransfuse. They can also be relatively resource-hungry, often requiring additional technician support or eroding the time of the operating room practitioner. Deeming the matter not yet settled, a review team in **Leiden (The Netherlands)** set out to revisit the issue of cell salvage in joint arthroplasty. They conducted a rigorous search of MEDLINE and used the gold standard pooled random effects model, in conjunction with the Cochrane Collaboration's risk of bias tool to produce their meta-analysis. In what turned out to

be a rather large review, the authors were able to identify 43 trials for inclusion, and overall there appeared to be a benefit of cell salvage, with a risk ratio of just 0.66 for autologous transfusion in favour of cell salvage. However, as the review team point out, this only applies to the older trials. Studies published after 2011 do not support the beneficial effect of cell salvage in either THA (RR = 0.82) or TKA (RR = 0.91) with confidence limits crossing 1.0.¹³ The review team venture that cell transfusion policy (which will affect the end point) may have changed in the interval and that is certainly possible. The other major effect may well be the use of tranexamic acid in an increasingly widespread manner. Whatever the cause, we can reliably say that with modern peri-operative care, the need for cell salvage appears to have reduced.

Femoroacetabular impingement in the Japanese population

■ While there have been a range of studies investigating the aetiology of femoroacetabular impingement and its incidence in Western populations, there is surprisingly little data surrounding its presence in Asian populations. This radiographic study from **Shiga (Japan)** sets out to establish the radiographic incidence of femoroacetabular impingement in the Japanese population. The study team reviewed cross-sectional imaging studies (CT scans) obtained for other purposes, but showing the hips. They examined a range of established femoroacetabular dysplasia measures, including centre-edge angle, acetabular index, acetabular anteversion and asphericity angle of the femoral head. This cross-sectional study included evaluation of 103 patients with asymptomatic hips. Using the standard definitions, asphericity angle of the femoral head was $>50^\circ$ in over half of the hips, with a negative acetabular anteversion angle seen in 16.5%, making a whopping 56.3% of the images examined radiographically

‘impingement hips’.⁴ Given an incidence of over 50% in asymptomatic hips, perhaps the radiographic parameters need to be refined for different populations before relying on them to make a diagnosis. It is known that skeletal morphology varies by population and, given these were asymptomatic hips, we would be very sceptical of any study that relied solely on these parameters.

Trunnionosis or taperosis and geometry

■ As more and more evidence is accumulating on adverse metal-on-metal reactions, it is becoming apparent to all concerned that the head-neck junction and taper play more of a role in metal debris generation than perhaps was initially suspected. The addition of a larger lever arm associated with a large metal head and the subsequently larger torque forces transmitted to the trunnion may be partially responsible for this. Although this is widely accepted modern hip ‘doctrine’, there is little in the way of hard data to support this mostly biomechanical view. Researchers from **London (Canada)** designed a study to establish if the femoral head length affects ‘taperosis’ (fretting and corrosion) in retrieved head-neck tapers. Their study reports the results of 56 metal-on-poly hip retrievals, all of which were *in vivo* for a minimum of two years (mean 8.7 years; 2.6 to 15.9). The 56 cobalt-chromium (CoCr) 28 mm femoral heads were of various different offsets (-3, 0, +4 and +8 mm) and there were three different stem designs reported in the study; 42 titanium alloy stems and two types of CoCr stems, all featuring a single 12/14 mm taper design.⁵ Fretting (wear of the asperities of contact surfaces) and corrosion were scored in three horizontally oriented concentric zones of each taper and measured by stereomicroscopy. In short, this study demonstrates the increasing femoral offset resulted in higher rates of fretting. As would be expected, the +8 mm femoral heads showed

greater total fretting scores than all other head lengths, and this was further seen when high-offset femoral stems were associated with greater total fretting of the bore taper.

Decontamination for staphylococcus aureus works! x-ref Knee, Research

■ The old saying, ‘prevention is better than cure’, appears more and more relevant in the world of arthroplasty today than it ever has. Many hospitals now have well developed infection bundles that usually involve elements of decolonisation, infection control methods and intra-operative prophylactic antibiotics. These measures are usually reserved for patients with positive MRSA screens and have been shown to improve rates of post-operative infection in a number of large prospective studies. The concept of ‘infection bundles’ is not a new one and researchers in **Iowa City (USA)** have simply extended the concept from MRSA to include MSSA. However, their results are impressive enough to warrant mention. In what is probably the largest study of this type, 20 hospitals underwent a pragmatic prospective study looking at a ‘before and after’ effect for implementation of an infection control bundle. The interesting thing in this study is that they also included carriers of MSSA. The intervention included the standard gamut of mupirocin nasally and a chlorhexidine wash daily for five days. Prior to the intervention there were 101 (from 28 218 operations) staphylococcal aureus infections requiring further intervention in the cohort and 29 (from 14 316) following the intervention. The cumulative effect of introduction of the infection care bundle was to reduce SSIs by 17 per 10 000 hip or knee replacements, i.e. reducing infection rates overall by 0.17%. This was seen to be effective in both antibiotic-resistant and sensitive staphylococcus.⁶ If this strategy remains cost effective, and the risks of engendering resistance to mupirocin with more widespread use ‘come out in the wash’, as they

say, we are to a certain extent here at 360 reminded of Florence Nightingale who would not let patients into the operating theatre without having had a good wash in antiseptic!



Policeman or opportunity? Quality improvement with registries

x-ref Research, Knee

■ Registries – love them or loathe them – are now a part of everyday life in orthopaedics. Born out of a combination of Northern European zeal and orderliness, coupled with some high-profile disasters with unproven implants, registries are for the most part designed for surveillance. They contain oodles of implant- and procedural-related information, but often very little higher fidelity data surrounding rehabilitation, templating, care pathways, etc. It seems reasonable to suggest that perhaps if registries were to be used for more than just quality assurance and health economic planning, more data ought to be incorporated. Researchers in **Michigan (USA)** set up their own state-wide arthroplasty registry with quality improvement in mind. Instead of simply duplicating data collated elsewhere, they set out specifically to collate higher-fidelity data surrounding the admission and readmission of patients undergoing arthroplasty in Michigan. In one of the first papers to emerge since this innovative registry was set up in 2012, the team set out to investigate a perceived variation in transfusion rates following total

joint arthroplasty. Their study was designed to establish if registry-derived data were capable of improving practice across a healthcare system.⁷ The study team started by collating data for 1872 total joint arthroplasty cases and, paying particular attention to the AABB transfusion guidelines, presented the guidelines at monthly orthopaedic service line meetings halfway through the study period. The authors noted a significant improvement in adherence to the nationally agreed guidelines, with inappropriate (Hb > 8 g/dL) transfusion falling from 6.5% to 1.3%. The authors noted that there were no observed increases in complications during the study period, and that their use of a regional registry to drive practice change through the audit cycle had been successful. The thorny issue of registries is one that will continue to raise its head. Here at 360 we are delighted to see good use made of what are essentially large audits such as this.

Death rates higher in readmission to other hospitals

x-ref Research, Knee

■ Hospital readmissions are common after major surgery, including a variety of orthopaedic procedures. It is, however, still unknown whether the particular hospital to which patients are readmitted is of import. Does readmission to the index institution improve or hinder outcomes? In a major study published in *The Lancet*, epidemiologists from **Salt Lake City (USA)** used the Medicare insurance dataset over a ten-year period to examine the location of readmission and its effect on outcomes in major orthopaedic, abdominal and cardiac surgery. Patients were included in the study if they had undergone readmission to any medical institution within a 30-day window of the index procedure. The study included a whopping 9 440 503 patients, and is to our knowledge the largest

epidemiological study involving orthopaedic patients in existence.⁸ The results are quite extraordinary. Readmission rates to the initial treating institution varied markedly, from 66% (for coronary artery bypass surgery) to 83% for colectomy patients. The most startling finding here was the significantly lower mortality rate in patients who were readmitted to their index hospital – 26% lower at 90 days, to be precise. This really is a crucial finding for planning health care. Facilities undertaking major procedures such as hip and knee arthroplasty must have 24/7 readmission facilities to reduce this burden in excess mortality on patients.

REFERENCES

1. **Duchman KR, Gao Y, Pugely AJ, et al.** The effect of smoking on short-term complications following total hip and knee arthroplasty. *J Bone Joint Surg [Am]* 2015;97-A:1049-1058.
2. **Ong KL, Lotke PA, Lau E, Manley MT, Kurtz SM.** Prevalence and costs of

rehabilitation and physical therapy after primary TJA. *J Arthroplasty* 2015;30:1121-1126.

3. **van Bodegom-Vos L, Voorn VM, So-Osman C, et al.** Cell salvage in hip and knee arthroplasty: a meta-analysis of randomized controlled trials. *J Bone Joint Surg [Am]* 2015;97-A:1012-1021.
4. **Mimura T, Kawasaki T, Itakura S, et al.** Prevalence of radiological femoroacetabular impingement in Japanese hip joints: detailed investigation with computed tomography. *J Orthop Sci* 2015;20:649-656.
5. **Del Balso C, Teeter MG, Tan SC, Lanting BA, Howard JL.** Taperosis: does head length affect fretting and corrosion in total hip arthroplasty? *Bone Joint J* 2015;97-B:911-916.
6. **Schweizer ML, Chiang HY, Septimus E, et al.** Association of a bundled intervention with surgical site infections among patients undergoing cardiac, hip, or knee surgery. *JAMA* 2015;313:2162-2171.
7. **Markel DC, Allen MW, Zappa NM.** Can an arthroplasty registry help decrease transfusions in primary total joint replacement? A quality initiative. *Clin Orthop Relat Res* 2015;(Epub ahead of print) PMID: 26215083.
8. **Brooke BS, Goodney PP, Kraiss LW, et al.** Readmission destination and risk of mortality after major surgery: an observational cohort study. *Lancet* 2015;(Epub ahead of print) PMID: 26093917.

Knee

For other Roundups in this issue that cross-reference with *Knee* see:

[Hip Roundup 1, 2, 3, 4, 7, 8, 9;](#)
[Research Roundup 1, 2, 3, 4, 7.](#)

Allergy and outcome in arthroplasty

x-ref Hip

■ Allergy is clearly a spectrum of disease, with some patients suffering genuine life-threatening anaphylaxis to everyday allergens, and others laying all of their healthcare problems at the door of a perceived minor food intolerance. In a very interesting and thought-provoking paper, surgeons in **New York (USA)** set out to establish if there was a link between reported allergies and outcomes. This study evaluated the number of patient-reported allergies in just over 500 patients undergoing primary hip or knee arthroplasty, and specifically

measured their satisfaction levels post-operatively and equated these to the patient-reported allergies.¹ These researchers have established that for each additional patient-reported allergy, there was an increase of between 37% and 62% in the odds of reporting poorer satisfaction ratings based on the satisfaction domain queried, and the type of joint arthroplasty performed. While it's difficult to state what constitutes a 'true allergy', as formal allergy testing was not performed in this study, this study evaluates a surrogate for potential patient dissatisfaction. Perhaps surgeons should be wary of setting high expectations in patients that present with a long list of allergies. Certainly the patients' perceptions of their outcomes may not be as good as other individuals who undergo total joint arthroplasty.

Physiotherapy and drains not such a bad combination?

■ Retransfusion drains have been thoroughly examined in a range of randomised controlled trials, and they seem to be safe and associated with lower rates of post-operative transfusion. The message from the combined wisdom of these studies appears to be that if you are going to use a drain in knee arthroplasty, then a retransfusion drain is probably the best variety to use. That said, patients often do not like undergoing physiotherapy with drains *in situ*, making these a potential bar to early discharge programmes. However, anaemia is also a bar to early mobilisation, with plenty of data to suggest that anaemic patients don't mobilise as quickly as non-anaemic patients. Although not a randomised controlled trial, our interest was caught

by this paper from **Victoria (Australia)** describing the outcomes of 303 primary total knee arthroplasties performed with one of three drain strategies – retransfusion drain, closed suction drainage (either deep or superficial) or no drain. As this was a retrospective study, there is likely to be significant selection bias in the groups, however the results of this single-surgeon series are still very interesting. Although the retransfusion drain was not associated with a lower rate of post-operative transfusion, it was associated with a lower haemoglobin drop, and also a significantly shorter interval to sitting out of bed and discharge home when compared with the other strategies.² This study serves to remind us that interventions such as arthroplasty are complex procedures and there is often more to them than