ROUNDUP360

Hip & Pelvis

For other Roundups in this issue that cross-reference with Hip & Pelvis see: Knee Roundup 1; Oncology Roundup 5; and Research Roundup 4.

Are we getting it right first time?

In the light of the metal-on-metal scandal, the position taken by the BOA and its president is that we should 'get it right first time'. A huge amount of work has gone into not only educational programmes but also to improving governance and reporting structures 'Beyond Compliance'. One year on, the question remains: are we 'getting it right first time'? Researchers from **Stanmore (UK)** have produced a further analysis of the National Joint Registry data, arguing that with savings of well over £20 billion required within the NHS over the next five years we can't afford not to get it right first time. The authors used data published in the eighth report (2011) to determine the implant mix currently being used in the UK and then went on to establish the survival record of these implants. The authors were able to demonstrate that the vast majority of arthroplasty operations currently performed within the UK are utilising components with (at least some) long-term survival data and in the majority of cases independent reports of function and survival. While innovation is required, common sense predicts that only small numbers of patients should be receiving these implants with an unknown survivorship, while the majority should be receiving the 'tried and tested option'.[1] In a thought-provoking paper that we would recommend to our readers, the authors go on to calculate both 'value for survival' and 'choice by revision rate'. It does seem that while there is more room for improvement, we are for teh most part getting it right first time. A heartening finding.

Tantalum augments in revision hip surgery

Tantalum 'porous trabecular metal' is a unique material that is manufactured with a porosity and 3D structure similar to that of trabeculated bone. It is not the tantalum itself that is unique. It's the 3D structure which allows bone 'through growth' with osteoblasts able to lay down new bone and completely incorporate the whole implant (much like reinforced concrete). While the theory is great, it is just a theory, and despite a smattering of case reports there are few convincing independent reports concerning retrieved implants. The implant retrieval centre in **Philadelphia (USA)** have recognised this gap and reported the first large-scale retrieval study of tantalum porous components. The centre had access to well over 100 retrieved components (76 acetabular shells, five femoral stems, 36 tibial trays and seven patellas). Although the leading cause of revision for first generation porous-coated ongrowth prostheses was aseptic loosening in this cohort of patients, the hip components were mostly revised for infection while the tibial trays were revised mostly for instability. The implant retrieval team provided evidence of full depth penetration of bone ingrowth into the tantalum shells, lending significant clinical weight to the claimed experimental findings.[2] We can see no reason why these results should not be transferable to tantalum augments and other implantable devices currently available. While exceedingly expensive, it does appear that tantalum porous coatings are indeed able to back up the claims.

Lower wear in dual mobility?

Dual mobility prostheses have been the focus of much excitement recently. Perhaps the next great hope of the hip arthroplasty world, they have been touted as the ideal solution for instability, revision, hip fracture and even primary hip replacement. We have to say that, here at *360*, we have always liked the concept, but have shied away from them as we are more than a little concerned that the addition of a second bearing surface might not be completely advantageous. The development team at Stryker Orthopaedics in **New Jersey (USA)** have sought to allay some of our (and others') fears. The Stryker scientists used standard polyethylene and their highly cross-linked heat annealed polyethylene which is known to have excellent wear characteristics in a hip simulator study. They performed controlled wear tests in conditions of impingement, abrasion and with immobilisation of the mobile liner at either the inner- or outer-diameter. The results were quite surprising, in that the largest determinant of the wear rate appeared to be the inner articulation and the conditions it experienced along with the polyethylene type. The research team were able to demonstrate that the dual mobility hip was able to produce 75% less wear than the equivalent polyethylene single articulation.[3] This is certainly encouraging work, and while the focus of this study is on precisely the conditions in which a dual mobility articulation would be most clinically indicated (likely impingement, etc.) it tells us little about the conditions in primary arthroplasty. Certainly a vote of confidence for the current indications, but we are not sure if there is enough reassurance here to make dual articulation a standard.

Changing faces changes outcomes

It is well known that a variety of factors, both objective and subjective, affect patients' satisfaction with surgery and hospital admissions. Important determinants of outcome are known to range from diverse factors such as hospital food and parking to scar appearance and nursing care. To our knowledge, this is the first study to look at the effects of changing surgeons when a patient has become dissatisfied with their index procedure. In a small study of 12 patients undergoing a second hip or knee replacement, researchers from **Montreal (Canada)** reported on the effect of referral to a second surgeon for their contralateral sided surgery. Their case series of 12 patients were all undergoing surgery for a second arthroplasty following

unhappiness with their initial procedure. The research team sought to establish if the patients would continue to be dissatisfied following their second procedure. Universally, all 12 patients reported that their subsequent arthroplasty decreased their pain and improved their function. All patients reported significantly improved outcome scores (Harris Hip Scores, WOMAC score and SF-36) following their second surgery, and this study is one of the few pieces of evidence evaluating satisfaction levels in patients having a second arthroplasty following a 'failed' initial procedure.[4] Whatever the underlying cause, it certainly seems sensible to refer dissatisfied patients on to a colleague if, as this data would suggest, they have a good chance of subsequently improved outcomes.

Synovial fluid aspiration in MoM hips

The Medicines and Healthcare products Regulatory Agency in the UK provides follow-up advice for patients with high risk of failure of implanted metal-on-metal hip replacements. These include regular clinic follow-up, radiographs and MRI scanning when appropriate, and monitoring of serum cobalt and chromium levels for all suitably high risk patients. Although these guidelines exist, there is little clinical data to inform the surgeon when making the decision about revision. Exactly how high do measures of serum metal ions have to be to be indicative of the requirement for revision surgery? Given the lack of clarity for the indications of surgery with regular investigations, the revision indications for rarer investigations such as aspiration in cases of possible infection are even more difficult to clear about. If a leucocytosis is detected, does this represent likely infection, or rather simply a response to the abraded metal debris? Researchers in **Rochester (USA)** have attempted to shed some light on the diagnostic value of synovial fluid aspirations in the presence of a metal-on-metal hip replacement for the diagnosis of clinical infection. Using a series of 39 patients who all underwent pre-operative hip aspirations prior to revision of their metal-on-metal joint replacements and their subsequent culture results, the research team attempted to identify appropriate cut-offs for likely infection. Of the 39 patients, four were culture positive and 35 culture negative. The research team were able to establish that selecting threshold values of WBC > 3000/µL gives a sensitivity of 100% and specificity of around 60%. Similarly, a neutrophil percentage of > 80% gives a higher sensitivity and specificity (100% and 97.1%, respectively). In a similar manner to conventional total joint replacements, a CRP > 8 and ESR > 22 were 75% and 66% sensitive, respectively. The authors conclude that the best investigation for possible infection in MoM total joint replacement is synovial fluid aspirate, and that neutrophil percentage is the most sensitive and specific predictor of infection.[5] While we would wholeheartedly agree with them, we would venture that these results are based on just two 'true positives', a small number. This makes the estimates of sensitivity and specificity likely indicative but not accurate.

Taper disease: the new epidemic of hip surgery

With public and surgeon demand for anatomic- (and sometimes 'gender-') specific prostheses, the push to higher and higher levels of modularity has stretched as far as modular necks. While offering more flexibility to match the prosthesis to the patient, these super-modular prostheses suffer the risks of an articulating and three non-articulating surfaces. While modular heads are commonplace and the morse taper is known to be successful, they are concentrically loaded which, due to the geometry of the neck module, is neither symmetrical nor symmetrically loaded. Researchers in **Chicago (USA)** have identified this as a potential problem in a very small retrospective case series of just 12 hips (11 patients), all suffering from adverse local tissue reactions. The cohort was a multicentre cohort with a mean age of 60 years and consisting of eight women and three men. All patients had a titanium alloy stem and a cobalt-chrome neck and presented with symptoms of adverse metal response at a mean of eight months following implantation. The diagnosis was confirmed in most cases with abnormally elevated serum chromium and MARS MRI scans, suggestive of an adverse metal debris reaction. Revision surgery was planned, and explanted tissue following revision was examined by a consultant histopathologist. Patients had an abnormally high level of serum cobalt (mean 6.0 ng/ml), chromium (mean 0.6 ng/ml) and titanium (mean 3.4 ng/ml). The MRI scan was positive in eight of nine patients, and in all cases large soft-tissue masses were found at revision surgery. Microscopic examination of the explanted prosthesis was consistent with subsurface crevice corrosion and fretting at the modular neck-body interface.[6] Although a small number of patients, this series certainly set alarm bells ringing here at 360 HQ. The authors have capably demonstrated that adverse metal debris-related reactions can occur at the neck-body interface and that this can result in catastrophic early failure of the device. Certainly for the time being we would join the authors and echo their concerns about the potential for early catastrophic failure when these devices are used.

The super-obese and THR

Recent efforts have established there is as much, if not more, efficacy in performing a THR or TKR in the obese patient compared with a patient with a normal BMI. Although most series attribute a higher complication risk, the functional results are extremely good. As patients get larger there is a rekindled interest in studying the results of arthroplasty in the more generously proportioned patient. Surgeons in **London (Canada)** have shared their experience of THR in the so-called super-obese (BMI > 50). The study team conducted a comparative case series with super-obese (BMI > 50), class I obese (BMI 30 to 34.9) and normal weight patients (BMI 18.5 to 24.9). The research team were able to compare 39 THRs performed in the super-obese with matched groups of 39 patients from the other groups. Patients' outcomes were comparatively assessed using the WOMAC score, Harris hip score and SF-12 score. In addition, data were collected about complications and lengths of stay for all patient groups. Patients in the super-obese group were found to have significantly higher rates of complication and lengths of hospital stay when compared with the other two groups. However, despite lower starting functional scores the improvement was similar, as were satisfaction levels when compared with normal weight and obese THR patients.[7] Although technically more demanding and at higher risk of complications, the benefit to super-obese patients both in terms of outcome scores and satisfaction appears to more than warrant THR in this patient group.

Can well-fixed stems remain in infected hips?

Just occasionally a paper crosses our desk that is so left-field it is difficult to know if the authors have spotted something we have all missed, or if indeed they are on a completely different page. The

accepted wisdom (for almost a generation) with infected hip replacements is that all of the infected tissue and prosthesis must be removed prior to implantation of a new prosthesis. Original work done many years ago demonstrated the effective joint space to encompass all implanted material, even in well-fixed hips. Thus, even revision hip surgeons, who are renowned for an inability to universally agree about much, have agreed over the past 20 years or so that everything must be removed. There, of course, the agreement ends with one stage, two stages, spacers, extended antibiotics, custom implants, etc. all being preferred by different surgeons. Surgeons in **Seoul (South Korea)** decided to revisit this basic tenet and when revising infected hips, left any well-fixed stems in place, reasoning that the destructive effort required to remove the stem would risk chronic osteomyelitis and sequestrum formation (a vanishingly rare complication in THR). Not deterred by conventional wisdom, the study team reports the results of 19 patients they treated with a modified two-stage procedure, leaving the stem in situ and replacing the acetabulum with a cement spacer. Over a mean follow-up period of four years the surgical team were able to eradicate infection in 13 patients (68%). Of the remaining six patients, two declined the second-stage surgery and four patients had recurrence of infection.[8] The results, as they say, speak for themselves. While the authors conclude that their variety of two-stage reconstruction could be a viable alternative to traditional methods, we are not so certain.

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