

ROUNDUP³⁶⁰

Hip & Pelvis

Swimming against the tide with resurfacing

■ Researchers from **Lille (France)** have reported a study designed to establish the outcome of metal-on-metal hip resurfacing in very young patients (< 30 years of age). The debate surrounding the risks and potential benefits of metal-on-metal as a bearing surface, and resurfacing in general, continues to rage, with it seems, as many different conclusions as there are articles published. We at 360 have to commend the authors for their work on two of perhaps the most controversial topics in medicine at the moment, hip resurfacing and arthroplasty in the under 30s. The authors used a prospective cohort series (Level III evidence) to follow up the results of 24 metal-on-metal resurfacing arthroplasties performed in patients ranging between 17 and 30 years of age. They followed the patients prospectively using the UCLA activity score, Harris hip score and plain film radiographs. They report excellent results in a cohort of severely restricted patients (mean UCLA 5.5; mean Harris 43.9), improving their activity and hip scores significantly (mean UCLA 7.7; mean Harris 89.3) at short-term follow-up (minimum 3.7 years).¹ Although this is a small series, the authors do present the potential benefits of this surgery with excellent surgical and clinical results, and few complications in a bearing surface that should provide many years of function. The authors make a compelling argument for the advantages of

such a controversial procedure in such a difficult-to-treat age group. Perhaps we have not heard the last of metal-on-metal; if the risk of ALVAL and adverse metal reactions could be reduced we would be convinced. In a market place with new surface technologies emerging all the time, we are sure the final chapter in hip resurfacing has yet to be written.

It's not just for athletes

■ Hip impingement surgery is one of the fastest growing areas of orthopaedic surgery. With the advent of hip arthroscopy the surgery has become ever more popular. Initially restricted to high performance athletes with functional impingement, the proponents of impingement surgery are ever keener to publicise the potential benefits for the wider population. The holy grail of hip arthritis surgery has to be early intervention to reduce the risk of subsequent degenerative change. There is precious little comparative data surrounding outcomes of hip arthroscopy in the athletic and 'normal' population. Researchers from **Cambridge (UK)** have designed a study to help fill the void. The researchers performed a prospective comparative series (Level II evidence) including athletic and non-athletic patients, treated arthroscopically for femoral acetabular impingement (FAI) at their centre. The authors included 122 patients in their series, consisting of 80 athletes and 42 non-athletes, which, at 360, we believe is the largest cohort of patients in the literature. Outcomes were assessed using the modified

Harris hip score (HHS), non-arthritic hip score (NAHS) and VAS scores. Follow-up was at six weeks, six months and one year following surgery. Additional outcomes in terms of quality of life scores were calculated using the HHS. The study clearly demonstrated post-operative improvement in both groups in all the scores measured. The athletes had a greater benefit than the non-athletes at early follow-up with significantly higher functional scores immediately after surgery and at six weeks. The non-athletic patients, however, caught their athletic counterparts by six months follow-up. There were no statistically significant differences in outcome between groups.² The authors have clearly demonstrated a benefit for arthroscopic FAI surgery in both athletes and non-athletes. We at 360 believe the strength in this study lies in its prospective nature and long follow-up. Had the authors only followed their patients to three months, the conclusions would have been substantially different. We wonder what the results will look like in five years' time.

Dying for cement?

■ The national joint registries in the majority of developing countries have been in place for many years and most contain hundreds of thousands of patient records. The traditional measure of failure in a joint registry is the failure of the implant taken as the subjective measure of revision. No large joint registries currently include patient outcome data, something that naysayers have

(often prolifically) criticised about the recent reliance on registries for robust outcome data in arthroplasty and other forms of surgery. This is a narrow view, and registries are able to tell us much more, such as complications, re-interventions, adverse events and mortality. Researchers in **Birmingham (UK)** have taken a second look at the National Joint Registry (NJR) data from the UK to include both mortality and revision rates between patients receiving different types of implants. The researchers were interested in examining if there were different outcomes between cemented, uncemented and resurfacing hip arthroplasties. The authors included nearly 300 000 patient records currently recorded by the NJR. Using some advanced statistical methodology they were able to adjust for some of the differences in baseline characteristics of the different groups (age, gender, ASA grade and complexity), thereby removing some of the selection bias. The researchers report a higher mortality in patients undergoing cemented arthroplasty (OR 1.11), but a conversely lower revision rate (0.015) compared with uncemented implants. The authors performed a mortality analysis, and reported that, in the male subset who underwent resurfacing arthroplasty, there was a lower mortality rate than in cemented or uncemented comparison groups, but again a higher revision rate than both of these other options.³ The authors present some very interesting findings with regards

to mortality, and as they acknowledge, it is impossible to know if their results truly represent a causal relationship, or rather may represent a selection bias towards fitter patients with the newer resurfacing implants that is not accounted for in the multivariate analysis. If this were the case the same argument would also potentially explain the differences in survivorship, as fitter patients are at much higher risk of revision. No single article will sort out the thorny issue that is hip resurfacing, but we are delighted to see some reports from joint registries that do not rely solely on the surrogate endpoint of revision surgery.

Cemented hips could be cheap and cheerful

■ The ability of an individual surgeon to choose which implant is best for their patient is becoming more difficult. Restricted healthcare budgets and group discounts for bulk purchasing have made purchasing decisions the business of hospital managers and healthcare providers. However, economic data on health is hard to come by and often contradictory. Researchers in **Bury St Edmunds (UK)** have used the UK NJR in a similar manner to the Birmingham group, but with different results. They used the endpoint of cost effectiveness, to determine if cemented or uncemented implants were most appropriate for use within the NHS. The researchers performed a comprehensive cost-effectiveness analysis including the implant costs and revision costs based on survivorship data and current health economic cost estimates. They included all patients operated on in 2009, and calculated an initial (implant) cost saving of £10 million could be achieved with a complete switch to cemented implants. Given the improved survival (i. e. lower revision rates) of this prosthesis, the authors assumed that the spend on the revision of uncemented implants would also be reduced. This would yield a predicted saving of up to £8.5 million. In contrast to the previous paper this research group have used the endpoint of cost effectiveness,

calculating that cemented THR would be £18 million cheaper per year in component and revision costs. In these days of cost effectiveness and spiralling healthcare costs it is essential to balance risks and benefits. Should the Birmingham group be correct about patient survival, the additional cost/QALY would be helpful in balancing the health economic arguments. Should the Birmingham data not represent causation, the research group from Bury St Edmunds may have sealed the fate of the uncemented THR, certainly within the UK.⁴ Can we continue in today's health economic climate to potentially waste so much money? Time will tell what happens, but as doctors become more accountable for the health economics of their treatments, here at 360 we are expecting a run on bone cement!

Obesity and co-morbidities are responsible in part for joint replacement infections

■ Since Charnley developed the early low-friction arthroplasty, the fight with infection has raged. With year-on-year lower infection rates, we are now able to offer our patients the expectation that it is extremely unlikely that their total hip replacement (THR) will become infected. However, some controversies remain, such as how much and when should we give peri-operative antibiotics? Which intra-operative measures are really likely to reduce infection? Which patients are most likely to suffer infection? The low-event rates of post-operative infection in primary total hip replacement make this an extremely difficult question to answer. Researchers from **San Diego (California, USA)** have stepped in to try and answer some of these dif-

ficult questions. They conducted a retrospective analysis of a prospective cohort study of over 30 000 primary THR performed in California and registered with the Kaiser Permanente Total Joint Registry. The investigators aimed to establish which patient characteristics were associated with higher infection rates. Patients who underwent THR between 2001 and 2009 with data available on the Kaiser Permanente Total Joint Registry were included in the study. Data were extracted pertaining to patient demograph-

ics, surgical details, surgeon and hospital volumes. The study cohort contained 20 491 THRs on patients with a mean age of 65.5 years, of which almost 60% were performed on women. The mean body mass index was 29 and the incidence of deep surgical infection was

0.51%. The authors established that a number of factors including female gender, age, diagnosis, obesity, ASA score, diabetes and race were associated with infection rates. In their series there was no association with surgeon volume, antibiotic cement, fixation method, laminar air flow or surgical approach and infection rates. They also identified a higher infection rate in bilateral serial total hip replacements.⁵ Many of the findings in this latest large study were previously known or generally accepted, however, the findings that obesity, chronic disease and bilateral THR are associated with an increased risk of infection warrant further investigation. These are modifiable factors, and here at 360 we wonder if patients should be warned that they are at higher risk of infection if they are obese or have chronic medical conditions. An infected THR is, after all, a complete disaster.



Cross-linked polyethylene: Notching? Not a problem

■ The relentless march of tribological innovation has given us a plethora of bearing surfaces from which to choose, ranging from the ultra-modern high-tech ceramic and metal surfaces to the tried and tested ultra-high molecular weight polyethylene. Here at 360 we do tend to favour the balance of cross-linked polyethylene which appears to confer many of the advantages of a newer material, but without some of the risks. Even cross-linked polyethylene has not been completely without its controversies with the early failures of Hylamer, concern about brittle properties, and the potential for a higher proportion of biologically active particles in the wear debris. There are a number of reports of a potentially concerning pattern of notching in the acetabular rim which might act as a stress riser. Concerns have been raised that this may cause crack propagation and rim failure. Researchers from **London (Canada)** have designed a study to examine the effect of notching patterns in cross-linked polyethylene liners and the effect of these on the integrity of the acetabular liner. The researchers undertook a retrieval study of 14 identical acetabular liners. The components were examined under light microscopy and then underwent MicroCT to establish the morphology and patterns of acetabular notching and cracking at a mean of two years after implantation. The investigators identified an identical notching pattern in both cross-linked and normal polyethylene liners. They were unable to identify cracks or rim failure in any of their 14 explanted components. When visualised on 3D microCT the notching patterns appeared to have been caused by liner-cup micromotion, and were classified as creep deformation because the investigators were unable to demonstrate any marked progression over longer periods of implantation.⁶ We, like many other surgeons I am sure, breathed a big sigh of relief with the publication of these results.

It seems currently there is little good news for arthroplasty surgeons, but we all agree, here at 360, that this sort of reassuring article makes for much more comfortable reading.

Cement is not necessary in oncological arthroplasty

■ A central tenet of hip replacement for metastatic fracture is that a cemented arthroplasty should be used to minimise the risks of failure, as the conventional teaching is that diseased bone will not osseointegrate sufficiently with an uncemented arthroplasty. As cemented THR is becoming an increasingly less common procedure, researchers from **Tel-Hashomer (Israel)** have taken a second look at the suitability of modern uncemented implants in the pathological femur. The research team designed a retrospective case note review (Level IV evidence) of 60 uncemented THRs performed for pathological lesions of the femur. They reported on a consecutive series of patients with metastatic lesions of all varieties. Impressively, the surgeons did not note any significant complications (such as iatrogenic fracture), and at a mean follow-up of 18 months they noted no cases of prosthesis loosening or failure. Despite

a high mortality with a one-year survival rate of only 58.5%, the use of a modern uncemented prosthesis appeared to be safe and without significant complication in this series of patients.⁷ With the continuing evolution of prosthesis surface technology and stem design it is heartening to see a well designed study evaluating a long-held orthopaedic tenet that may now be an orthopaedic myth. The next time we have a metastatic lesion to treat, it may well be with an uncemented prosthesis.

Total hip replacement may result in weight gain

■ Much research has been conducted surrounding obesity and joint replacement. We know that obese patients are at higher risk of complications and some studies show poorer functional outcomes, but the effect of total joint replacement on weight is poorly described. We often have patients in the clinic telling us 'I can't lose weight without my joint replacement, but I will afterwards'. Researchers from **Richmond (USA)** designed an investigation to see if patients really do lose weight after joint replacement, which would confer an additional health benefit from the procedure. The study group used a

prospective US arthroplasty register and multivariable logistic regression model to establish the effects of arthroplasty on weight change post THR. The results were interpreted in relation to a control group from the same geographic area. The study defined clinically significant weight gain post arthroplasty as a gain of 5% of pre-operative weight within a five-year period. The risk adjusted multivariable model revealed that the odds ratio for important weight gain was 1.7 (95% CI 1.06 to 2.6) and an additional arthroplasty procedure further increased this to 2.0 (95% CI 1.4 to 2.7). Examined from a different angle, patients who had lost weight pre-operatively had a 12% chance of clinically significant post-operative weight gain for each kg of pre-operative loss.⁸ This is an extremely important epidemiological study that highlights the risks of obesity post-operatively in the hip replacement population, which may compound the public health problem of obesity. Within surgery in general, and orthopaedics in particular, we need to be more and more aware of the impact of obesity on our patients' health, and in light of the findings of this study, the impact of our surgery on obesity.

REFERENCES

1. **Krantz N, Miletic B, Migaud H, Girard J.** Hip resurfacing in patients under thirty years old: an attractive option for young and active patients. *Int Orthop* 2012;36:1789-1794.
2. **Malviya A, Stafford GH, Villar RN.** Is hip arthroscopy for femoroacetabular impingement only for athletes? *Br J Sports Med* 2012;(Epub ahead of print) PMID: 22878258.
3. **McMinn DJ, Snell KI, Daniel J, et al.** Mortality and implant revision rates of hip arthroplasty in patients with osteoarthritis: registry based cohort study. *BMJ* 2012;344:e3319-e3319.
4. **Griffiths EJ, Stevenson D, Porteous MJ.** Cost savings of using a cemented total hip replacement: an analysis of the National Joint Registry data. *J Bone Joint Surg [Br]* 2012;94-B:1032-1035.
5. **Namba RS, Inacio MCS, Paxton EW.** Risk factors associated with surgical site infection in 30 491 primary total hip replacements. *J Bone Joint Surg [Br]* 2012;94-B:1330-1338.
6. **Paterson NR, Teeter MG, MacDonald SJ, et al.** Highly cross-linked vs conventional polyethylene: no differences in rim notching from micromotion on retrieved acetabular liners. *J Arthroplasty* 2012;27:1616-1621.
7. **Thein R, Herman A, Chechik A, Liberman B.** Uncemented arthroplasty for metastatic disease of the hip. *J Arthroplasty* 2012;27:1658-1662.
8. **Riddle DL, Singh JA, Harmsen WS, Schleck CD, Lewallen DG.** Clinically important body weight gain following total hip arthroplasty: a cohort study with five-year follow-up. *Osteoarthritis Cartilage* 2012;(Epub ahead of print) PMID: 23047011.