Welcome to the fifteenth issue of Hip and Knee Surgery Research Review.

We begin this issue with a study looking at tranexamic acid use in patients undergoing THA without routine chemical thromboprophylaxis and discover that in this patient group the overall risk of DVT associated with tranexamic acid use does not outweigh the benefits of such therapy. Other topics covered in this issue include microfracture of knee cartilage lesions in adolescents, irrigation and debridement for periprosthetic infections in THA, nonagenarians undergoing THA, TKA and THA incidence projections for New Zealand in 2026, the effects of obesity on primary THA outcomes, and TKA following tibial plateau fracture.

We hope you enjoy reading this issue and look forward to receiving your comments and feedback, which will be passed on to Garry Heynen and Mark Clatworthy who provide the independent commentary for this review.

Kind regards,

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Does tranexamic acid alter the risk of thromboembolism after total hip arthroplasty in the absence of routine chemical thromboprophylaxis?

Authors: Nishihara S et al.

Summary: This retrospective case-control study involving 254 patients undergoing THA without routine chemical thromboprophylaxis examined whether tranexamic acid increases the prevalence of VTE. Tranexamic acid 1g was administered pre-operatively to 127 patients, while the other 127 untreated patients acted as controls. All patients received mechanical thromboprophylaxis. Pre-operatively and on post-operative days 1 and 7, patients were examined for DVT by bilateral ultrasonography. Compared with the control group, tranexamic acid recipients exhibited a significantly (p < 0.05) increased incidence of total DVT on days 1 and 7; 24 (18.9%) vs 12 (9.4%). Most cases were isolated distal DVT, however one patient in each group developed proximal DVT. A non-fatal symptomatic pulmonary embolism was experienced by one patient in the control group.

Comment (GH): This is a study published in the British Journal of Bone and Joint Surgery, which further reinforces the use of tranexamic acid for reduction of blood loss and minimising the requirement for transfusion following joint replacement surgery. The concern has always been that using agents such as tranexamic acid may increase the risk of venous thrombo-embolic disease after joint replacement surgery, and this was a study comparing 127 patients who received tranexamic acid and 127 patients who didn’t, with using ultrasound venography as the diagnostic test. They identified the fact that there was no increase in pulmonary embolism or proximal DVT formation although they did say there was a statistically increased level of distal DVT. This is the first study to my knowledge that has identified this factor, however the overall benefit of reduction of blood loss and restriction of transfusion requirement probably outweighs this possible consequence. The conclusion in this study was that the overall risk did not outweigh the benefit and they recommended ongoing use of tranexamic acid in total hip replacement, which I would agree with.


Abstract

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Outcomes following microfracture of full-thickness articular cartilage lesions of the knee in adolescent patients

Authors: Steadman JR et al.
Summary: This US study looked at outcomes following microfracture for full-thickness cartilage defects of the knee in individuals <19 years of age. A total of 26 patients (14 female; 12 male; average age 16.6 years [range 12-18.9 years]) treated between January 1992 and June 2008 were identified who met the study inclusion criteria. In 96% of cases, the lesions were patellar or medial or lateral femoral condyle defects (37%, 26% and 33%, respectively). Overall, 22/26 patients were followed for a minimum of 2 years, with an average follow-up of 5.8 years (range: 2.0-13.3 years). The average post-operative Lysholm score was 90 (range: 50–100), the median Tegner scale was 6 (range: 2–10) and the median patient satisfaction with outcome was 10 (range: 1–10). The average post-operative Lysholm score in females was 86 and in males was 93 (p = 0.22). Analysis revealed that the Lysholm score correlated with both the Tegner scale (rho = 0.586; p = 0.011) and patient satisfaction (rho = 0.70; p = 0.001). Revision microfracture was undertaken in one patient.

Comment (MC): This study is performed by the inventor of the microfracture technique Richard Steadman. This technique has been criticised by some surgeons as only being a “temporary fix.” The repair tissue is typically fibrocartilage “scar tissue” rather than normal hyaline cartilage, thus there is concern about the longevity of this tissue. This study evaluates the medium-term outcome of this procedure in adolescent patients. Good outcome measures, patient satisfaction and survival are reported at a mean of 5.8 years. These results are encouraging; however, for such a young group of patients longer-term follow up is required. Evaluation of our microfracture in patients under 45 years of age show similar medium-term results with 84% 10-year survival. Interestingly, 80% of our failures occurred in the first two years, indicating that repair tissue is durable.

Abstract

Irrigation and debridement for periprosthetic infections of the hip and factors determining outcome

Authors: Triantafyllopoulos GK et al.
Summary: In order to identify the success rate and factors predicting outcome of irrigation and debridement in patients with deep peri-prosthetic joint infection of the hip following primary revision THA, these researchers retrospectively reviewed clinical characteristics of 60 such patients (29 men; 31 women; mean age 64.9 years) who had undergone the procedure between January 2000 and May 2013. The implant retention rate after a mean follow-up of 59 months (range 12-168) was 70% (42 patients). A correlation was seen between irrigation and debridement treatment failure and duration of symptoms >5 days (p <0.001), and obesity (BMI ≥ 30; p = 0.0289). Furthermore, treatment outcome was affected by the type of pathogen (p = 0.0482) and those with methicillin-resistant staphylococci had significantly lower odds of success.

Comment (GH): This was a retrospective review from a large population base with an experienced lead author, Thomas Sculco. They identified 60 patients who presented with peri-prosthetic infections of which 42 patients were able to retain their implants. The duration of symptoms and obesity were the main factors that determined the success of single stage revision. Symptoms of longer than five days and a BMI of greater than 30 increased the risk of failure. They also identified the fact that Methicillin resistant staph had significantly lower odds of success. There is ongoing interest in single-stage rather than two-stage revision for peri-prosthetic infection. The study identifies the fact that patients need adequate workup including identifying the pathogenic organism, and only attempting salvage in a situation where patients present acutely with presence of symptoms less than five days. The article did not state whether these patients were maintained on ongoing antibiotic therapy, and hence it is difficult to know whether a cure was achieved or ongoing suppressive treatment was required.

Reference: Int Orthop. 2015;Mar 31 [Epub ahead of print]
Abstract

When diet, exercise, and medication aren’t enough, TARGETING OSTEOARTHRITIS (OA) KNEE PAIN AT THE SOURCE

Viscosupplementation to treat pain associated with osteoarthritis of the knee

When diet, exercise, and medication aren’t enough, TARGETING OSTEOARTHRITIS (OA) KNEE PAIN AT THE SOURCE

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High correlation of the Oxford Knee Score with postoperative pain, but not with performance-based functioning

Authors: van Hove RP et al.

Summary: This prospective cohort study involving 88 cementless mobile-bearing TKA recipients, involved in a RCT, evaluated the correlation between the overall Oxford Knee Score (OKS) and its subscales for pain (PCS) and function (FCS), with performance-based functioning using the DynaPort® Knee Score (DKS), visual analogue scale score for pain (VAS) and the Knee Society Score (KSS). The scores were all measured pre-operatively, 6 months and 1-year post surgery, with overall change in outcome over time analysed until 5 years after surgery. It was found that all scores improved over time, with the OKS being influenced by sex, age and pre-operative BMI. While the internal consistency of the OKS PCS increased over time, the OKS FCS remained the same. Moderate correlation was seen between the mean post-operative OKS FCS and the DKS (r = 0.65, p < 0.001); however, the mean post-operative OKS and OKS PCS showed high correlation with the VAS (r = -0.79 and r = -0.82, respectively, p < 0.001). High correlations were also seen between the mean post-operative KSS and the OKS (r = 0.80, p < 0.001), the OKS PCS (r = 0.72 p < 0.001) and OKS FCS (r = 0.74, p < 0.001). The study authors concluded that the post-operative OKS and the OKS PCS are highly correlated with pain, but only the post-operative OKS FCS is well correlated with performance-based functioning.

Comment (MC): This study evaluates the effectiveness of the OKS to measure pain and function post TKA. They report that the OKS is a better measure of pain than performance based functioning. They advocate the DynaPort® Knee Score which is a functional test whereby 29 functional knee movements are captured by an accelerometer then analysed by a physiotherapist. This is extremely labour intensive thus not appropriate as a patient-reported outcome measure for large groups of patients such as our NZ Joint Registry. The OKS did correlate well with the Knee Society score.


Abstract

Are nonagenarians too old for total hip arthroplasty? An evaluation of morbidity and mortality within a total joint replacement registry

Authors: Miric A et al.

Summary: Patient characteristics and the incidence of post-operative morbidity and mortality were evaluated in 183 nonagenarian THA recipients among 43,543 primary THA patients in a total joint replacement registry. Despite nonagenarians exhibiting a greater one-year mortality, a longer hospital stay, and a greater number of comorbidities pre-operatively than those <90 years of age, they did not have an increased risk of infection, DVT or pulmonary embolism. The post-operative mortality was actually within expected rates for individuals over 90 years of age.

Comment (GH): This is an interesting article which points out the fact that with our aging population, patients over the age of 90 are going to increasingly present with painful joints for total joint arthroplasty. These patients as a result of their age obviously have a higher incidence of co-morbidities, which does increase their one-year mortality following surgery, but the study identified the fact that there was no increased risk of infection, DVT or pulmonary embolism. The post-operative mortality was within the expected rates for individuals over the age of 90 and therefore as an operating surgeon, there is no reason to discriminate against someone over the age of 90 and offer them a quality of life improving procedure such as a joint replacement as long as they are aware of the risk associated with their existing co-morbidities. Total joint replacement in nonagenarians is equally as efficacious in terms of improving quality of life as it is in the younger age brackets.

Reference: J Arthroplasty 2015; Mar 14 [Epub ahead of print]

Abstract
The influence of obesity on primary total hip arthroplasty outcomes: A meta-analysis of prospective cohort studies

Authors: Liu W et al.

Summary: In a meta-analysis of data from 15 prospective cohort studies, researchers examined the effect of obesity on overall complication rate, functional outcome and operative time and hospital stay duration for primary THA (11,271 arthroplasties). Pooled data indicated that the complication rate in obese patients was higher (RR: 1.68; 95% CI 1.23-2.30; p = 0.0004), as was the dislocation rate (RR: 2.08; 95% CI 1.54-2.81; p < 0.0001); the RR of deep infection was 2.92 (95% CI 0.74-11.49; p = 0.13). Functionally, obese patients had relatively lower Harris Hip Scores than non-obese patients (mean difference -2.75; 95% CI -4.77 to -0.6), but no difference in Oxford Hip Score (mean difference -0.46; 95% CI -2.18-1.26; p = 0.60). The duration of operation was longer in obese than non-obese patients (mean difference 10.67; 95% CI 3.00-18.35; p = 0.006); however, there was no difference in the length of hospital stay (mean difference -0.16; 95% CI -0.34-0.02; p = 0.08).

Comment (GH): This was an analysis of the existing databases, looking for relevant articles related to THA and complication rates in obese patients. The reason for the article was the inconsistency of results from the literature, hence the need for a meta-analysis. The authors managed to pull data from fifteen studies, which involved over 11,000 hip replacements. From this baseline the complication rate demonstrated that obese patients suffered higher complication rates including dislocation and deep infection compared to non-obese patients. Functional outcomes scores tended to be lower in obese patients than non-obese patients and operative time was found to be longer in obese patients compared to non-obese patients. There however appeared to be no significant difference in the length of stay in hospital between obese and non-obese patients. Surgeons need to be aware of these statistics, especially considering the prevalence of obesity now in our patients and these patients need to be advised of their increased risk accordingly.

Reference: Orthop Traumatol Surg Res. 2015; Mar 25 [Epub ahead of print]

Abstract

Total knee arthroplasty following tibial plateau fracture: a matched cohort study

Authors: Scott CEH et al.

Summary: This study examined the indications and outcomes for TKA in 31 patients after fracture of the tibial plateau versus age (mean age 65 years) and gender-matched (23 women, eight men) patients receiving a TKA for primary osteoarthritis. Patients with instability or nonunion underwent TKA earlier (14 and 13.3 months post-injury) than those with intra-articular malunion (50 months; p < 0.001). In 27 (87%) patients primary cruciate-retaining implants were used. Complication rates in the post-traumatic osteoarthritis group were higher than in the control group and included wound complications (13% vs 1%; p = 0.014) and persistent stiffness (10% vs 0%; p = 0.014). In two post-traumatic osteoarthritis patients revision TKA was required at 57 and 114 months. Mean Oxford Knee Score was pre-operatively worse in primary osteoarthritis than post-traumatic osteoarthritis patients (18 vs 30; p < 0.001), but post-operative Oxford Knee Score and patient satisfaction did not differ.

Comment (MC): This study compares the complication rate and outcome of total knee replacement following a tibial plateau fracture with primary osteoarthritis. They report a higher complication rate, similar outcomes and patient satisfaction despite the post fracture patients being more disabled pre surgery. This study highlights that post traumatic knee replacements are technically more difficult, with previous scars and trauma increasing the risk of infection and stiffness. I believe it is very important to set the expectation for post traumatic knee replacements by explaining that they are likely to have more pain, less motion and a higher rate of infection than the osteoarthritic patient.


Abstract

Independent commentary by orthopaedic surgeons

Mr Garry Heynen and Mr Mark Clatworthy.

Garry is an orthopaedic surgeon at Mercy Ascot Hospital, Auckland. He qualified in 1982 and specialises in joint replacement surgery, minimally invasive joint replacement and computer-navigated surgery.

Mark is an orthopaedic knee specialist who has been practicing in Auckland for fourteen years. He practices at Mercy Ascot and Middlemore Hospital with satellite clinics on the North Shore and in West Auckland. During this time he has treated over 16,000 patients with knee problems. Mark initially trained in New Zealand then worked under leading knee surgeons in the US, Canada, the UK and Australia.

Survivorship and clinical outcome of Birmingham hip resurfacing: a minimum ten years’ follow-up

Authors: Azam MQ et al.

Summary: This retrospective, single surgeon, study evaluated long-term survivorship and functional outcomes in 222 (153 male, 69 female) osteoarthritic hip patients (244 hips) requiring Birmingham hip resurfacing surgery over a mean follow up of 12.05 years. Overall survival was 93.7% (95.4% in males, 89.86% in females). Failure occurred in 14 patients (16 hips), including seven (10.1%) females and seven males (4.6%). Femoral component failure because of aseptic loosening and varus collapse occurred in eight patients over a mean of 9.6 years. Metal allergy occurred in three female patients (five hips). Femoral neck stress fractures occurred in two patients and acetabular component loosening occurred in one patient. The failure rate was higher when the Birmingham hip resurfacing femoral component size was <46 (10 of 16 hips).

Comment (GH): This is a study, which further outlines the clinical decision-making process and medium-term outcome of resurfacing hip replacement in a reasonable number of patients. They followed 222 patients, of which the vast majority were males. Their results further back up other international articles, which document a poorer survival of the resurfacing in females, and in general terms, poorer 10-12 year survivorship of resurfacing compared to conventional hip replacement. Metal allergy was once again a problem, and the ongoing concern in relation to cobalt and chromium toxicity, both locally in the tissues and systemically, was not addressed at all in the paper. Metal-on-metal hip replacement, whether resurfacing or conventional type joint replacements are falling out of favour as a result of the unpredictability of the outcome related to chromium and cobalt levels. Large epidemiological studies are now looking at the effect, and to date there is no information on cobalt and chromium toxicity following metal-on-metal hip replacement.

Reference: Int Orthop. 2015; Mar 31 [Epub ahead of print]

Abstract