



Journal Club: 23 September 2010
Organiser: Mr Chris Servant & Mr Chris Roberts
The Ipswich Hospital NHS Trust
Recent papers published in the JBJS (Br)

Report written by Mr Chris Servant

Introduction

This journal club was chaired by Mr Chris Servant and Mr Chris Roberts. The meeting was attended by 8 Consultants and 8 Orthopaedic trainees. 4 papers that had been published in the Journal during 2010 were reviewed by one of the trainees. Each reviewer provided a summary and a critical analysis of each paper prior to a full discussion. The aim was to decide if the paper advanced knowledge and had the potential to change practice. The papers are presented below.

Comparison of standard and gender-specific posterior-cruciate-retaining high-flexion total knee replacements: a prospective, randomised study.

Kim YH, Choi Y, Kim JS.

J Bone Joint Surg [Br] 2010;92-B:639-45.

Reviewed by Miss Bree Winger

Summary

This is a prospective study of a consecutive series of women who underwent simultaneous bilateral TKRs, receiving a standard high-flexion cruciate-retaining prosthesis in one knee and the gender-specific version of the same prosthesis in the other knee. At a minimum follow-up of 3 years, there were no significant differences in clinical scores (Knee Society Score and WOMAC score), patient satisfaction, radiological results and complication rates. There was significantly more peri-operative blood loss from the knee with the gender-specific prosthesis. The authors found that the standard femoral component resulted in under-coverage in 32% and overhang in 10%, whereas the gender-specific femoral component resulted in under-coverage in 89% but no overhang.

Study strengths

- Prospective, randomised trial
- Impressive sample size: 146 bilateral female TKRs were performed by a single surgeon in a 6-month period

- Well-defined group of patients: all had a varus pre-operative deformity and a BMI < 35
- Methodological benefits of comparing knees after simultaneous bilateral surgery, e.g. well-matched groups
- Validated outcome measures were used
- The evaluators were blinded
- Clearly written paper

Study weaknesses

- The findings in Asian patients cannot be extrapolated to Caucasian patients.
- Relatively short follow-up (3 years) for a study of TKR design.
- Cannot separate the function of the knees at post-operative assessment.
- No patella-specific outcome measure was included in the study. It would have been interesting to include one (e.g. Kujala score or Bartlett score) since one of the main purported advantages of a gender-specific design of femoral component is that it is a more “patella-friendly” option for the female knee.
- The results for the aspect ratio of the distal femur are not presented. This should have been reported since Asian knees tend to have a different morphology to Caucasian knees.
- The authors do not define under-coverage or overhang, but the results suggest that a close match was considered to be a less than 1mm difference in medio-lateral width between the femoral component and the bone. This seems a very exacting definition.
- Salami slicing. A similar paper by the same authors assessing cruciate-substituting prostheses was published 3 months later (J Bone Joint Surg Am. 2009 Aug; 91 (8):1874-81), but no reference was made to the earlier paper.

Relevance

Gender-specific knee arthroplasty has been marketed strongly in recent years. This study adds to the scepticism that such a concept may not have any clinical merit. The authors found that there was no measurable advantage at 3 years in using a gender-specific design.

Indeed, the increased peri-operative blood loss seen with the gender-specific prosthesis may be explained by the poor coverage of the bone by the gender-specific femoral component.

Of course it is possible that the outcome measures used may have missed a subtle difference in outcome, although the patients expressed no clear preference for one knee over the other. Furthermore, a difference may appear with longer follow-up. It should also be emphasised that the results of this study may be applicable only to Asian women. It is possible that a gender-specific design may have some benefits for Caucasian women, who tend to have different knee morphology.

A prospective, randomised trial comparing closed intramedullary nailing with percutaneous plating in the treatment of distal metaphyseal fractures of the tibia.

Guo JJ, Tang N, Yang HL, Tang TS.

J Bone Joint Surg [Br] 2010;92-B:984-8.

Reviewed by Mr Saaj Kaleel

Summary

The aim of this study was to compare the outcomes of two methods of fixation of a specific fracture of the distal tibia (an AO /OTA 43A or metaphyseal extra-articular fracture). The authors performed a prospective, randomised trial comparing a closed intramedullary nail (IMN) and a locking compression plate (LCP) inserted using a minimally invasive approach. The authors' hypothesis was that patients would 'recover better' after IMN than after LCP.

They report the results of a sample of 85 patients that showed no statistical difference at one year follow-up in the primary outcome measures (AOFAS score, pain, and function). There was also no statistical difference in time to union, alignment and wound problems. However, the operating time and mean intra-operative radiation time was significantly longer in the LCP group. Most of the patients wanted their implant to be removed and this had been done in over half of the patients by the time the paper was written. Removal of one or more LCP locking screws was achieved with "some difficulty" in over one-third of patients.

The authors conclude that their preferred method now is IMN.

Study strengths

- The study has a robust methodology and in general the inclusion and exclusion criteria are well-defined.
- The surgical procedures, post-operative care, follow-up details and criteria for fracture healing and non-union are well-described.

Study weaknesses

- Despite this being a prospective trial, no a priori power analysis was performed.
- No images are included in the article and it would have been helpful to show an illustration (line diagram and/or a radiograph) of a typical OTA type 43-A fracture
- Nearly one-quarter of the cohort (26 of 111 patients) had not reached one year of follow-up. It would have been preferable for the authors to wait a few months before analysing their data so that the whole cohort had reached a minimum of one year of follow-up.
- The majority of the p values listed in Table II are erroneous. The value for radiation time in the IMN column is also wrong.

- The rate of metalwork removal is high.
- 19 patients were excluded because they underwent fixation of an associated fracture of the fibula in the presence of syndesmotic instability. This is probably an unjustified exclusion and also it is not clear whether these 19 patients were part of the original cohort of 111 patients or were separate.

Relevance

The study's main hypothesis that patients would 'recover better' after IMN than after LCP has not been proven. The only statistically significant finding is that IMN was associated with a shorter operation (around 16 minutes quicker) and less intra-operative fluoroscopy. Both methods appear to result in good outcomes and so we feel that this study suggests that the choice of implant can be left to individual surgeon preference.

Does diabetes affect outcome after arthroscopic repair of the rotator cuff?

Clement ND, Hallett A, MacDonald D, Howie C, McBirnie J.
J Bone Joint Surg [Br] 2010;92-B:1112-17.

Reviewed by Mr Sam Imam

Summary

This paper reports a retrospective cohort study comparing the clinical outcome of arthroscopic sub-acromial decompression and rotator cuff repair in two groups of patients: (a) a group of 5 type I and 27 type II diabetic patients, and (b) a matched group of 32 non-diabetic patients. Both groups included patients with a small to large tear of supraspinatus +/- infraspinatus and all patients had failed non-operative management, although it seems that a pre-operative sub-acromial injection was performed in only one patient.

At 6 months post-operatively the Constant-Murley score showed a mean increase of 24% in the diabetic group and a 41% increase in the non-diabetic group. The difference between the groups was largely due to the diabetic group demonstrating smaller increases in both range of motion and power. The improvement in the pain component was comparable in both groups: 77% in the diabetic group and 75% in the non-diabetic group. Further similar improvements in both pain and function were also seen one year post-operatively. There was a single superficial portal infection in the diabetic group.

Study strengths

- The inclusion and exclusion criteria are described clearly.
- The groups appear well-matched.
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- A single surgeon performed all the surgical procedures and the surgical technique used was consistent.
- The clinical assessments were performed by an independent assessor (not the operating surgeon) and included validated outcome measures.

Study weaknesses

- Retrospective study.
- The sample sizes are relatively small.
- The radiological inclusion criteria were mixed: the majority underwent MRI but some underwent ultrasound scanning.
- No post-operative imaging was performed to assess the integrity of the cuff repair.
- The authors neglect the potential beneficial effect of performing a sub-acromial decompression. They infer that the rotator cuff repair was responsible for the improvement in pain and function in both groups.
- The authors make an unjustified conclusion, stating that the risk of infection in diabetic patients is lower with an arthroscopic repair than with a mini-open repair, even though their study did not include any mini-open repairs.

Relevance

This study suggests that arthroscopic sub-acromial decompression and rotator cuff repair can be performed in diabetic patients with a low risk of infection and the anticipation of pain relief similar to non-diabetic patients, but with less improvement in function.

Internal rotational error of the tibial component is a major cause of pain after total knee replacement.

Nicoll D, Rowley DI.

J Bone Joint Surg [Br] 2010;92-B:1238-44.

Reviewed by Mr Sim Johal

Summary

The aim of this study was to assess the rotational alignment of a group of painful total knee replacements (TKRs) by comparing them with a randomly selected group of painless TKRs using CT scanning.

Over half the painful TKRs had internal rotation errors, with 44% of the tibial components being internally rotated more than 9° and 15% of the femoral components being internally rotated more than 6°, compared with none in the painless group. Furthermore, a combined

internal rotation of greater than 11° was found only in the painful group. External rotational errors were not found to be associated with pain.

Study strengths

- An elegant study with a straightforward study design.
- An estimation of sample size (a power calculation) was performed.
- A previously reported CT protocol was used to calculate the rotational alignment of the components accurately.

Study weaknesses

- The number and experience of the surgeons is not specified.
- The painful group was selected on the basis of unexplained moderate pain, with moderate pain being defined as “a KSS of >20 points”. However, pain is only one component of the Knee Society Score (KSS), with no pain scoring 50 points and severe pain 0 points (original 1989 scoring system).
- The site of pain is not specified. Internal rotation of the tibial component leads to relative external rotation of the tibial tuberosity and thus it is likely to be associated with anterior (patellofemoral) pain.
- It is not clear how the authors excluded aseptic loosening as a cause of pain.
- It is suggested that the sole landmark used to judge the rotational alignment of the tibial component was the tibial tuberosity. This may not be a reliable landmark in some patients, particularly those with patellar maltracking, who may have an increased lateral offset of the tibial tuberosity. For this reason many surgeons use additional landmarks, such as the anterior tibial crest or the second toe with the knee in extension, using an alignment rod. Furthermore, many also assess how the tibial component aligns itself during a trial range of motion with the patella reduced. It is not clear if the surgeons in this study used any of these additional methods.
- It would have been interesting to know if there was any correlation between pre-operative coronal plane deformity and the incidence of rotational error. It is known that internal rotation of the femoral component is a greater risk in valgus knees.
- Similarly, it would have been interesting to know if there was any correlation between gender and the incidence of rotational error. An increased lateral offset of the tibial tuberosity (a large Q-angle) is more common in females.

Relevance

It is already well-recognised that internal rotation of the femoral component should be avoided when performing a TKR. Accepting that this is a retrospective study, the results add weight to the theory that a surgeon should also avoid excessive internal rotation of the tibial component, which may cause patellofemoral pain.