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Medial unicompartmental knee replacement in the under 50s

Parratte S, Argenson J-N A, Pearce O, Pauly V, Auquier P, Aubaniac J-M.
J Bone Joint Surg [Br] 2009;91-B:351-5.

Review

Methods:

Originality and study design

Although other authors have reported results of unicompartmental knee replacements in under 60s, none to date have looked at the results in an even younger, more active cohort. This paper represents an original review of a series of unicompartmental knee replacements in patients younger than 50 years of age. The study is a retrospective radiological and functional review of a small series of patients, making this a study with level 4 evidence.

Subject recruitment and criteria

This was a small series of 35 unicompartmental arthroplasties in 31 patients who met strict inclusion criteria. Some of these criteria such as the absence of any, even minor fixed flexion deformity, the need for complete correction on stress radiographs, and no patellofemoral arthritis are far stricter than those stipulated for the much used Oxford unicompartmental knee replacement. The subjects had a variety of initial pathologies other than primary idiopathic osteoarthritis, leaving the possibility that pathologies such as AVN may affect loosening of components.

The prosthesis implanted is a fixed bearing polyethylene insert of average 8 mm to 12 mm thickness. This again differs significantly from the successful Oxford implant which is mobile bearing and rarely using polyethylene greater than 6 mm.

Hypotheses

There are no specific hypotheses described but instead three objectives of the study are identified: 1) functionally does the UKR perform as well in this younger group as it does in older patients?; 2) the incidence of radiolucent lines; 3) is the UKR as durable as measured by 12-year survivorship in the younger age group as it is in older patients?

The implication from the introduction and these hypotheses is that the authors expect the prosthesis to perform less well in this series than in older patients.

Results:

Outcome measures

Patients were assessed radiologically and functionally by independent assessors and using validated scoring systems. The authors describe how the radiographs were performed to standardise them; however we know from work from the Oxford group that unless the post-operative images are aligned using image intensifier control the true incidence of radiolucent lines is inaccurate.

Completeness/missing data

There is no loss to follow up and a mean follow up of 9.7 years represents a reasonable mid-term review; however the authors must have extrapolated the data to produce a 12-year survivorship analysis.

Table 1 describing activity levels of the patients is unclear as to what data is actually being described.

Analysis

Results show 6 knees requiring revision surgery, 4 of these being for polyethylene wear with no apparent loosening of components. The authors, having previously mentioned activity levels of their patients and the concern that high levels of activity and impact negatively affect survivorship of the UKR, do not describe if these patients with polyethylene wear requiring revision are in fact those patients participating in significant amounts of activity. They do however conclude that the wear is not due to component malalignment. Varus malalignment of the affected limb was corrected from an average of 7° of varus to 4° and it is possible that this intentional realignment although not to physiological valgus may have an effect on contact stresses and thus implant wear. The Oxford group have shown that correction of varus malalignment with their prosthesis can lead to premature failure of the implant.

They describe a large number of patients with progression of radiological arthritis in one or both of the lateral and patellofemoral compartments. Although only one of these was symptomatic enough to require revision this is again a phenomena not described by Oxford. There is no radiological loosening described in these patients.

The survivorship at 12 years with the end-point being revision for any reason is 80.6%.

Appropriate statistical analysis of knee scores shows significant improvement in terms of function and activity following surgery; however only 65% of patients are enthusiastic about their surgery with just short of 10% not reporting satisfaction with the outcome.

Complications

The authors adequately describe any complications including thromboembolism and infection.

Conclusions and Discussion:

The authors conclude that this UKR is reliable in improving function and activity in this group of young patients, and certainly the scores support this, although subjective assessment from the patients is not as convincing. It is also concluded that survival of the implant was acceptable although lower than seen in older patients, and polyethylene wear is a concern. Comparisons of data and outcome are made with other studies including a study looking at TKR in patients with an average age of 50.7 years. TKRs in this age group appear to do better; however a true comparison of these studies is difficult as it is not clear if the cohort of patients is a comparable population in terms of comorbidities and activity levels etc.

Limitations and relationship with existing work

It is acknowledged that this study is retrospective and not matched to an older patient cohort or other alternative operative interventions such as TKR or high tibial osteotomy. It would be particularly useful to know the 12-year survival of this Zimmer implant in over 50s and less active patients, allowing more information on survival data of this implant to discern “is it implant factors or patient factors that are causing failure?”

Conclusions justified and relevance

Limitations of UKR in young patients are acknowledged, however despite poor 12-year survival the authors still feel that this is a reliable intervention in this set of patients, conclusions I am not sure their data supports. However this paper is relevant to everyday practice where it is not uncommon to see young active patients with advanced medial compartment arthritis in whom management is challenging.