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Cover Picture:
Antoni van Leeuwenhoek (1632-1723):
Father of Microscopy
(Refer to page 557-558)

Editorial

Unicompartmental Knee Arthroplasty: Is it a Step in the Right Direction? – Surgical Options for Osteoarthritis of the Knee

K Satku

Osteoarthritis of the knee is the commonest degenerative joint disease. The prevalence of symptomatic disease in adults over 65 years is 10%. The prevalence of radiological disease in the same age group is 33%⁽¹⁾. Because of the magnitude of the problem its management consumes a significant proportion of health care resources of the nation. In some countries a needs assessment has been performed so that the appropriate resources can be allocated for this growing problem.

Prevention has not been entertained as a form of management as the aetiology has remained obscure. The main thrust of management has been medical and includes analgesics to relieve pain, exercises to maintain and promote function, braces and orthoses to help redistribute the load and contain the progression of osteoarthritis and, more recently, nutritional supplements such as glucosamine and chondroitin sulfate, professed to be chondroprotective agents, to help in cartilage “homeostasis”.

Surgical management remains the last resort and is undertaken when pain is debilitating and function is compromised despite medical management. Until some five decades ago arthrodesis (fusion of the joint) was the only surgical option. Although it relieved pain, the resulting stiff knee remained a functional disability. The 1950s and 1960s witnessed major developments in the surgical management of osteoarthritis of the knee. Surgical debridement, realignment osteotomy and prosthetic arthroplasty were introduced.

Realignment osteotomy although technically demanding, was the preferred surgical option in the 1960s and 1970s. With improved biomaterials and designs of prosthesis, prosthetic knee arthroplasty gained popularity. Both unicompartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA) prostheses were developed and used. By the eighties TKA had become the gold standard for surgical management of osteoarthritis in the elderly, not responding to medical management, and remains so to this day.

Osteotomy, because of its lesser outcome, was relegated to being the choice of treatment for the more active younger patient (aged sixty years or less). Such patients would not be suitable for TKA as their life expectancy was expected to exceed that of the survival of the prosthesis. As the indications become more refined and confidence in TKA grew TKA was also performed for the younger patient (late 50s) whose disease was so severe that osteotomy alone would not have provided relief. This was with the understanding that there was no alternative treatment available and that revision arthroplasty with its attendant increased risks and lesser outcome would be inevitable at a later date. Only 52% of patients reported satisfaction at five years following revision for primary TKA⁽²⁾.

Department of
Orthopaedic
Surgery
National University
Hospital
5 Lower Kent
Ridge Road
Singapore 119074

K Satku, MBBS,
FRCS, FAMS
Professor &
Senior Consultant

Correspondence to:
K Satku
Tel: (65) 6772 4342
Fax: (65) 6778 0720
Email: dossatku@nus.edu.sg

In 5 to 20% of patients undergoing TKA, the arthritis was predominantly in one compartment with minimal or no involvement of the patellofemoral joint. With this knowledge some surgeons continued their efforts to refine the unicompartment prosthesis to resurface the affected compartment and preserve the rest of the joint. Their hope was that with more conservative surgery and preservation of most of the joint, normal knee kinematics would be retained with better functional results. Their perseverance has today secured almost comparable results of UKA to TKA at 10 years in appropriate patients. However, this development has not influenced the practice of most orthopaedic surgeons since the success of TKA still remains unsurpassed with excellent survival of the prosthesis even at 20 years⁽³⁾.

The advent of minimally invasive surgery (MIS) has now allowed UKA to be undertaken with less morbidity than TKA. This has resulted in a resurgence of interest in UKA.

The paper by K Y Yang et al in this issue of the journal demonstrates the diminished morbidity and increased cost effectiveness of UKA done for isolated unicompartmental osteoarthritis⁽⁴⁾. In particular perioperative blood loss, duration of hospitalisation and total hospitalisation cost were considerably less. This is a short term study. Whether the UKAs done with MIS will secure the same precision of alignment of implants and match the long term results of UKAs done by the conventional approach will need to be evaluated⁽⁵⁾.

It may be appropriate at this juncture to discuss the ideal patient who would benefit from this surgical treatment. Kozinn and Scott⁽⁶⁾, the latter one of the most distinguished pioneers of UKA suggested the following: age 60 or more, weight less than 82 kg, low activity, a range of movement of 90° or more with fixed flexion deformity of less than 5°, angular deformities of less than 10° varus and 15° valgus and minimal or no involvement of the adjacent tibio-femoral and patello-femoral compartments. The best results could be expected if the older patients currently scheduled for TKA but who would be suitable for UKA have UKA done.

UKA is a technically demanding operation and unless a surgeon is well-versed in its technique, the good outcome that we speak of today would not be achieved. In contrast, TKA is today the province of the general orthopaedic surgeon, and most would do 10 to 30 TKAs in a year. Of the patients scheduled for a TKA an estimated 5% – 20% would be suitable for UKA. If these patients do undergo UKA each surgeon is likely to perform one to six UKAs a year, a number that is insufficient to sustain surgical expertise in UKA. This will perhaps be the greatest cause for resistance to the prescription of UKA in suitable patients.

The improved results of UKA and its more conservative nature have led to the broadening of the indications for its use by some surgeons. These surgeons now use UKA for patients in their 40s and 50s with osteoarthritis as an alternative to osteotomy (the criteria for UKA are more stringent than that for osteotomy). The results have been dismal. Engh and McAuley reported revision rates varying from 28% to 14% at seven years depending on the type of prosthesis used⁽⁷⁾. The proponents of UKA will be quick to add that revision of UKA will relatively be easily accomplished and hence should not be considered a deterrent to its use. A review of patients in the Swedish Knee Arthroplasty Register who had revisions for UKA revealed a satisfaction

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rate of only 61% at five years⁽²⁾. These findings must certainly be sobering for proponents of UKA in the younger patients.

For the older patient, TKA or UKA when appropriate gives good results. For the younger active patients (40s and early 50s), medical measures must be vigorously promoted and when necessary an osteotomy done. However, when the disease is extensive and even an osteotomy is unlikely to provide relief, TKA should be prescribed reluctantly. UKA would not be an alternative to TKA and would be inappropriate in this latter group because of the extensive disease.

It is highly unlikely that arthroplasty will be the eventual solution for the younger active patient. For these patients, let the surgeons be prudent for the future holds a different kind of optimism.

Developments in stem cell, articular cartilage research and tissue engineering have resulted in an interest in biological resurfacing of damaged articular cartilage in knees. Implantation of cultured chondrocytes together with osteotomy may be the future in the management of osteoarthritis of the knee in the younger patient.

Osteonecrosis of the knee, its progression to osteoarthritis and its association with osteoporosis suggest that the latter may be a significant contributory factor in the development of osteoarthritis⁽⁸⁾. Attention to the management of bone loss in the perimenopausal period may open a new chapter in the prevention of osteoarthritis. **SMD**

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