

# SURGICAL MANAGEMENT OF ARTHRITIS

K Satku, V P Kumar

## ABSTRACT

*The progression and manifestations of arthritis can to a large extent be controlled by medical measures. In the instance of inflammatory arthritis surgical synovectomy may have to be undertaken to control the disease.*

*Once the arthritis has resulted in significant damage to the joints surgical intervention may be the only means of providing relief of pain and restoring function to the affected limb.*

*Arthroplasty, arthrodesis, debridement and osteotomy remain the most used surgical procedures to achieve this.*

**Keywords:** Arthroplasty, Osteotomy, Arthrodesis, Inflammatory joint disease, Degenerative joint disease.

SINGAPORE MED J 1991; Vol 32: 445 - 447

## INTRODUCTION

Degenerative arthritis especially of the knee is by far the commonest arthritis in our region. Inflammatory arthritis is less common and it is the milder sero-negative arthritis that is often encountered. The manifestations and effects of most types of arthritis can be managed by conservative measures. Medications, rehabilitative programmes, splints and adaptation to cope with activities of daily living form the bulk of conservative measures. Occasionally, however, the disease runs a course that cannot be contained by medical measures, or it damages the affected joints so extensively that pain, loss of function and deformity cripple the patient. In most of these situations surgical intervention is the only solution. The decision to intervene surgically must be a team effort. The rheumatologist, the rehabilitation physician and the surgeon must be aware of the limitations of medical measures and at the appropriate moment advocate surgical intervention as the treatment of choice.

## AIMS OF SURGERY

The primary objective of surgery is to relieve pain, correct deformities and restore function. In monoarticular or pauciarticular disease, especially if it is of the degenerative type, dramatic transformation of the life of the patient can be achieved following surgery. Pain is relieved and a significant degree of freedom with respect to ambulation is achieved. Most of these patients can be expected to pursue activities of daily living without limitations.

In polyarticular disease, especially of sero-positive rheumatoid arthritis, the patient may already be crippled by multiple joint involvement and the achievements of surgery are less dramatic but still useful. The relief of pain and increased mobility in the operated limb are still a welcome improvement to these patients and their families. For the more fortunate of this group of patients, ambulation is still possible although in some instances only after multiple surgical procedures, as often more than one joint is responsible for the disability.

The precise goals of surgery must be made clear to each patient. When multiple surgery will be required this must be

made known to them from the outset. Often, the wishes of the patient and the possible goals of surgery are not similar and this could be a source of great discontent for these patients after surgery.

## PATIENT ASSESSMENT

Although most patients with degenerative arthritis have only one or two arthritic joints and need little preparation for surgery and rehabilitation, patients with inflammatory arthritis have multiple problems and unless all aspects of management are taken into consideration, the surgical results may be compromised.

Medications, in particular steroids, have to be adjusted accordingly. These patients pose an anaesthetic risk. Routine cervical spine evaluation to exclude cervical spine instability is necessary. Temporomandibular joint involvement can make intubation difficult and the anaesthetist's attention must be drawn to it. It is now well recognised that the frail atrophic skin of the arthritic patient increases the incidence of wound complications amongst which are skin necrosis and haematoma formation. Also, these patients have an increased risk of infection.

The "success" of the surgery also depends to a large extent on the patient's own motivation, the support that he receives from his family and the environment at home. Post-operative rehabilitation is just as important as the surgery itself. Lack of motivation, family support or a conducive home environment may make the surgery a futile exercise.

## Surgery

The types of surgery available can be broadly categorised into four subgroups which are synovectomy, arthroplasty, arthrodesis, osteotomy and debridement.

### Synovectomy

When synovitis is persistent and unresponsive to non-steroidal anti-inflammatory drugs and disease-modifying drugs for six months or more there emerges a significant risk of the synovitis causing extensive articular cartilage destruction. To combat this situation intra-articular radioisotope instillation, intra-articular steroid injection and surgical synovectomy have been used.

Intra-articular radioisotope instillation is only available in some centres and even then only to patients 40 years and older because of the long term risks associated with the use of radiation<sup>(1)</sup>.

Intra-articular steroids do not have these restrictions but their effects last only a few months at most and often less than a few weeks<sup>(2)</sup>. Further, the repeated injections of intra-articular steroids have the potential to transform the affected joint into one similar to a neuropathic joint. Hence intra-articular steroids are to be used sparingly.

---

Department of Orthopaedic Surgery  
National University of Singapore  
Lower Kent Ridge Road  
Singapore 0511

K Satku, MBBS, M Med, FRCS  
Consultant

V P Kumar, MBBS, FRCS(Edin), FRCS(Glas), AM  
Consultant

Correspondence to : Dr K Satku

---

The surgical excision of synovium is also a temporising procedure but its effects last longer, for up to a few years<sup>(3)</sup>. Fortunately the synovitis at recurrence is of a considerably lesser severity and amenable to medical management<sup>(4)</sup>. The recurrence is related to persistence of antigenic material in the joint articular collagenous tissue<sup>(5)</sup>.

Surgical synovectomy is today the the treatment of choice for intractable synovitis. Synovectomy must be undertaken early before significant joint destruction is evident. The result of synovectomy undertaken in the presence of significant articular cartilage damage with respect to pain relief and restoration of function is disappointing<sup>(3)</sup>.

Not all joints lend themselves to synovectomy. This limitation is largely related to the surgical accessibility of all of the synovium in the joint. The knee, elbow, wrist, metacarpophalangeal and interphalangeal joints are most suited.

Even in these joints synovectomy will be incomplete and within months the synovium would have proliferated to reline the joint although to a very much lesser degree. The morbidity, in particular the stiffness that follows synovectomy, and the limited duration of benefit are the main mitigating factors that have restricted the use of synovectomy.

Arthroscopic synovectomy especially of the knee, ankle and elbow with its limited morbidity is most popular today<sup>(4,6)</sup>. At the elbow the excision of the head of the radius in addition to the synovectomy regularly provides relief of pain and restores useful range of movement<sup>(3)</sup>.

#### Arthroplasty

When massive joint destruction is present, pain, loss of function and deformity of the joint become the primary reason for surgical intervention. Years ago excision arthroplasty and interposition arthroplasty were the main means of dealing with a severely damaged joint. Although they restore movement and diminish pain in the affected joints, these procedures resulted in significant instability of the joint. Today with the advent of the artificial joint and its success, excision arthroplasty and interposition arthroplasty have limited use. Excision arthroplasty is most popular in the management of forefoot pain and deformities following involvement of the 2nd to 5th metatarsophalangeal joints of the foot<sup>(7)</sup>. At the hip and some other joints it is used to salvage infected or failed replacement arthroplasty.

Total joint replacement arthroplasty is the treatment of choice for restoration of function in joints severely damaged by the disease. Of course the problem of loosening and wear of the components and infection are still ever present following such surgical intervention but at the current state of evolution of the prosthesis and the procedure these risks are small and the benefits gained often overwhelm the risk.

Total knee replacement has probably the best result, achieving close to 97% survivorship at 10 years. Infection and technical problems are the factors contributing to the failure. The survivorship of hip prosthesis is in the region of between 80 and 90% at about 10 years<sup>(8)</sup>.

Replacement arthroplasty must be however restricted to the older patients and for those whose activity level has been considerably diminished by the severity of the disease. The need to undertake revision surgery because of loosening, wear or other complications is ever present and becomes significant in those who pursue an active life style or after almost 10 years. The morbidity at revision surgery is significantly higher, satisfactory results dropping significantly<sup>(9)</sup>.

Total joint replacements of the shoulder, elbow and metacarpophalangeal joints have also been successful although to a lesser extent.

In total joint arthroplasty the damaged surfaces of the joints are resected and resurfaced with artificial components made of

metal, stainless steel in most instances, and metalbacked high density polyethylene. This combination gives a low coefficient of friction and hence minimal wear rate. The components are anchored in their position with methylmethacrylate which is a biocompatible bone cement. In recent years there have been attempts to secure the bone implant interphase bond by encouraging bone ingrowth into the surface of the prosthesis. Although this has been achieved in the occasional cases most of the cementless prostheses are bonded to the bone by dense fibrous tissue that appears to serve the function of anchoring the prosthesis just as well.

#### Arthrodesis

Arthrodesis is the surgical ablation of a joint and is secured by fusion of the joint surfaces. It is an extremely useful procedure when very severely damaged, painful joints have to be salvaged. It secures pain relief, correction of deformity and stability. Unfortunately the elimination of movement is a great limitation and the patients' ability to cope with an arthodesed joint will be dependent on compensatory movements afforded by the adjacent joints.

It is therefore the procedure of choice only in situations where no alternative treatment is possible, articular damage is extensive and joint movement is already so severely restricted that the ablation of the joint will not cause any further substantial loss of joint movement and function, but afford pain relief, correction of deformity and stability. It may also be used in situations where the joint destruction is of a lesser degree but pain, deformity or loss of function necessitates surgical intervention and arthroplasty is not appropriate or not available.

This latter situation arises in young patients with pauciarticular involvement who retain a high level of activity. Joint replacement is not advisable in these patients because it could lead to rapid wear of the artificial joint or loosening of the components - circumstances that will result in revision arthroplasty and its attendant increased morbidity.

Arthrodesis is a popular choice when dealing with severely damaged wrists, ankles, subtalar and mid-tarsal joints and the unstable cervical spine. Elsewhere arthrodesis is used only as mentioned earlier, in young patients in whom arthroplasty is inappropriate and likely to fail. Example of these instances includes arthrodesis of the hip in a young manual labourer who has post-traumatic or post-infective arthritis that necessitates surgical intervention.

#### Osteotomy

Osteotomy, which is the transection of bone adjacent to the affected joint today retains popularity only as a procedure for arthritis of mechanical origin (degenerative arthritis). In such arthritis only a part of the joint surface is eroded and this introduces a deformity at the joint which further accentuates the process of wear of the already affected joint surface. By transection of the bone and over-correction of the deformity the well-preserved surfaces of the joint are brought into the line of weight transmission. This alteration in the joint mechanics and the decongestion of the bone by the osteotomy play a significant role in bringing about pain relief. Pain relief following osteotomy is less predictable than for procedures like arthroplasty and arthrodesis. However almost all of pre-existing joint movements are retained. There is also a gradual but definite deterioration of the arthritis and recurrence of the pre-existing deformity with time. Approximately 20% of joints would have relapsed to the pre-operative deformity at about 9 years after the operation<sup>(10)</sup>.

In arthritis due to inflammatory diseases the damage to the joint surfaces is uniform. Although progressive deformities occur, overcorrection of these deformities will not be beneficial and hence corrective osteotomies are not suitable.

Double osteotomy, the division of subchondral bone on both sides of the joint was popular in the 70s and early 80s,

especially for the surgical management of inflammatory arthritis at the knee and shoulder. The results have however been inconsistent and in instances where pain relief was afforded the precise mechanism of action is not known<sup>(1)</sup>.

#### Debridement

Debridement is a useful surgical procedure in the management of some cases of degenerative arthritis. It is a temporizing procedure delaying major surgical intervention for up to a few years. It is indicated when the affected joint is symptomatic, demonstrates only mild to moderate articular cartilage erosion radiologically and retains a useful range of movement and is not deformed. The procedure involves removal of all diseased tissues that are thought to be responsible for the patient's symptoms. Generally all debris, articular cartilage flaps, osteophytes and other damaged tissues eg meniscal flaps are removed. The areas of loss of articular cartilage are also abraded to encourage the formation of a protective fibrocartilage.

The procedure has regained popularity recently with the advent of the arthroscope. Arthroscopic debridement minimises post-operative morbidity although it is limited in the extent to which debridement can be undertaken especially with regard to removal of osteophytes.

#### CONCLUSION

Although various surgical options exist to treat joints damaged by arthritis, each one of them must be carefully considered and the most appropriate one selected. Occasionally the risks of surgery in a particular patient and the limited benefits to be gained may mitigate against a surgical intervention. One must heed these situations for too often brilliant surgery has been done which benefited no one.

The timing of surgery is equally important. Replacement arthroplasty, the most spectacular of all surgical options, may lead to early failure if carried out prematurely and cripple the

patient more than if the damaged joint were left untreated. The survivorship of artificial joints and increased risks of revision surgery must be constantly borne in mind. Despite these words of caution the judicious use of surgical intervention will bring about dramatic transformation of the lives of arthritic patients.

#### REFERENCES

1. Gumpel JM. Radisynoviothrosis. *Clin in Rheu Dis* 1978; 4:311-26.
2. Gray RG, Gottlieb BL. Intra-articular steroids. *Clin Orthop* 1983;235-63.
3. Tillmann K. Recent advances in the surgical treatment of rheumatoid arthritis. *Clin Orthop* 1990; 258:62-72.
4. Kim JM. Effect of arthroscopic synovectomy in rheumatoid arthritis and juvenile rheumatoid arthritis. *Handbook of the Combined Congress of the International Arthroscopy Association and the International Society of the Knee*, 1991:122.
5. Cooke TDV. A scientific basis for surgery in rheumatoid arthritis. *Clin Orthop* 1986; 208:20-4.
6. Cleland LG, Treganza R, Dobson P. Arthroscopic synovectomy: A prospective study. *J Rheumatol* 1986; 13:907-10.
7. Mann RA, Thompson FM. Arthrodesis of the first metatarsophalangeal joint for hallux valgus in rheumatoid arthritis. *J Bone Joint Surg* 1984; 66A:687-92.
8. Scuderi GR, Insall JN, Windsor RE, Moran CM. Survivorship of cemented total knee replacement. *J Bone Joint Surg* 1989;71B:798-803.
9. Bryan RS, Rand JA. Revision total knee arthroplasty. *Clin Orthop* 1982; 170:116-22.
10. Stuart MJ, Grace JN, Ilstrup DM, Kelly CM, Adams RA, Morrey BF. Late recurrence of varus deformity after proximal tibial osteotomy. *Clin Orthop* 1990; 260:6-65.
11. Benjamin A. Double osteotomy for the painful knee in rheumatoid and osteoarthritis. *J Bone Joint Surg* 1969; 51B: 694-9.

## BOOK REVIEW

# HANDBOOK OF CLINICAL NEPHROLOGY

by Dr Woo Keng Thye  
PG Publishing, 1991

To most medical students and internal medicine trainees, nephrology has often been a subject shrouded in mystery and full of confusing nomenclature especially when it comes to understanding glomerulonephritis. *Clinical Nephrology* appears to have been written with this in mind and the author succeeds in presenting the subject in a clear and comprehensive manner.

While not claiming to be a textbook on renal diseases, a vast selection of topics in sufficient detail. The opening chapters lay the groundwork with a brief revision of anatomy, physiology, symptoms and signs and investigative procedures in renal disease. Glomerulonephritis and the nephrotic syndrome is discussed and there is an excellent chapter on the pathogenesis and treatment of IgA Nephritis, a topic usually poorly covered in most textbooks, complete with a long list of references. This is the commonest form of glomerulonephritis in Singapore and the author shares the ten year experience of the Renal Unit at SGH.

Lupus nephritis, yet another not uncommon local problem, is well discussed, with a clear outline of treatment. Practical issues in the relationship between sexual intercourse and renal

disease are confronted. The chapters on fluid and electrolytes and acid-base balance are supplemented by data interpretation type exercises suitable for the internal medicine trainee. Dialysis and renal transplant in this Singapore context are reviewed.

The writing style is clear and concise, with frequent headings enabling easy reading and revision and this has contributed significantly to making a difficult subject like renal tubular acidosis comprehensible. Flow charts and diagrams are however lacking and their addition would certainly enhance the book as useful reference material in a busy ward. Apart from the chapter on IgA Nephritis alluded to above, references are generally lacking. It would be useful to provide a list of review articles or monographs for the keen student contemplating a career in this field.

On the whole *Clinical Nephrology* is a very readable book; highly recommended for both doctors and students.

Dr Pang Weng Sun  
Dept of Geriatric Medicine  
Tan Tock Seng Hospital