

Management of osteoarthritis

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ABSTRACT Osteoarthritis is the most common arthropathy worldwide and the clinical and radiological prevalence increase with age. The aetiology is uncertain, but genetic and environmental factors are recognised. Symptoms predominantly occur in the spine, hips, knees, hands and feet, in isolation or combination, and may be relapsing – remitting or progressive. The signs may mimic inflammatory arthropathies or non-articular rheumatism, but clinical signs and appropriate investigations are discriminatory. Management is multi-modal with emphasis on diet, physiotherapy, and occupational therapy. Simple analgesics and occasionally systemic or topical anti-inflammatories are symptom-relieving, but unremitting pain and increasing disability from the hips or knees are indications for arthroplasty in suitable patients.

KEYWORDS Osteoarthritis, management, rheumatology review article

LIST OF ABBREVIATIONS carpometacarpal (CMC), C-reactive protein (CRP), distal interphalangeal (DIP), erythrocyte sedimentation rate (ESR), interphalangeal (IP), metacarpophalangeal (MCP), metatarsophalangeal (MTP), National Institute for Clinical Excellence (NICE), non-steroidal anti-inflammatory drugs (NSAIDs), proximal interphalangeal (PIP), systemic lupus erythematosus (SLE)

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INTRODUCTION

Osteoarthritis is a complex of symptoms and disability which develop in relation to alterations in the structure and biochemistry of articular cartilage, subchondral bone, and the periarticular tissues. Pathological and radiological features of osteoarthritis are present in one or more joints of the majority of individuals in middle age and are essentially universal in the aged. Accurate figures for the clinical prevalence are hard to obtain since the correlation between clinical features and objective parameters is weak, but around 10% of the population are managed for 'osteoarthritis' in primary care. The clinical diagnosis is rare before the age of 45 but applies to at least 25% of those over 80. Osteoarthritis is more common in Caucasians than in black or Asian populations and prevalence is increased in women. Osteoarthritis is multifactorial, with genetic and environmental influences demonstrable. Obesity is the most clinically relevant association, but other potentially treatable causes such as acromegaly and haemochromatosis are rare. The economic impact of such a ubiquitous and disabling condition is substantial. The direct annual costs (medical and surgical care) exceeded \$1,500 billion in the US at 1994 prices and the indirect costs (loss of income, welfare costs) were at least five times greater.

CLASSIFICATION AND DIAGNOSIS

A number of attempts have been made to sub-classify osteoarthritis in relation to the clinical features or the

presence of predisposing associations (primary, generalised nodal, secondary, etc.) but in practice there is sufficient overlap to make such attempts impractical or unhelpful and the pattern of joint involvement and the presence or absence of inflammatory stigmata usually suffices in classification.

A pragmatic clinical diagnosis is usually achievable, but overdiagnosis or malattribution is common, particularly in the elderly where clinical or radiological features of osteoarthritis may obscure the concurrent features of non-articular rheumatism, inflammatory arthritis, or polymyalgia rheumatica. The experienced practitioner will seek the relevant features and give appropriate 'weight' to the clinical, laboratory, or X-ray findings before defining a positive diagnosis of osteoarthritis or an alternative. Frequently, osteoarthritis will be a diagnosis of exclusion at the common sites including the spine, hip, knee, hands and feet. In the latter, focal inflammation of the first metatarsal-phalangeal joint can mimic gout.

INVESTIGATION

The course of symptomatic osteoarthritis is also highly variable and symptoms may be static, relapsing, or progressive. Laboratory tests are of limited value but the acute phase response (anaemia of inflammation, thrombocytosis, and elevated ESR, viscosity, or CRP) should be negative and the biochemistry normal.

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Rheumatoid factor and anti-nuclear antibodies are usually negative but may be present in low titre, particularly in the elderly, and their uncritical application will uncover more false than true positives and can lead to diagnostic doubt. In large joints with signs of inflammation, synovial fluid analysis can reveal elevated polymorph counts but these are modest in comparison to rheumatoid arthritis, sepsis, or crystal arthritis.

Radiographic changes include cartilage loss, osteophyte development, and subchondral sclerosis. Sometimes 'erosive' changes are seen in the small joints of the hands and feet. Areas of diagnostic confusion most often present in relation to hand symptoms, back and neck pain, or generalised locomotor pain.

PAINFUL SWOLLEN HANDS

The differential diagnosis (Table 1) would include inflammatory osteoarthritis, connective tissue disease, or inflammatory arthritides, such as rheumatoid and psoriatic arthritis, and less often polyarticular gout. If the swelling is predominantly in the DIP joints and is tender, the distinction between osteoarthritis and psoriatic arthritis can be difficult as osteoarthritis may present with these features before evolving into the characteristic, non-tender, bony swelling (Heberden's nodes). The presence of inflammatory signs in the PIP, MCP and wrist joints of the upper limb and the MTP joints and ankles suggests inflammatory arthritis, and the presence of nail changes, occult psoriatic patches, or tophi may help. Similarly, the definition of non-tender/bony swelling of the DIP and PIP joints and crepitation and restriction of the CMC joint of the thumb would favour osteoarthritis. The presence of a significantly elevated ESR, viscosity, or CRP favours inflammatory disease and the presence of high titre rheumatoid factor might be relevant if the clinical features are equivocal.

TABLE 1 Differential diagnosis of painful swollen hands.

	Distinguishing signs in hand arthropathy
Inflammatory osteoarthritis	Concomitant osteoarthritis in DIPs (Heberden's nodes) PIPs (Bouchard's) CMC and IP of thumb, first MTP, hip, knee, or spine.
Psoriatic arthritis	Patchy involvement of IP joints of hands and feet. Nail changes. Occult psoriatic patches (scalp, umbilicus, internatal cleft). Family history of psoriasis or seronegative arthritis.
Rheumatoid arthritis	Symmetrical involvement of PIP, MCP, MTP joints and wrists. Rheumatoid nodules.
Polyarticular gout	Tophi of fingers, elbows, or ears. History of podagra.
Systemic lupus erythematosus	Less impressive swelling and tenderness of the hand joints. Prominent tendon involvement. Rashes and systemic features.

BACK AND NECK PAIN

Osteoarthritis of the facet joints and vertebral/disc complex are common but acute, and chronic neck and back pain are more frequently due to injury or degeneration of the discs and paravertebral ligaments and muscles. Secondary osteoarthritis is a frequent, often asymptomatic, accompaniment particularly in those beyond middle age. Rarer causes include inflammatory spinal diseases and bony metastases. A number of 'red flags' (Figure 1) should alert the clinician.

GENERALISED PAIN

Widespread pain can be a feature of osteoarthritis but even if some stigmata of osteoarthritis are present, more commonly results from non-articular disease including fibromyalgia or chronic widespread pain syndrome. Systemic illnesses including hypothyroidism, hyper or hypocalcaemic disorders, or malignancy, including myeloma or carcinoma with bony metastases, can rarely present this way.

Distinguishing features include clues from the age of onset, presence of systemic symptoms, or abnormalities on general examination. A laboratory check including urinalysis, a full blood count, ESR or viscosity, biochemistry including calcium and liver function tests, and thyroid function tests, provides reassurance on most occasions, with a myeloma screen, prostate-specific antigen and chest X-ray sometimes giving additional security. An isotope bone scan can provide reassurance in severe or protracted cases.

MANAGEMENT OF OSTEOARTHRITIS

Educating the patient about the nature of the condition and its unpredictable course and the limitations of drug treatment is fundamental and referral to an experienced physiotherapist is helpful to explore techniques to achieve pain relief and to develop and maintain muscular strength, co-ordination, and balance (Figure 2). Well fitting trainers and repositioning of the patella by external 'taping' are often helpful for osteoarthritis of the knee. Results often reflect the enthusiasm and experience of the therapist

- Young patients
- New onset in the elderly
- Unrelieved by position
- Night pain
- Progressive or worsening pain
- Neurological signs
- Systemic symptoms or signs
- Patient immunosuppressed
- History of malignancy

FIGURE 1 Red flags in spinal pain.

- Heat, ice, ultrasound, diathermy
- Transcutaneous electrical nerve stimulation (TENS), acupuncture, hydrotherapy
- Weight loss
- Shock absorbing footwear, e.g. trainers
- Biomechanical techniques, e.g. foot wedges, patellar taping

FIGURE 2 Potential physical therapies.

and the beliefs and expectations of the patient. Allocating the patient 'control' and responsibility for the pain management may be valuable. Weight loss is the only dietary treatment of proven efficacy.

Analgesics and anti-inflammatories provide the mainstay of pharmacological management in osteoarthritis although the widespread use of complementary therapies testifies to frequent dissatisfaction with their efficacy and concern about short- and long-term toxicity. A bewildering array of non-pharmacological treatments are utilised and probably say more about the individuals perception of the 'pain experience' than providing an evidence-based route to management

Patients frequently self-medicate with glucosamine and chondroitin supplementation, and there have been a small number of controlled trials with positive outcomes in osteoarthritis of the knee. Although there are some concerns about the variable dose, purity, and quality control of the many preparations of these non-prescription drugs, the few clinical trials reported no significant toxicity.

Analgesics are valuable, but the evidence base is restricted to short-term use and paracetamol-based regimes predominate with the choice of a compound analgesic (paracetamol-codeine, paracetamol-dihydrocodeine, paracetamol-dextropropoxyphene) down to patient selection after a trial of $n=1$. The Committee on Safety of Medicines has indicated a plan to withdraw paracetamol-dextropropoxyphene in the UK due to concerns about its toxicity after accidental or deliberate overdose.

Some patients, and many physicians, prefer an anti-inflammatory analgesic although the evidence for these is not entirely compelling. Toxicity is a limiting factor, particularly in the osteoarthritic elderly. Gastrointestinal bleeds and perforations with conventional NSAIDs cause significant morbidity and mortality and an excess of cardiovascular risk is now confirmed for some if not all COX-2 agents. Topical NSAIDs may be symptom relieving for small joint osteoarthritis but have a limited evidence base.

Night pain may respond poorly to analgesia and not at all to hypnotics, but the co-prescription of a pain modifying dose of amitriptyline or alternative often gives satisfactory results. The onset of significant sleep

disturbance is often a trigger for consideration of joint replacement and referral to a surgeon.

Intra-articular steroids may be valuable in selected joints, particularly those with clinical signs of inflammation, but there is little evidence for long-term benefit in patients being considered for surgery. Arthroscopy and lavage are sometimes offered for large joint osteoarthritis and may temporise the decision to replace the joint.

A number of agents have been introduced as 'viscosupplementation' largely for the knee. Hyaluronic acid (Hyalgan) is the most widely available but the limited evidence base and the need for up to six intra-articular injections deters many potential recipients and prescribers.

TIMING OF SURGERY

In osteoarthritis of the hip and knee, arthroplasty is increasingly advised and is now amongst the most commonly performed elective procedures in the world. The success, longevity, and safety of hip and knee replacement are reflected in the referral of more, frailer, and younger patients. It is essential to balance carefully the benefits and risks of the primary procedure and in some younger patients the likelihood for a revision procedure. The decision to operate is very much an interpersonal decision between the patient, their family, and the orthopaedic surgeon, but the rheumatologist can provide insight concerning the anticipated benefits (pain relief and mobility) and risks relevant to the individual who may often have significant co-morbidity. Patients should usually have 'failed' with weight loss, physiotherapy, and analgesia before referral for surgery.

REPLACEMENT ARTHROPLASTY

Replacement arthroplasty of the hip and knee has transformed the management of uncontrollable pain and disability resulting from osteoarthritis. Joint replacement has largely superseded the alternative operations of osteotomy or arthrodesis, although there remain indications for both of those procedures. The primary indication for arthroplasty is pain at rest, while activity-related pain must be viewed as a relative indication. Surgery for stiffness and deformity may be effective but since the range of movement after surgery is more dependent on the pre-operative range than any other factor, the results may be disappointing.

Assessment of the effectiveness of arthroplasty by comparison with other treatments is difficult as no other treatment has the potential to relieve pain completely and improve function to the same degree. Equally, the available cost effectiveness data may no longer be valid, as relative costs have dropped for surgery, with decreased lengths of stay in hospital, even before the advent of ultra

short lengths of stay with minimal access surgery. This may be offset, however, by attempts to use new prostheses (cementless, metal on metal, ceramic) or newer implantation techniques (minimally invasive surgery, navigation assisted surgery), which require longer in the operating room.

The data available from the biggest arthroplasty registers for long-term studies support the use of classical cemented metal on plastic arthroplasties. Such devices can and should give survivorship of 90% at ten years. Modifications have tended to give poorer result but there may be difficulty in interpreting these, as some of us have not included precocious exchange of polyethylene acetabular liners of cementless arthroplasties as revision operations. While most fit patients can return to almost any activity after a hip arthroplasty, stiffness after knee replacement may, in particular, limit the ability to descend hills and stairs. When assessed in terms of quality adjusted life years, comparisons are made with procedures such as coronary artery bypass grafting, but it has to be questioned whether this is a valid comparison since arthritis is not in itself life-threatening. Nonetheless, total hip replacement is generally considered to be effective. Some authors have suggested that there is more benefit for hip replacement than for knee replacement and that the patient with greater morbidity before surgery gains more from the procedure.

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While making little judgement about the precise costs of arthroplasty, the enthusiasm with which patients subject themselves to second or third implants and indeed revision procedures is probably a better guide to efficacy than the sterile opinion of the health economist.

HIGHLIGHTS

- Osteoarthritis is the most common symptomatic arthropathy in the world.
- Symptoms correlate poorly with clinical and radiological signs of disease.
- Diagnosis rests on the clinical recognition of the common patterns and the exclusion of alternatives. Laboratory tests and imaging are only useful to exclude clinically cogent alternatives.
- Management is multimodal with major emphasis on education, weight loss, physiotherapy, and the use of appropriate adaptations to home and environment. Simple and compound analgesics are the mainstay of drug management.
- Joint replacement is one of the most effective and durable of surgical procedures but the timing of the procedure and the potential for early and late failure or sepsis should be explicitly agreed prior to any procedure.

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