Introduction

Pain or swelling of a single joint is a common medical problem. Crystal induced arthritis and osteoarthritis are common in daily practices. However, acute monarthritis is also a potential medical emergency. Failure to make the correct diagnosis could lead to permanent damage to the patient and medico-legal consequences. The initial work up of these patients should focus on excluding an infectious etiology. Chronic monarthritis (i.e. persistent joint inflammation over six weeks) represents a different challenge.

Acute Monarthritis

Causes of acute monarthritis are:

**Infectious**
- Bacterial arthritis (Gonococcal and non-gonococcal)

**Inflammatory**
- Crystal induced arthritis – gout, pseudogout
- Systemic rheumatic diseases – seronegative spondyloarthropathy, juvenile chronic arthritis, rheumatoid arthritis, palindromic rheumatism

**Non-inflammatory**
- Trauma
- Internal derangement of knee
- Nontraumatic hemarthrosis
- Periarticular syndromes

Chronic Monarthritis

Causes of chronic monarthritis are:

**Infectious**
- Bacterial arthritis, bacterial osteomyelitis, tuberculous, fungal, Lyme arthritis

**Inflammatory**
- Systemic rheumatic diseases – seronegative spondyloarthropathy, juvenile chronic arthritis, rheumatoid arthritis, sarcoid arthropathy
Non-inflammatory

- Osteoarthritis
- Internal derangement of knee
- Avascular necrosis of bone
- Neoplasia

History

The demographic and medical background of the patient can be revealing. Gouty arthritis typically occurs in middle age men with history of heavy alcohol intake and is often associated with a metabolic syndrome of obesity, hypertension, diabetes mellitus and dyslipidemia. While in female patients it usually occurs after menopause and in those taking diuretic therapy. In young otherwise healthy patients, gonococcal and reactive arthritis should be considered and the history of venereal exposure should be elicited tactfully.

History taking may elicit more joints involved although patient complains about one particular joint. The severity, time course and duration of symptoms usually give a clue to the diagnosis. Bacterial arthritis tends to increase in severity until treated. Osteoarthritis symptoms wax and wane with activity. Crystal induced arthritis symptoms develop intensely overnight and there may be prior episodes of acute monoarthritis that resolve spontaneously. Additive symptoms and morning stiffness lasting more than one hour suggest rheumatoid arthritis.

Infective arthritis must be also considered in a rheumatoid arthritis patient with sudden increase in pain and swelling of one particular joint. Constitutional symptoms such as fever, chills, malaise and weight loss and the presence of concomitant septic foci should prompt to an infectious etiology. Conjunctivitis, urethritis, recent diarrhoea and psoriasis of skin correlate seronegative spondyloarthropathy.

Physical Examination

It is important to differentiate between arthritis and periarthritis. Arthritis involves the whole articular space with warmth and erythema of the overlying skin, more intense in bacterial and crystal induced arthritis. There is swelling and tenderness surrounding the joint, and limitation and pain in all planes of movement. Periarthritis refer to inflammation of the tissues around a joint. This includes tendon injuries, peritendinitis, bursitis and ligament tears. One notable example is calcium crystal-associated arthritides, which typically affects the shoulder joint. It is also mandatory to look for extra-articular signs such as mouth ulcer, psoriasis of skin, keratoderma blenorrhagicum, nail changes, skin nodules, infective foci and axial joint limitations.

Synovial Fluid Analysis

It is worthwhile to do joint fluid aspiration whenever there is significant joint effusion and whenever septic arthritis is suspected. Removal of joint fluid is both therapeutic and diagnostic. Initial fluid is sent for crystal microscopy, white cell count, gram stain and bacterial cultures.

Normal synovial fluid has less than 180 white blood cells/µL and mostly of mononuclear cells. A ‘noninflammatory’ fluid such as in osteoarthritis has transparent, straw colour and the viscosity is high. The white cell count is less than 2,000/µL and neutrophils less than 25%. A noninfectious ‘inflammatory’ fluid such as in acute gout, is translucent and viscosity is decreased. The white cell count is between 2,000 to 50,000/µL, and neutrophils 25-75%. An infectious fluid looks purulent with low viscosity. The white cell count is more than 50,000/µL and neutrophils more than 90%. A decreasing synovial white cell count in repeated aspirates of infective arthritis parallels treatment response.

Crystal Microscopy

Synovial fluid microscopy can be easily done in office setting. A fresh preparation is made by putting a tiny drop of synovial fluid from the needle tip onto a clean glass slide and covered with a thin glass slid. The amount of fluid should not cause overflowing. Monosodium urate crystal (MSU), associated with gout, is easily seen even under ordinary light microscope as intracellular needle shaped crystals (engulfed by neutrophils). Calcium pyrophosphate crystals (CPPD), associated with pseudogout, are smaller and more difficult to see under light microscopy. They could be rods or rhomboid shape.

A compensated polarized microscope helps to confirm the crystals. MSU crystal is negatively bi-refringent; the crystal is yellow in colour when parallel to the axis of slow vibration of the compensator and becomes blue when the compensator is rotated 90 degrees. CPPD is weakly positive bi-refringent; the crystal is blue in colour when parallel to the axis of slow
vibration of the compensator and becomes yellow when the compensator is rotated 90 degrees.

Radiographs

Radiograph of the joint is ordered to rule out fracture in cases of trauma or as a base line in persistent monoarthritis. A standing anteroposterior film of the knee shows medial compartment joint narrowing, bony sclerosis and osteophytes in osteoarthritis. Chondrocalcinosis appears as punctate or linear densities in articular hyaline or fibrocartilaginous tissues, commonly in wrists and knees of older people; and is associated with pseudogout. Tophaceous gout may cause para-articular joint erosion with an overhanging margin but relatively preserved joint space, common in toes and fingers. A pelvic radiograph may show sacroilitis in spondyloarthropathy.

Laboratory Tests

Ordinary screening blood tests do not confirm the cause of acute monarthritis. A high sedimentation rate or neutrophil count can occur with septic arthritis or acute gout. Serum uric acid may be normal in acute gout. Rheumatoid factor and anti-nuclear factor are usually not helpful. Blood culture should be sent on patients suspected with bacterial arthritis, immuno-compromised, febrile or toxic. Skin ulcer, cervical, urethral or urine cultures should be considered if gonococcal arthritis is suspected. Human immunodeficiency virus (HIV) antibody is ordered on patients with high-risk sexual behaviours. Lyme antibody supports the diagnosis of Lyme disease in people from endemic areas, though the test is not available in Hong Kong.

Synovial Biopsy

Referral of patient for synovial biopsy should be considered in monarthritis of uncertain etiology. Tissue culture may grow gonococcus or mycobacterium tuberculosis. Histology can confirm amyloidosis, sarcoidosis, pigmented villonodular synovitis or other tumours. DNA testing by polymerase chain reaction is available in some centres for Lyme disease, gonococcus and chlamydia infection.

General Guidelines to Treatment

Empirical intravenous antibiotic treatment, with cloxacillin and/or a third generation cephalosporin, is recommended in suspected bacterial arthritis before gram stain and culture results are available. N. gonorrhea is the most common organism in healthy adults. S. aureus is the most common non-gonococcal organism. Gram-negative pathogens are found more in immunocompromised hosts. Intravenous antibiotic is given two to six weeks depending on the pathogen and clinical response. Arthrotomy and drainage is important to remove infective joint fluid, which causes cartilage destruction. Repeated large bored needle closed drainage and irrigation works well in knee infection.

Acute gout and pseudogout is treated with non-steroidal anti-inflammatory drugs (NSAIDs), at a higher dosage for a couple of days and then maintenance dosage for a few days. The sooner the drug therapy is initiated, the quicker will the patient respond. New cyclooxygenase-II (COX II) specific inhibitors are the alternative choice for patients with history of peptic ulcer. Oral colchicine at frequent dosing to abort acute gout may cause nausea and diarrhea, and is not usually recommended, especially for the elderly and those with impaired renal function. Corticosteroid is not the treatment of choice in most cases. Prednisolone, 20-30 mg daily for a week can be successful for patients with acute gout who are contraindicated for the use of NSAIDs or colchicine. Intra-articular steroid injection is at times the safest alternative for monoarticular gout if septic arthritis has been excluded.

Chronic monarthitis of the knee with obscured etiology, a form of undifferentiated seronegative arthritis, occurs usually in young patients. Arthroscopic synovial biopsy and synovectomy should be considered. Intra-articular steroid injection may be tried when infection has been ruled out. Diseases modifying anti-rheumatic agents (DMARDs), such as sulfasalazine or methotrexate have been reported to be helpful in some cases.

Palindromic rheumatism refers to the syndrome of recurrent arthritis and or periartthritis with normal findings in between. The episodes can be intensely inflammatory and painful, lasting a few days. A literature review of patients followed up ranging months to 30 years, shows 48% of patients continue
to have palindromic episodes, 33% progressed to rheumatoid arthritis, and 15% had prolonged remission. NSAIDs are helpful in relieving symptoms. DMARDs may be beneficial in preventing attacks, though controlled studies are lacking.

Further Reading


