A diagnostic approach to the common arthritic conditions

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Abstract

Arthritis is a common cause of pain and disability in adults. In this article, the first in a series of two articles on arthritis, a clinical approach to musculoskeletal disorders is reviewed, with emphasis on the history and examination as the basis for diagnosis of common rheumatic disorders. A simple step-by-step clinical approach is discussed and basic investigations are considered in the context of clinical findings. Some common clinical pitfalls in diagnosis are highlighted. Broad principles of management of rheumatic diseases are briefly discussed as a prelude to the second article in which an in-depth approach to the management of rheumatoid arthritis is covered.

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Introduction

A quarter of all consultations to primary care practitioners are for musculoskeletal symptoms, which, in the majority of cases, are for self-limiting soft tissue rheumatism. Furthermore, the commonest cause of physical disability in the elderly is osteoarthritis (OA). In spite of these observations, many clinicians are unsure about the diagnostic approach and management of common rheumatic disorders. In this article we review the clinical approach to the diagnosis of some common rheumatic disorders and highlight some common pitfalls in the assessment of the patient presenting with musculoskeletal symptoms.

The integrity of the diarthrodial (synovial) joint is maintained primarily by the subchondral bone, the overlying hyaline cartilage, the synovium and joint capsule. The primary insult in most rheumatic diseases is directed at one of these structures (Figure 1), and this, in many instances, is followed by secondary involvement of surrounding articular and peri-articular structures. For example, in rheumatoid arthritis (RA), synovial inflammation is the primary insult which left untreated, results in secondary destruction of cartilage, subchondral bone and capsule.

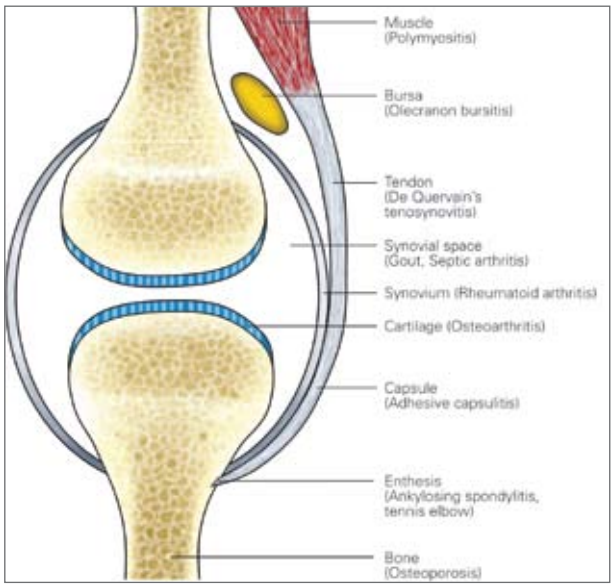

Figure 1: Structures and associated pathologies of the diarthrodial joint

The history and clinical examination – cornerstones of diagnosis

The clinical assessment, which includes the history and examination, is the diagnostic cornerstone of musculoskeletal medicine. Special investigations like serological tests and X-rays are important as confirmatory tests but should never be used as surrogates of the clinical assessment.

Clinical pattern recognition

Pain is the cardinal symptom of musculoskeletal disorders and for the most part, clinical pattern recognition of pain is sufficient to diagnose most common rheumatic disorders.[1] Table I summarises the steps of clinical pattern recognition.

Table I: Steps for clinical pattern recognition in the patient with musculoskeletal symptoms

• **System localisation:** Locomotor system *vs* other system (e.g. neurological system)
• **Anatomical localisation:** Articular *vs* periarticular
• **Mode and pattern of onset:** Acute *vs* chronic Flitting *vs* additive vs intermittent
• **Extent and pattern of joint involvement:** Monoarticular/oligoarticular *vs* polyarticular
• **Extra-articular manifestations** Especially eye and skin features

Firstly, generalised pain and neurogenic pain need to be distinguished from regional locomotor pain. Common causes of generalised musculoskeletal pain are listed in Table II. Regional pain results from either true articular disorders (e.g. osteoarthritis), periarticular conditions (tendinitis, bursitis) or referred pain (e.g. nerve entrapment) (Table III). These three broad groups of causes of regional pain are readily distinguished on the basis of range of motion of the joint on active (initiated by the patient) and passive (initiated by the clinician) movement.

Table II: Medical causes of generalised musculoskeletal pain

Rheumatic
Fibromyalgia syndrome
Primary hypermobility syndrome
Polymyalgia rheumatica
Endocrine
Hypothyroidism
Osteomalacia
Hyperparathyroidism
Drugs
Statins
Zidovudine
Fluoroquinolones
Chloroquine

Table III: Localisation of pathology based on joint range of motion (ROM)

Site of pathology	Active ROM	Passive ROM
Referred pain	Normal	Normal
Peri-articular	Decreased	Normal
Intra-articular	Decreased	Decreased

In the case of true inflammatory joint disease like rheumatoid arthritis (RA), signs of inflammation (or synovitis) are diffuse tenderness and soft-tissue swelling of the joint, while in degenerative joint disease (or OA), joint line tenderness, crepitus and bony overgrowth are typical clinical signs. Joint effusions can occur in both cases but are more common with inflammatory joint disease.

The *mode* and *pattern* of onset help to narrow the differential diagnosis. Attacks of gout and septic arthritis tend to have an acute onset, reaching a peak within days, whereas in RA, onset is usually over weeks to months. The pattern of joint involvement can be additive, migratory, or intermittent. Gout is classically an *intermittent* arthritis, where the same joint is involved in different episodes of inflammation, but the joint is quiescent during intervening periods. In *migratory* or *flitting* arthritis, joints are sequentially affected where, as one joint settles, another becomes inflamed. This is typically seen in acute rheumatic fever. The *additive* pattern, where subsequent joints are involved while preceding ones are still inflamed, is most common but least specific. Rheumatoid arthritis usually presents as an additive arthritis.

For the most part, the differential diagnosis of monoarthritis or oligoarthritis (2–4 joints) differs from that for polyarthritis (≥ 5 joints). Gout, septic arthritis, OA and reactive arthritis commonly present as a monoarthritis/oligoarthritis. The differential diagnosis for polyarthritis is much wider (See Table IV) and includes RA (Figure 2), other connective tissue diseases like lupus, nodal OA (Figure 3), tophaceous gout (Figure 4) and psoriatic arthritis. Inflammatory backache, where back pain and stiffness is worse in the early hours of the morning and improves with exercise, can occur in isolation or in association with peripheral joint disease. When present in a male under the age of 40, it is very suggestive of a seronegative spondyloarthropathy (SpA) like ankylosing spondylitis.

Additional musculoskeletal features of SpA are enthesitis, where there is inflammation at the insertion of a tendon or ligament to bone (e.g. Achilles tendinitis) and dactylitis or 'sausage digit', referring to diffuse swelling of a digit that extends beyond the joint margins.

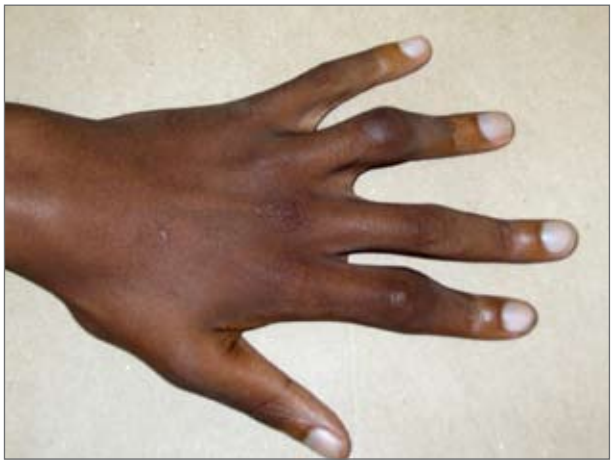

Figure 2: Rheumatoid arthritis

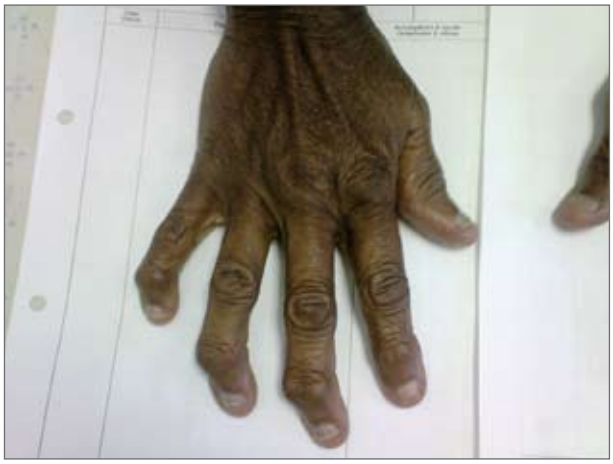

Figure 3: Nodal osteoarthritis

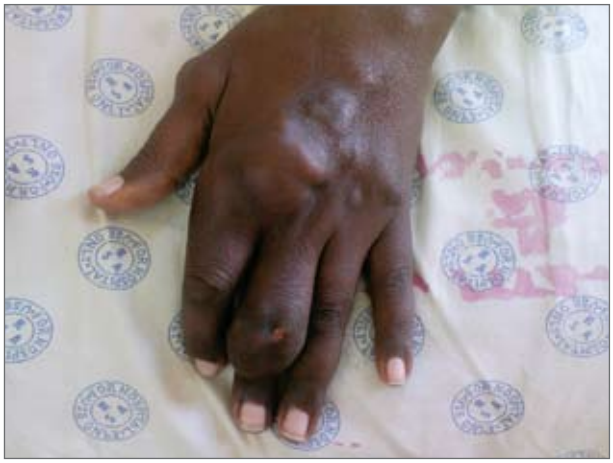

Figure 4: Chronic tophaceous gout

Finally, extra-articular features, especially those involving the skin and eye, are extremely helpful in the diagnosis of systemic rheumatic diseases (Table V). Constitutional symptoms like weight loss, fatigue and anorexia, are common with systemic inflammation but are non-specific.

Table IV: Overview of the common polyarticular arthritides

Disease	Clinical features	Laboratory investigations	X-ray changes
Generalised nodal osteoarthritis	• Mainly peri/postmenopausal females • Asymmetrical oligo/polyarthritis • 1st CMCJ, DIPJ, knees, 1st MTPJ	• Normal FBC • Normal ESR/ESR (mild ↑ in erosive OA) • -ve RF, -ve ANA	• Focal joint space narrowing • Subchondral sclerosis • Subchondral cysts • Osteophytes
Rheumatoid arthritis	• Especially in perimenopausal females and male smokers • Early morning stiffness • Symmetrical polyarthritis • PIPJ, MCPJ, wrists, elbows, shoulders, knees, ankles and MTPJ • Swan-neck and boutonnière finger deformities in established disease • Subcutaneous nodules	• Anaemia, thrombocytosis • ↑ ESR/CRP • +ve RF (80%)	• Soft tissue swelling • Juxta-articular osteopaenia • Uniform joint space narrowing • Marginal erosions
Tophaceous gout	• Postpuberty males; postmenopausal females • Risk factors: obesity, hypertension, beer, diuretics • DIPJ, PIPJ, wrists, knees, ankles, midfoot, 1st MTPJ • Tophi – elbows	• ↑ WCC, ESR/CRP (during acute attack) • ↑ serum urate • Urate crystals in synovial fluid and/or tophi	• Asymmetric soft tissue swelling • 'Punched out' periarticular erosions
Psoriatic arthritis	• Peak onset 4–5 decade • Both sexes • Early morning stiffness • Asymmetric oligo/polyarthritis • DIPJ ± PIPJ, wrists, knees, big toe IPJ • Dactylitis • Nail pitting/ridging • Psoriasis plaques	• Anaemia • ↑ ESR/CRP • -ve RF, -ve ANA • HLA B27 +ve (50%)	• Soft tissue swelling • Periosteal reaction (dactylitis) • Marginal erosions • Exuberant periarticular new bone formation
Systemic lupus erythematosus	• Peak onset 3–5 decade • Female preponderance • Early morning stiffness • Symmetrical polyarthritis • PIPJ, MCPJ, wrists, elbows, shoulders, knees, ankles and MTPJ • Correctable hand deformities • Malar/discoid rash	• Anaemia, ↓ WCC/lymphopaenia • ↑ ESR, normal CRP • +ve ANA (99%)	• Soft tissue swelling • Joint space narrowing • No erosions

DIPJ – distal interphalangeal joint; PIPJ – proximal interphalangeal joint; IPJ – interphalangeal joint; CMCJ – carpometacarpal joint; MCP – metacarpophalangeal joint; MTP – metatarsophalangeal joint; FBC – full blood count; WCC – white cell count; ESR – erythrocyte sedimentation rate; CRP – C-reactive protein; RF – rheumatoid factor; ANA – antinuclear antibody

Investigations

Synovial fluid analysis

Acute monoarthritis is a medical emergency, where joint aspiration and synovial fluid (SF) analysis are mandatory to exclude septic arthritis and gout. Both conditions can produce turbid SF.[2] Macroscopic examination of the SF is also helpful in excluding a haemarthrosis, as in the case of trauma and haemophilia. Microscopy is essential to determine the white cell count, to detect bacteria by gram stain and to look for uric acid crystals under polarised light. Synovial fluid culture is indicated in cases where infection is suspected.

Blood investigations

The full blood count is a useful screening test. Anaemia is common, mostly due to anaemia of chronic disorders, but can also result from iron deficiency secondary to non-steroidal anti-inflammatory drug-induced peptic ulcer disease, and rarely Coomb's positive haemolytic anaemia as in systemic lupus erythematosus (SLE). Leucocytosis is a feature of septic arthritis, acute gout and juvenile arthritis. Leucopaenia, and especially lymphopaenia, in a patient presenting with polyarthritis, is very suggestive of SLE. Note that Felty's syndrome, characterised by neutropaenia, is a long-term complication of poorly-controlled RA and therefore not seen in early RA. Reactive thrombocytosis is common with active chronic inflammatory arthritis, like RA and juvenile idiopathic arthritis, whereas thrombocytopaenia can be a presenting feature of SLE.

An acute phase response, with elevation of the erythrocyte sedimentation rate and C-reactive protein (CRP), aids in the differentiating inflammatory from non-inflammatory arthritis. It generally lacks specificity, except when the CRP is greater 100 mg/L, in which case septic arthritis or gout should be excluded.

Screening for rheumatoid factor and antinuclear antibodies (ANA) is indicated in the patient presenting with polyarthritis, the latter test being especially useful when there are associated connective tissue disease symptoms. Importantly these tests are neither 100% sensitive or specific and should never be the sole basis on which a diagnosis of a systemic rheumatic disease is made. Testing for specific autoantibodies like the anti-double stranded DNA antibodies and antibodies to extractable nuclear antigens is only indicated if the ANA is positive.

Hyperuricaemia is a feature of gout, but 30–45% of patients have a normal serum uric acid level during an acute attack of gout. Conversely, hyperuricaemia is common in patients with hypertension and the elderly of whom only a small proportion develop gout. Hence, hyperuricaemia is

Table V: Extra-articular manifestations of rheumatic diseases

Clinical feature	Causes
Mucocutaneous	
Photosensitivity	Systemic lupus erythematosus (SLE), dermatomyositis, Sjögren's syndrome
Raynaud's phenomenon	Scleroderma, SLE, dermatomyositis
Mouth ulcers	Behçet's disease, IBD-associated arthritis, SLE, Reiter's syndrome
Subcutaneous nodules	Rheumatoid arthritis (RA), tophaceous gout, acute rheumatic fever
Erythema nodosum	Sarcoidosis, IBD-associated arthritis, Behçet's disease
Nail dystrophy	Psoriatic arthritis, Reiter's syndrome
Cutaneous vasculitis	SLE, RA, dermatomyositis, Behçet's disease, RA
Ocular	
Keratoconjunctivitis sicca	Sjögren's syndrome, RA, SLE, scleroderma
Conjunctivitis	Reiter's syndrome
Scleritis	RA, Wegener's granulomatosis
Uveitis	Ankylosing spondylitis, IBD-associated arthritis, juvenile idiopathic arthritis, Behçet's disease, sarcoidosis
Retinal vasculitis	SLE, Behçet's disease
Renal	
Acute renal failure	Scleroderma (renal crisis), SLE, Wegener's granulomatosis
Glomerulonephritis	SLE, microscopic polyangitis, Wegener's granulomatosis
Renal calculi	Gout
Cardiopulmonary	
Serositis (pleuritis, pericarditis)	Rheumatoid arthritis, SLE, systemic juvenile arthritis (Still's disease), acute rheumatic fever
Interstitial lung disease	Scleroderma, dermatomyositis, SLE, RA, sarcoidosis
Nodules	RA, Wegener's granulomatosis
Pulmonary hypertension	Scleroderma, SLE
Valvular heart disease	
Mitral regurgitation	Acute rheumatic fever, RA, SLE
Aortic regurgiation	Ankylosing spondylitis, Reiter's syndrome, RA, Takayasu's arteritis
Myocarditis	SLE, scleroderma, dermatomyositis, RA, sarcoidosis, Takayasu's arteritis
Neurological	
Mononeuritis multiplex	RA, SLE, polyarteritis nodosa
Stroke	SLE, anti-phospholipid syndrome, Behçet's disease, Takayasu's arteritis

IBD – inflammatory bowel disease

only of clinical significance in the context of a patient presenting with a typical acute arthritis or tophaceous gout.

Imaging

Plain radiography is the imaging method of choice. Apart from being cheap and readily available, the common rheumatic diseases have distinctive radiological features (Table IV). Ultrasonography is especially useful in the diagnosis of soft tissue disorders, such as rotator cuff lesions. It has the advantage of being safer (no radiation) and less expensive than computed tomography (CT) or magnetic resonance imaging (MRI), and can also detect erosions in inflammatory arthritis with an accuracy of 96% compared to MRI.[3] Only in exceptional cases is MRI indicated to better define the nature and the extent of joint, bone and surrounding soft tissue changes.

Diagnosis and management

It is clear from the above discussion that the diagnosis of rheumatic diseases is based on a constellation of clinical, laboratory and radiological features. It is critically important to arrive at a diagnosis and treat early and appropriately in acute monoarthritis, especially in the case of septic arthritis, and potentially life-threatening complications in systemic rheumatic diseases, like nephritis. Conversely, it is important to avoid over-treatment, particularly with potentially toxic drugs like oral corticosteroids, in cases where the diagnosis is unclear. Numerous long-term studies have shown that patients with ill-defined rheumatic symptoms seldom progress to develop serious complications or disability.[4]

A review of the specific management of common rheumatic diseases is beyond the scope of this article. For pain control, it is important to note that both medical and non-pharmacological therapies (e.g. muscle strengthening exercises and joint protection education) are often needed. Non-steroidal anti-inflammatory drugs (NSAIDs) should only be prescribed for pain relief after a trial of simple analgesics, like paracetamol, especially in OA. NSAIDs should be used with great caution in the elderly, patients at risk for peptic ulcer disease and those with a history of cardiovascular disease. Local intra-articular and intralesional corticosteroid injections are very effective for pain relief in cases of monoarthritis/oligoarthritis, excluding septic arthritis, and soft tissue disorders like bursitis and tenosynovitis, respectively.

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