RHEUMATOID ARTHRITIS AND ANAESTHESIA

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SELF ASSESSMENT

- You go to assess a rheumatoid patient pre-operatively. She has a hoarse voice. Why might this become significant during anaesthesia?
- What percentage of patients affected with atlanto-axial instability have symptoms or clinical signs of the condition?
- Patients often have extra-articular manifestations of disease. Which organ systems can rheumatoid disease affect?
- Patients with rheumatoid disease affecting the lung may have a restrictive pattern of disease in spirometric studies. Which pathological conditions may cause this?
- A seropositive rheumatoid patient has a routine FBC; it reveals neutropenia, anaemia and thrombocytopenia. What clinical signs would you look for in association with this? If the patient does not have any associated clinical signs, what may also be causing this pattern on the FBC?

DEFINITION

Rheumatoid arthritis is a chronic inflammatory disorder. It is characterised by a chronic polyarthritis that primarily affects the peripheral joints and related periarticular tissues. It usually starts as an insidious symmetric polyarthritis, often with non-specific systemic symptoms.

PREVALENCE

Prevalence ranges from 0.5–1.5% of the population in industrialised countries. Rheumatoid arthritis occurs more frequently in women than men (ratio 3: 1).

PROGNOSIS

The course of rheumatoid arthritis is variable with a range of disease patterns and progression. Over years, structural damage occurs, leading to articular deformities and functional impairment. Patients may also have multisystem disease as a result of the continuing inflammatory process. Rheumatoid arthritis shortens life expectancy.

ARTICULAR DISEASE

Assess joint deformities prior to anaesthesia. Special consideration must be paid regarding positioning. If regional anaesthesia is being undertaken, can the patient move their limbs into the required position for the technique? Manual dexterity is needed to use patient controlled anaesthesia devices post-operatively.

Temporomandibular joint: If the patient is unable to open their mouth, intubation may become a problem. It may be necessary to conduct a nasal fibroscopic intubation or avoid general anaesthesia.

Cricoarytenoid: Fixation of the cricoarytenoid joints may lead to voice changes, hoarseness, or even stridor from glottic stenosis. Minimal oedema may lead to airway obstruction postoperatively.

Spine: Joints of the cervical spine are often affected. This may lead to atlantoaxial subluxation or, less commonly, subluxation at lower levels, with subsequent compression of the spinal cord. The earliest and most common symptom of cervical subluxation is pain radiating up into the occiput. Other symptoms include paraesthesia, sudden deterioration in hand function, sensory loss, abnormal gait, and urinary retention or incontinence.

Atlantoaxial subluxation (AAS): AAS occurs in 25% of severe rheumatoids. Only 25% of affected patients will have any neurological signs or symptoms such as paraesthesia in the hands/feet or neck pain. Assess the range of movement in the neck. Excessive movement may lead to cervical cord compression and should be carefully avoided.

- Anterior AAS: 80% of all AAS. This is where C1 moves forward over C2 from destruction of the transverse ligament. A gap >3mm between the odontoid peg and the arch of the atlas is significant as seen in lateral flexion radiographs. Atlantoaxial extension should be avoided.
- Posterior AAS: C1 backwards on C2 resulting from destruction of the odontoid peg.
- Vertical AAS: Destruction of lateral masses of C1. The odontoid moves upwards through the foramen magnum to compress the cervicomedullary junction.
- Lateral AAS: Arises from involvement of the C1 C2 facet joints. >2mm difference in lateral alignment is significant. Requires a frontal open mouth view to assess.

EXTRA-ARTICULAR MANIFESTATIONS OF RHEUMATOID ARTHRITIS

Rheumatoid nodules: These can affect between 20%-30% of patients. Most common at sites of pressure; the extensor surfaces of the forearms and the posterior surface of the Achilles tendon. Rarely, nodules may arise in visceral organs, such as the lungs, the heart, or the sclera of the eye.

Vasculitis: Disease of small and sometimes larger blood vessels may be caused by deposition of immune complexes in the vessel walls. This can lead to digital infarction, skin ulcers, and mononeuritis because of damage to the vasa nervorum.

Eye: Sjogren's syndrome results in dry gritty eyes with slight redness but normal vision. It is usually a late feature in women with seropositive rheumatoid arthritis. Patients have a variable expression of disease in other exocrine glands: characterised by dry skin, decreased perspiration, dry vaginal membranes, or a non-productive cough. Commonly, there is also a polyclonal lymphoproliferative reaction characterized by lymphadenopathy and splenomegaly. This can mimic and rarely transform into a malignant lymphoma.

Episcleritis is ocular irritation with nodules. Vision is normal. Scleritis causes severe pain and occasionally reduces vision. There is diffuse or nodular redness, and the end stage of the condition is healing, with atrophy producing a bluish-grey sclera.

Felty's syndrome: This is a combination of seropositive rheumatoid arthritis (often with relatively inactive synovitis) with splenomegaly and neutropenia. It is associated with serious infections, vasculitis (leg ulcers, mononeuritis), anaemia, thrombocytopenia and lymphadenopathy.

Neurological complications: These include entrapment of peripheral nerves (carpal tunnel, ulnar, lateral popliteal, tarsal, etc), mononeuritis multiplex, peripheral neuropathy either associated with the disease or caused by drugs, compression of nerve roots and compression of the cervical region of the spinal cord.

Liver: Tests for liver function may give abnormal results in patients with rheumatoid arthritis. Serum concentrations of transaminases and alkaline phosphatase may be moderately elevated when the disease is active.

Pulmonary: There are several pulmonary manifestations of rheumatoid arthritis:

- Pleurisy with or without effusion
- Intrapulmonary nodules
- Rheumatoid pneumoconiosis (Caplan's syndrome)
- Diffuse interstitial fibrosis; anti-rheumatic drug reactions in the lung may be associated
- Bronchiolitis obliterans organising pneumonia (BOOP)
- Bronchiectasis
- Pulmonary hypertension

Cardiovascular: Cardiac involvement occurs in many patients with severe seropositive rheumatoid arthritis. The most common manifestation is pericarditis. This can be associated with pericardial effusion and the development of acute or chronic pericarditis with tamponade, although most cases are asymptomatic. The restrictive pericarditis of rheumatoid arthritis responds poorly to medical therapy and generally requires pericardectomy.

Rheumatoid nodules may affect the pericardium, myocardium, and endocardium. Disease affecting the heart valves can lead to valvular regurgitation. The mitral valve is most commonly affected, but all can be involved. Myocardial nodulosis and myocarditis have been associated with conduction defects and congestive heart failure. Rarely, rheumatoid vasculitis affecting the coronary arteries leads to angina or myocardial infarction.

Detecting limitations in exercise tolerance is difficult due to problems in mobility. Check for signs of raised venous pressure.

Skin: Palmar erythema, cutaneous vasculitis and pyoderma gangrenosum are all associated.

Renal: Renal disease is rare but may occur as a result of secondary renal amyloidosis due to long standing chronic inflammation. It is often related to treatment with nonsteroidal anti-inflammatory drugs (NSAIDs), anti-rheumatoid drugs or vasculitis. Renal manifestations include glomerulonephritis, uraemia, interstitial nephritis, and papillary necrosis.

Haematological: The majority of patients with rheumatoid arthritis have a normochromic-normocytic anaemia of chronic disease. Thrombocytosis may be apparent as a result of acute and chronic inflammation. Some patients may also be deficient in iron, folic acid, or vitamin B12 causing a mixed picture on haematological analysis. Active rheumatoid disease is generally associated with an elevated erythrocyte sedimentation rate and CRP. The risk of lymphoma in patients with rheumatoid arthritis is independent of immunosuppressive therapy and is two to three times that of the general population.

Drug therapy

Patients are commonly prescribed a variety of drugs in order to control their pain, limit disease progression and suppress active inflammation. These include

- Disease Modifying Antirheumatoid Drugs (DMARDs) e.g. methotrexate, azothiaprine, gold.
- Steroids
- NSAIDS
- Analgesics

There is potential for DMARDs to increase the risk of infection and prolong wound healing. This has to be balanced against the likelihood of flare-ups around the time of surgery.

Steroids: A full description of pharmacological and physiological actions is beyond the scope

of this article. However, important side effects of chronic steroid use relevant to patients undergoing anaesthesia include:

- Hypothalamic adrenal corticoid suppression requiring replacement therapy
- Immunosupression
- Diabetes
- Obesity
- Poor wound healing
- Osteoporosis
- Nerve entrapment syndromes

NSAIDS: Aspirin has irreversible effects on platelet function and should be stopped 10 days prior to major surgery. Other NSAIDs should be continued to enable early mobilisation, but should be stopped if there is excessive bleeding, shock or deterioration of renal function.

INVESTIGATIONS AND PREOPERATIVE ASSESSMENT

All patients with significant disease undergoing surgery should have a FBC, creatinine, electrolytes, LFTs, ECG and chest Xray if symptomatic.

- ECG may indicate conduction disorders/ischaemic heart disease or LV strain or hypertrophy as a result of disease.
- CXR may show evidence of pleural effusion, nodulosis, infection, bronchiectasis or fibrotic lung disease.
- Cervical spine Xrays are controversial. Any patients with neurological symptoms from the cervical spine should have a careful Xray and assessment. Most patients however are best managed by carefully noting the degree of comfortable preoperative cervical spine movement and ensuring that during anaesthesia this is not exceeded. Patients wearing collars should bring them to theatre and have them replaced during surgery, after intubation.
- Cardiac ECHO may reveal regurgitant valves secondary to nodulosis or pericardial fibrosis. This should be done if there is a murmur or if the patient has symptoms of cardiac disease.
- Pulmonary function tests should be carried out in patients with dyspnoea or radiological evidence of pathology. Investigation may reveal a restrictive pattern of disease in fibrotic disorders, although an obstructive pattern may be present with emphysematous disorders which are commonly potentiated by rheumatoid disease.
- An ENT opinion should be sought and nasendoscopy performed if there is hoarseness or symptoms and signs of respiratory obstruction.

Patients currently taking regular steroids

Recommended guidelines for steroid replacement:		
<10mg prednisolone/day	Assume normal hypothalamic pituitary axis	No additional steroid cover required
>10mg prednisolone/day	Minor surgery e.g. hernia	Routine preoperative steroid or hydrocortisone 25mg IV at induction
	Intermediate surgery e.g. hysterectomy	Routine preoperative steroid plus hydrocortisone 25mg IV at induction. Postoperative hydrocortisone 25mg IV 6 hourly for 24hrs
	Major surgery e.g. cardiac	Routine preoperative steroid plus hydrocortisone 25mg IV at induction. Postoperative hydrocortisone 25mg IV 6hourly for 48-72hrs
High-dose immunosuppresion	Should continue usual immunosuppressive equivalent dose until able to revert to normal oral intake e.g. 60mg predisolone/24 hr= 240mg hydrocortisone/24h	
Patients formerly taking regular steroids < 3 months since stopped steroids - treat as if on steroids > 3months since stopped steroids - no perioperative steroids necessary		

- DVT prophylaxis. RA patients tend to be slower to mobilise and follow a protracted course of recovery secondary to their presurgical disability.

ANAESTHESIA

Many rheumatoid patients have undergone repeated surgery and anaesthesia. They may have specific requests or drugs which they prefer to avoid – listen and take these comments into account.

Each patient requires individual assessment and planning with regard to their airway. Take care of the neck at all times during anaesthesia to ensure that a neutral position is maintained, especially during transfers and on positioning the patient. Unless it is certain that there are no neck problems, manual in-line stabilisation must be carried out during airway manipulation. If there is AAS, awake fibreoptic intubation is preferred by some anaesthetists.

Careful positioning and padding of affected joints is necessary. Patients often have fragile skin; special attention must be given to avoid skin tears or pressure areas developing. Assess any deformities before induction and try to maintain limbs in this position so as not to stress joints overtly. Veins are often extremely fragile and may cross fixed joints.

Regional techniques provide effective postoperative pain relief but may be technically difficult due to problems in positioning patients in order to put in blocks, spinals or epidurals. Patients may not be able to move into the ideal position due to reduced range of movement or pain. If a patient is required to remain awake during anaesthesia under regional blockade, they may become uncomfortable as a result of their joint disease.

A smaller endotracheal tube may be required due to crico-arytenoid disease, ensure a small tube is available.

Hypothermia may increase the risk of wound infection, so should be avoided.

Strict asepsis must be maintained due to immuno-suppression from the disease and drug therapy.

POSTOPERATIVELY

Pain should be controlled adequately to ensure early mobilisation. All regular analgesic medications should be recommenced, and tailored appropriately to the increased requirements postoperatively. Patients may require continuation of their NSAIDs. In the elderly check renal function and watch for gastro-intestinal side effects such as haemorrhage.

Ensure DVT prophylaxis until mobility improves.

Physiotherapy is an essential adjunct. Prolonged periods of immobility can cause stiffening of affected joints; this can lead to a protracted course of recovery. Early mobilisation helps to prevent this, and in doing so reduces risks of DVT and pneumonia.

Fluids should be balanced accordingly. Renal function should be checked regularly for signs of deterioration. Renal dysfunction may be multi-factorial, thus a close monitoring is essential for early detection and appropriate treatment. Drug toxicity is more likely at this time due to the number of adjuvant stressors.

Restart DMARDs. These drugs are commonly omitted only for two days post-operatively as there is little evidence for discontinuing them prior to surgery reduces the incidence of postoperative complications. However if there is a leucopenia (associated with azathiopine), withdrawal may be required 2-3 weeks prior to surgery.

SELF ASSESSMENT ANSWERS

You go to assess a rheumatoid patient pre-operatively. She has a hoarse voice. How might this become significant during anaesthesia?

Fixation of the cricoarytenoid joints may lead to voice changes, hoarseness, or even stridor from glottic stenosis. A small endotracheal tube may be required.

What percentage of patients affected with Atlanto-axial instability have symptoms or clinical signs of the condition?

AAS occurs in 25% of severe rheumatoids. Only 25% of affected patients will have any neurological signs or symptoms such as paraesthesia in the hands/ feet or neck pain. Assess the range of movement in the neck. Excessive movement may lead to cervical cord compression and should be carefully avoided.

Patients often have extra-articular manifestations of disease. Which organ systems can disease affect?

- Cardiovascular
- Pulmonary
- Gastrointestinal - All of them!
- Central nervous system
- Skin
- Renal
- Haematological
- Eyes

Patients with rheumatoid disease affecting the lung may have a restrictive pattern of disease in spirometric studies. Which pathological conditions may cause this?

- Rheumatoid pneumoconiosis (Caplan's syndrome)
- Diffuse interstitial fibrosis, anti-rheumatic drug reactions in the lung may be associated
- Bronchiolitis obliterans organising pneumonia (BOOP)

A seropositive rheumatoid patient has a routine FBC; it reveals neutropenia, anaemia and thrombocytopenia. What clinical signs would you look for in association with this?

This may be Felty's Syndrome. Look for a patient who has seropositive disease, neutropenia and splenomegaly. They may have signs of vasculitic disease, immunosupression and lymphadenopathy.

The above patient does not have any associated clinical signs, what may also be causing this pattern on the FBC?

Many of the DMARDs can cause bone marrow suppression: Methotrexate, Leflulamide, Sulfasalazine and Gold. There are many potentially serious complications as a result of taking long term immunosuppressant and cytotoxic drugs. Patients are closely monitored whilst taking these medications to observe for signs of marrow suppression.