

Ankylosing Spondylitis

A chronic inflammatory disease (seronegative spondyloarthropathy) that affects ligamentous attachments of the spinal column; characterized by low back pain, sacroiliitis, multiplane rigidity of spine, chest stiffness, uveitis with potential for aortic insufficiency / cardiomyopathy and requiring detailed attention to airway and cervical spine

ANESTHETIC CONSIDERATIONS:

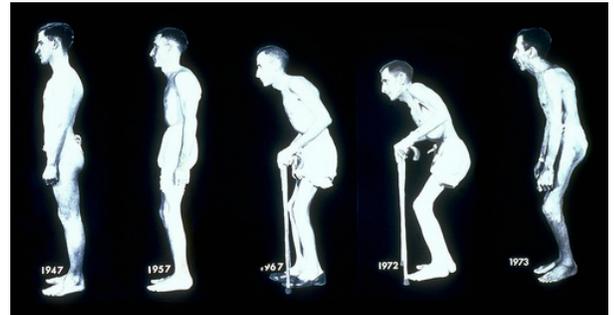
- Potential for difficult airway
- Potential for cervical spine instability (atlanto-axial)
- Axial spine fusion
 - Neuraxial anesthesia may be technically difficult
 - “Bamboo spine” → risk of spine fracture – positioning difficulties
- **Multisystem** disease with extra-articular features:
 - Restrictive lung disease (rigid chest) and pulmonary fibrosis
 - Aortic insufficiency → antibiotic prophylaxis as required
 - Conduction system disease
- Medications: steroids etc.

ANESTHETIC GOALS:

1. Anticipate potential difficult airway and secure the airway safely
 - Aspiration prophylaxis
 - AFOI as needed for C spine disease
2. Optimization of multisystem disease (esp. restrictive lung disease, cardiomyopathy, AI)
3. Optimization of medications including stress-dose steroids as required

HISTORY

- Should focus on three key areas:
 - Airway assessment and potential requirement for awake FOI
 - TMJ arthritis, arytenoid deviation (limited mouth opening, jaw pain, voice abnormality)
 - Assessment of axial skeleton mobility (back pain, sacroiliitis, joint ankylosis, kyphosis [“chin on chest”], “bamboo spine,” spondylodiskitis)
 - Positioning during procedure
 - Potential for neuraxial technique
 - Identification and quantification of co-morbidities
 - Restrictive lung disease
 - Functional capacity, resting O₂ saturations
 - Clinical evidence of pulmonary HTN
 - Aortic insufficiency, cardiomyopathy (SOB, chest pain, palpitation, exercise tolerance)
 - Conduction system disease (palpitations)
 - IBS (abdominal pain)
 - Chronic prostatitis (pain with urination)
 - Radiculopathy (radiating pain in extremities)
- Detailed medication history and search for attributable co-morbidities



PHYSICAL

- **HEENT**
 - Uveitis (fundoscopic exam)
 - Airway exam, indirect laryngoscopy
- **CVS**
 - Cardiomyopathy, conduction defects (distant HS, rales, arrhythmia)
- **RESP**
 - Pleuritic inflammation, rigid chest (decreased BS, chest excursion)
- **CNS**
 - Atlanto-axial subluxation, occult spine fracture (basic neurological exam)
- **MSK**
 - ROM of extremities
 - Spine, skeletal exam

INVESTIGATIONS

- **Labs**
 - CBC → cytopenias related to treatment
 - Lytes, BUN, Cr if risk of NSAID nephropathy, immunosuppressives
- **Imaging**
 - EKG for evidence of conduction system disease and signs of pHTN
 - The remainder should be guided based on underlying function and proposed procedure
 - CXR → CAS guidelines suggest in presence of pulmonary disease
 - PFTs & ABG → role in restrictive lung disease not defined
 - ECHO if significant pulmonary disease (pHTN and RV failure) or if concern of aortic regurgitation

OPTIMIZATION

- If significant restrictive lung disease:
 - Limit duration of surgery to < 3 hours

- Use laparoscopy when possible
- Adjuvant spinal or epidural anesthesia
- If awake FOI → anticholinergic agent, aspiration prophylaxis
- Preoperative acetaminophen, NSAIDs

ANESTHETIC OPTIONS

- Local, regional & GA acceptable
- Neuraxial anesthesia
 - May be technically difficult although majority should be successful
 - Dr. Vaghadia's review of 16 neuraxial cases:
 - Spinal successful in 10 of 13
 - Epidural not successful in 3 attempts
 - Increased risk of epidural hematoma
 - Review of case reports showed that ankylosing spondylitis present in 5 of 51 epidural hematomas
 - Reason unclear but may be related to technical difficulties, NSAIDs, but also suggestion of increased risk of spontaneous epidural hematomas in this population

ANESTHETIC SETUP

- **Drugs**
 - Standard emergency drugs
- **Equipment**
 - CAS monitors + 5-lead EKG (with ST-segment analysis)
 - Consider invasive monitoring if procedure warrants it or presence of significant aortic regurgitation or restrictive lung disease
 - PAC if severe myocardial dysfunction
 - Transcutaneous pacemaker available if conduction system disease
 - May require neurophysiologic monitoring for spinal deformity surgery

MANAGEMENT OF ANESTHESIA

- **Induction**
 - Airway management
 - Generally, consideration for awake FOI:
 - Technically difficult intubation due to deformity and lack of mobility (risk inability to intubate conventionally)
 - Avoid manipulation of spine (cervical spine instability & risk of fracture)
 - Rapid desaturation due to restrictive lung disease
 - Case series of 11 patients with intubating LMA with successful placement of I-LMA in 11/11 and successful intubation in 10/11 patients
 - Ensure careful positioning and padding as risk of iatrogenic spine fractures (check with patient preoperatively)
 - Considerations of aortic regurgitation
 - May require higher ventilating pressures due to reduced compliance (may not tolerate spontaneous ventilation)
- **Maintenance**
 - With positive pressure ventilation, decrease Vt and increase rate
 - High ventilating pressure may predict large blood loss
- **Emergence**
 - Ensure adequate ventilation and pain control prior to extubation, awake & warm also

DISPOSITION & MONITORING

- Observe in high-dependency unit if any concerns:
 - Poor preoperative respiratory function
 - Upper abdominal or thoracic surgery
 - Prolonged surgery

COMPLICATIONS

- Airway control
 - The extreme distortion of the spine, especially the neck, may make intubating the trachea & ventilating the patient very difficult
 - Any airway compromise or depression of ventilation can result in catastrophe
 - Depression of ventilation with opiate analgesics can be dangerous
- Pulmonary function
 - Owing to abnormal mechanics of the thorax & neck, the ability to ensure normal oxygenation during surgery and in the postoperative period can be a potential problem
- Regional anesthesia
 - Placement of spinal, epidural, or caudal block could be technically very difficult
 - Action of local anesthetics in the central axis could be unpredictable
 - Strongly consider paramedical approach to central block

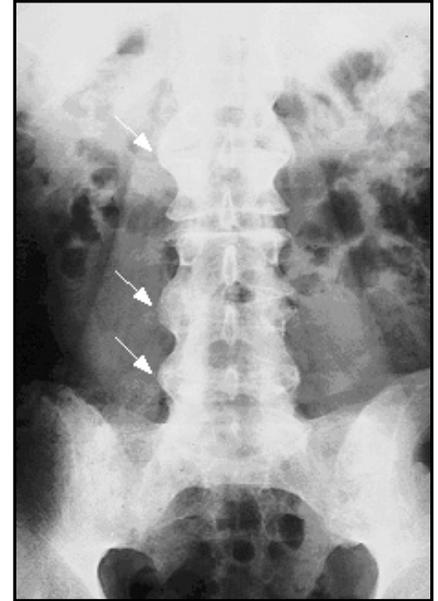
PATHOPHYSIOLOGY

- Inflammatory seronegative spondyloarthritis of the axial skeleton
- Primarily affects males (3:1)
- Strong family incidence with ~90% having HLA-B27 genotype
- Entesopathy (inflammation at site of attachment of ligaments and tendons to periosteum) and arthropathy (i.e. synovial involvement)
- **Clinical manifestations**
 - Axial skeleton involvement
 - Begins at SI joints and spreads cranially (although may have isolated sacroiliitis)
 - Progressive inflammation of axial spine until ankylosed (i.e. fused – the bamboo spine, see figure)

- Can fracture easily with mild trauma
- Atlanto-axial subluxation in up to 21%
- Extra-articular involvement
 - Conjunctivitis and uveitis
 - Cardiovascular disease (29%)
 - Valvular abnormalities → most common is AI
 - Conduction abnormalities
 - Pericardial effusion
 - Pulmonary disease
 - Restrictive lung disease due to costovertebral rigidity
 - Majority have only mild ↓ TLC / VC due to compensation by ↑ abdominal excursion
 - Gas exchange generally normal
 - Apical pulmonary fibro-bullous disease 1.5 – 15%
 - Mostly asymptomatic but can be progressive
 - Renal disease → NSAID nephropathy, associated with IgA nephropathy and secondary amyloidosis

- **Treatment**

- Acetaminophen
- NSAIDs
- Anti-TNF alpha antagonists (Etanercept, infliximab, adalimumab)
 - Risk of infections and reactivation of TB
 - Pancytopenia and aplastic anemia
 - Heart failure
- Sulfasalazine → leukopenia, neutropenia
- Methotrexate → pancytopenia, immunosuppression, renal toxicity



REFERENCES

- Wulf H. Epidural anaesthesia and spinal haematoma. *CJA* 1997;44:1319
- Schelew BL and Vaghadia H. Ankylosing spondylitis and neuraxial anaesthesia – a 10 year review. *CJA* 1996;43:65.
- Robins K. Ankylosing spondylitis and epidural haematoma. *Anaesthesia* 2005;60:617
- Hyderally H. Epidural hematoma unrelated to combined spinal-epidural anesthesia in a patient with ankylosing spondylitis receiving aspirin after total hip replacement. *Anesth Analg* 2005;100:882.
- Lu P et al. The intubating laryngeal mask airway in severe ankylosing spondylitis. *CJA* 2001;48:1015.
- Stoelting, R., & Dierdorf, S. (2002). *Anesthesia and Co-Existing Disease*, 4th Edition. Philadelphia: Churchill Livingstone.
- UptoDate Ankylosing Spondylitis