Pre-Operative Services Teaching Rounds 1
Jan 2011

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• **Rheumatoid Arthritis**
  ○ Patho-physiology
  ○ history
  ○ physical
  ○ labs
  ○ medications

• **Shoulder surgery**
  ○ anesthesia
  ○ positioning
Case: 55 yr old female for left shoulder arthroscopy/biopsy

- **PMH:**
  - RA since 1989
  - Hypothyroidism
  - DM type 2 for 7 years

- **PSH:**
  - L shoulder arthroplasty
  - R shoulder arthroscopy
  - Wrist and knee procedures
Case (cont)

- NKDA
- 4 METS –limited by joints
- Normal exam except for joint deformities of the hands and surgical scars.

- Meds: Sulphasalazine, synthroid, insulin and metformin.
Labs

Labs?

- CBC
  - Hb 11.5
  - Hct 34.5
  - MCV 96.9
  - MCH 32.2
  - Plt 225
  - WCC 5.4

- Chem
  - Na 142
  - K 4.2
  - Gluc 142
  - BUN 9
  - Cr 0.53

- ECG
- βHcg
- Xray
- ECHO
RA – pathophysiology

Rheumatoid arthritis is a systemic inflammatory disease
Auto-immune
Causes destruction of synovial joints.

1%
Women 3:1
Pain and disability
Clinical presentation

  - Osteopenia
  - Symmetric
  - Early morning stiffness

- Constitutional
  - fever
  - Wt loss
  - malaise
Clinical presentation (cont)

- Musculo-cutaneous
  - Subcutaneous Nodules
  - Vasculitis
  - Myopathy
    - Myositis
    - Vasculitis
    - drugs
Other systems

- **Pulmonary**
  - Restrictive – thoracic joints
  - Pul HTN
  - Infections
  - Pleural effusions (serositis)
  - Fibrosis
  - Nodules
  - Drugs

- **Cardiovascular** – higher morbidity than general population
  - Atherosclerosis
  - PVD
  - Stroke
  - Pericardial effusion
  - Fibrosis
    - conduction
    - LV stiffness
  - Vasculitis
  - Valvulopathy (AI)
  - Amyloid
Other systems

- Renal
  - Vasculitis
  - Drugs
  - Amyloid

- Hematological
  - Anemia
  - Neutropenia
  - High platelets
  - Many others

- Liver

- Ocular
  - Dry eyes

- Neurological
  - Peripheral neuropathy
    - vasculitis
  - Nerve entrapment
    - E.g. carpal tunnel
  - Cord injury

- Lymphoma
Treatment options

- Exercise
- Nutrition – Calcium, Vit D, Fish Oil
- Risk reduction – weight/lipid/smoking
- Vaccination
- Physical / Occupational therapy
- Analgesia
- Anti-inflammatory
  - Local
  - Systemic
- Disease modifying
- Surgery
Medications

- NSAIDs
- Glucocorticoid
- Gold (kidney/liver/skin side effects)
- Penicillamine
- Azathioprine (imuran)—inhibits mitosis and coenzyme formation
- DMARDs – biologic and non biologic
  - Alone or in combination with other DMARD or glucocorticoid.
DMARDs
(disease modifying antirheumatic drugs)

1) Antimalarial
2) Sulphasalazine
3) TNF inhibitors: (infection risk/pregnancy)
   ○ Adalimumab (Humira) – IgG monoclonal antibody
   ○ Etanercept (Enbrel)
   ○ Infliximab (Remicade) - monoclonal antibody
4) Methotrexate – purine metabolism
   (c/I liver disease and pregnancy)
5) Leflunomide (Arava) – pyrimidine synth pathway
## Perioperative management of rheumatologic agents

<table>
<thead>
<tr>
<th>Name or class of drug</th>
<th>Clinical considerations</th>
<th>Recommended strategy for surgery with brief NPO state</th>
<th>Recommended strategy for surgery with prolonged NPO state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonsteroidal antiinflammatory drugs</td>
<td>Continuation may cause perioperative hemorrhage.</td>
<td>Hold for 3 days prior to surgery.</td>
<td>Resume with oral intake.</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>Potential risk of bone marrow suppression</td>
<td>Continue therapy up to and including day of surgery. In patients with renal insufficiency, hold two weeks prior to surgery.</td>
<td>Continue therapy up to and including day of surgery. Resume with oral intake.</td>
</tr>
<tr>
<td>Sulfasalazine and azathioprine</td>
<td>Potential risk of bone marrow suppression</td>
<td>Hold for one week prior to surgery.</td>
<td>Hold for one week prior to surgery and resume with oral intake.</td>
</tr>
<tr>
<td>Leflunomide</td>
<td>Potential risk of bone marrow suppression</td>
<td>Hold for two weeks prior to surgery</td>
<td>Hold for two weeks prior to surgery and resume with oral intake.</td>
</tr>
<tr>
<td>Hydroxychloroquine</td>
<td>Low risk of side effects</td>
<td>Continue therapy up to and including day of surgery.</td>
<td>Continue therapy up to and including day of surgery. Resume with oral intake.</td>
</tr>
<tr>
<td>Biologic response modifiers (etanercept, infliximab, anakinra, rituximab, adalimumab)</td>
<td>Risk of infection</td>
<td>Hold for one to two weeks prior to surgery and resume one to two weeks after surgery.</td>
<td>Hold for one to two weeks prior to surgery and resume one to two weeks after surgery or with oral intake.</td>
</tr>
</tbody>
</table>
Specific to anesthesia

- **Airway:**
  - C-spine
  - TMJ (mallimpati/locking/clicking)
  - Arytenoids (hoarseness/swallowing/difficult ETT)

- **C-spine involvement:**
  - Hx - symptoms of myelopathy: bowel/bladder, progressive weakness, incoordination, gait changes, unsteadiness.
  - Cranial nerve and upper root problems: dysphagia, dysphonia, trouble swallowing, pain in occiput
C-spine

- Incidence 15-85%
- More than 50% without clinical features
- RA has synovial joint destruction
  - Also vertebrae, ligaments and discs
- Joints are destroyed, the connection between vertebrae becomes unstable.

2 categories
a) most common: atlantoaxial instability
b) subaxial
1) Spondylolisthesis can occur - upper vertebra is able to slide forward on top of the one below.
2) ‘Settling’ skull onto C1 – odontoid pressure onto cord/vertebral arteries
3) Pannus (granulation tissue in the joint)
4) Ankylosis
? C-spine X-Ray

**RA:**
- Duration
- Severity of disease
  - Chronic medications
  - Joint involvement
- Age of onset

**Surgical features:**
- Neck position for:
  - Intubation
  - Procedure
A statistically significant correlation was noticed between patients' functional status (Steinbroker's classification) and disease phase (ARA) with the radiographic changes on patients' cervical spines. The presence of radiographic changes on cervical spines of patients with rheumatoid arthritis did not show a statistically significant correlation with nervous pressure-related pain or signs.

Cesar P. Souza¹; Helton L.A. Defino²
Acta ortop. bras. vol.13 no.1 São Paulo 2005
Shoulder surgery considerations

- Comorbidities
- Ambulatory – biggest at SBUH
- 3 hour surgery - OSA
- Sitting – Blood pressure – Ace inhibitors
- Fluids – cardiac failure
- Shoulder sling – weight/immobility
For the patient

- **GA** usually with intubation and/or
- **Blocks**
  - Infection
  - Hematoma
  - Nerve damage
- **Specific to interscalene**:  
  - Pneumothorax
  - Horner’s syndrome
  - Phrenic nerve
  - Recurrent laryngeal – (hoarseness)
Brachial Plexus

Schema

To longus colli and scalene muscles (C5, 6)
Dorsal scapular nerve (C5)
To phrenic nerve
To subclavus muscle (C5, 6)

Middle trunk

Superior trunk

Suprascapular nerve (C5, 6)

Anterior divisions

Lateral pectoral nerve (C5, 6, 7)

Lateral cord

Musculocutaneous nerve (C5, 6, 7)

Posterior cord

Axillary nerve (C5, 6)
Radial nerve (C5, 6, 7, 8, T1)
Median nerve (C5, 6, 7, 8)
Ulnar nerve (C7)
Lower subscapular nerve (C5, 6)
Thoracodorsal (middle subscapular) nerve (C6, 7)

Medial cord

Upper subscapular nerve (C5, 6)

Contribution from C4
Dorsal ramus

Contribution from C4
C5 ventral ramus
C6 ventral ramus
C7 ventral ramus
C8 ventral ramus
T1 ventral ramus
1st intercostal nerve
1st rib
Long thoracic nerve (C5, 6, 7)

Contribution from T2
Inferior trunk

Surface anatomy of the brachial plexus emphasizing the approaches for brachial plexus block

- Cervical approach
- Supraclavicular approach

Key anatomical structures:
- Cricoid
- Sternocleidomastoid
- Clavicle
- First rib
- Humerus
- Axillary sheath
- Axillary approach

Arm
Block technique

- Monitoring
- Sedation
- Positioning
- Landmarks
- Nerve stimulator
- Ultrasound

(Protect the anesthetized arm)
Beach chair position
Lateral position
Fiber-optic intubation
Arytenoid cartilage
Summary

- Not enough to write RA on chart
  - Duration
  - Extent of disease
  - Organ involvement
  - Medications
  - Airway

- Shoulder surgery
  - Ga +/- Block
  - Positioning