Surgical Patients with Rheumatic Diseases

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Disclosure: **I DO NOT** have a financial interest in any commercial products or service.

Overview

- Preoperative evaluation of patients with specific rheumatic diseases
- Perioperative management of rheumatic disease medications
- Fat emboli syndrome


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- Large musculoskeletal hospital
- Close working relationship between surgery, rheumatology and perioperative medicine

Rheumatic Disease Patient

- M.R. is a 62yo WF who has long-standing rheumatoid arthritis and is desirous of a TKR. She has hypertension, hyperlipidemia and a BMI of 26. She can walk 1 block with a cane. She is maintained on etanercept, prednisone 5mg daily, an ACE inhibitor and a statin. You are asked to see her for perioperative consultation.

Combined Arthritis Program (CAP)

- Founded in 1968 by Dr. Lee Ramsay Straub and Dr. Richard H. Freyberg
- One clinic that could provide surgical care for patients with rheumatic diseases
- Referral from Rheumatology clinic to CAP clinic
- Patients are presented by the orthopedic house staff to a multidisciplinary team where both medical and surgical issues are discussed.
- Patients are followed by both rheumatology and orthopedics preoperatively and postoperatively

Overview

- Patients with rheumatic diseases often have multiple co-morbidities that can effect the surgical outcome
- Patients also are often on anticoagulants and on medications that can cause immunosuppression
- Whenever necessary medicine should coordinate a perioperative plan with anesthesia and surgery---- **preoperatively**

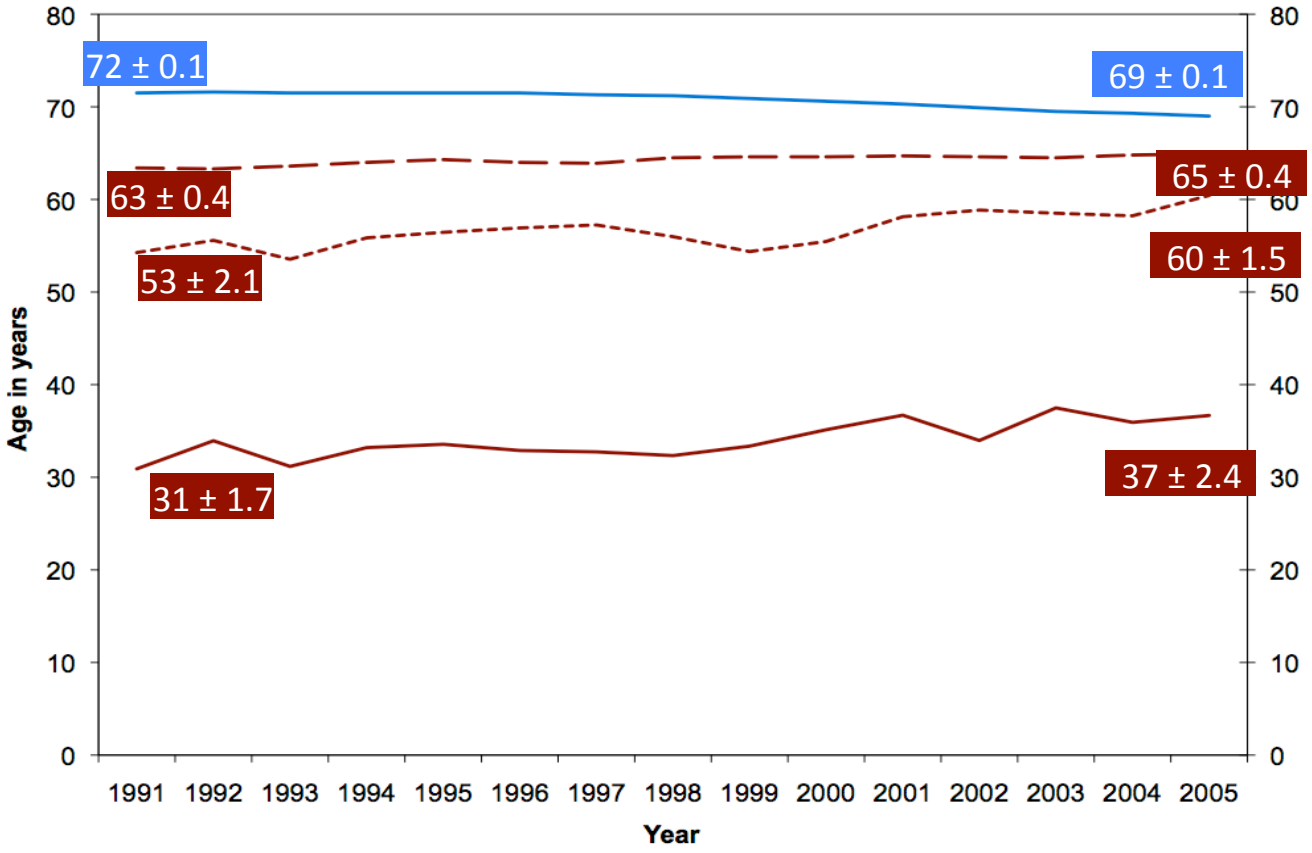
Co-Management

- The Orthopedic community, as a sub specialty has embraced perioperative co-management of the patient undergoing surgery more than other surgical sub-specialties (Pinzur Orthopedics 2009)
- Requires a respect and trust as well as an appreciation of the medical and surgical concerns for patient care of each treating physician.

Preoperative Assessment Rheumatoid Arthritis

- Although less RA patients seem to require surgery due to better treatments, studies suggest up to 50% of RA patients will have an orthopedic procedure of any type over the course of their illness (Massardo J Rheum 2002, Kapetanovic Ann Rheum Dis 2008)
- RA patients are higher risk of THR and TKR infection (4.2%) compared to OA patients (1.4%, over a 5-year period (Bongartz Arthritis Rheum 2008).

Age at TJA Increasing for Inflammatory Arthritis



OA ↓3yrs

RA ↑2yrs

SpA↑7yrs

JIA ↑6yrs

Surgery in Rheumatoid Arthritis

- Increased medical complexity
  - Co-morbidities
  - Medications
- Increased surgical complexity
  - Multiple involved joints
  - Complex deformities
  - Poor bone and soft tissue quality

Outcomes: Risk Factors

Modifiable

- Pre-op expectations
- Adverse events – infection
- Disease activity – flare

Not Modifiable

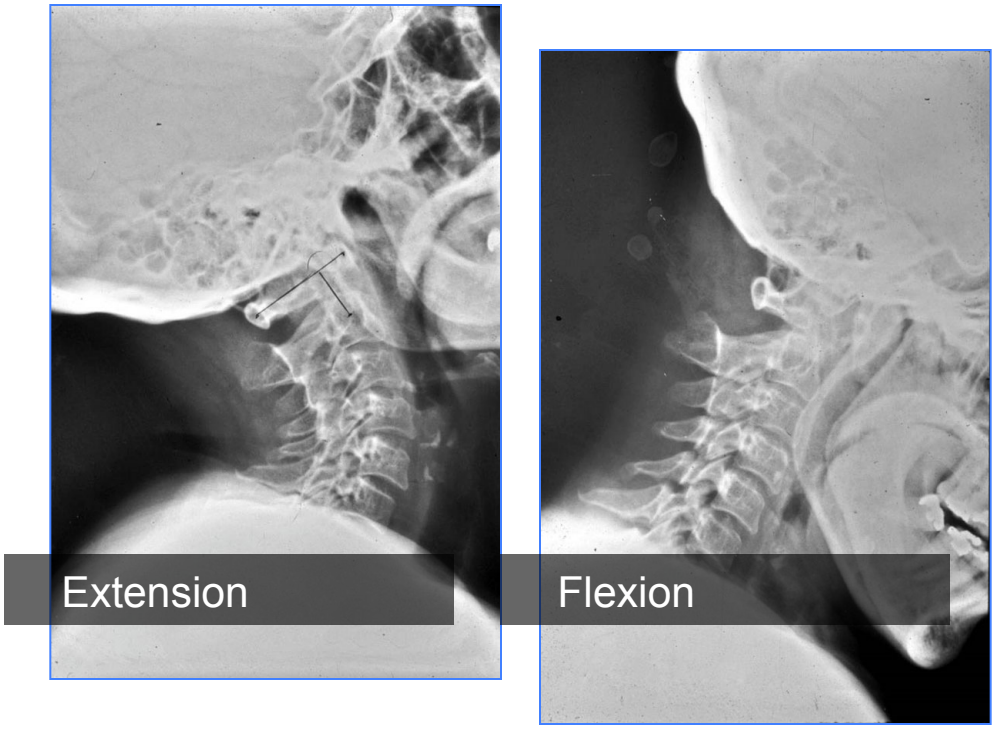
- Pre-operative functional status
- Other affected joints
  - Cervical spine involvement
- Comorbidity burden
  - Cardiovascular risk

Preoperative Assessment Rheumatoid Arthritis

- RA patients with erosive disease are at risk for involvement of the cervical spine; 44% of RA patients referred for arthroplasty have asymptomatic cervical spine instability (Neva Ann Rheum Dis 2006).
- Recommend screening all patients being contemplated for surgery for cervical spine disease and placing all patients with cervical instability, in a neck brace, in the operating room to protect the spine during surgery.

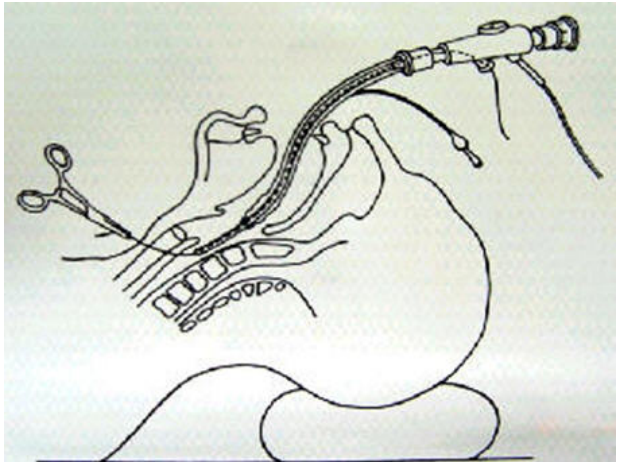
Screening: Flexion-Extension Views

- Neck pain not predictive
  - Subluxation-69% had neck pain
    65% had neck pain



Preoperative Assessment Anesthesia

- Cervical spine Preop X-rays AP/lateral/flexion/ extension (RA, SpA)
- Consideration for fiber optic intubation in RA pts with unstable spine (and SpA patients)



Preoperative Assessment Rheumatoid Arthritis

- Patients with severe disease may have cricoarytenoid involvement-- often present with hoarseness; consideration for anesthesia

Preoperative Assessment Psoriatic Arthritis (PsA)

- As in RA, treatment advances have improved outcomes (Ritchlin Ann Rheum Dis 2009)
- Fewer patients require orthopedic intervention, compared to RA patients (Michet Ann Rheum Dis 2005)
- There is a concern for surgical site infection, if psoriatic plaques are involved over the surgical site and increased risk of prosthetic infection if plaques become colonized.
- The rate of prosthetic joint infection may be as high 9-17% in PsA (Stern Clin Orthop Relat Res 1989).
- The perioperative goal is to try and control psoriasis as much as possible.
- Consideration for antibiotic laden cement may be appropriate for patients at high risk for prosthetic infection.

Preoperative Assessment of Spondyloarthritis

- Decreased cervical motion can necessitate fiber optic intubation
- Consideration for regional anesthesia, whenever possible
- Remember patients are at risk for aortic stenosis
- Poor chest wall expansion can contribute to pulmonary complications; Postoperative pulmonary toilet is critical.
- Aim to prevent postoperative ileus and constipation , which may interfere with diaphragm function, further compromising pulmonary function.

Preoperative Assessment of Spondyloarthritis

- Patients are at increased risk for heterotopic ossification after THA. Most common in young men, revision surgery and a trans-trochanteric approach (THA).
- Consider treating at-risk patients with indomethacin for 2-4 weeks and/or a single dose of postoperative radiation.

Preoperative Assessment Systemic Lupus (SLE)

- In 29 patients with SLE undergoing surgery for a total of 36 procedures, 19 patients had active disease at the time. 37 complications occurred (mostly infectious). Patients with infections had higher doses or oral prednisone, higher number of organ systems involved and more frequent renal involvement (Papa Am J Sur 1989)
- Another study assessing risk factors in patients with SLE undergoing surgery, lymphopenia and hypoalbuminemia were associated with complications (Takahashi Am Surg 1995)

Preoperative Assessment Systemic Lupus

- There are no guidelines for the perioperative management of patients with SLE
  - Assessment of Disease Activity
  - Assessment of Organ Involvement
  - Assess Degree of renal insufficiency and active renal disease
  - Assessment of Risk of Thrombosis

Preoperative Assessment Systemic Lupus

- It is generally agreed that SLE patients with inactive disease do better perioperatively
- Screen patients with SLE through history, physical examination, and laboratory evaluation.
- Use of perioperative corticosteroids to prevent disease activation is not recommended.

Antiphospholipid Syndrome

- Arterial and Venous Thromboembolism
- Thrombocytopenia
- Miscarriages
- Often INR goal 3.0-3.5

- Usually err on bleeding, not clotting periop

Perioperative Management Raynaud's Phenomenon

- Keep patient as warm as possible
- Try to avoid cold IV fluids whenever possible
- Consider avoiding BBlockers, whenever possible
- Avoid A-lines, whenever possible

Preoperative Assessment
Myositis

- Special considerations
  - Interstitial lung disease
  - Respiratory muscle weakness
  - Esophageal dysmotility and aspiration pneumonia
  - Cardiomyopathy
  - Generalized weakness

Preoperative Assessment
Myositis

- May require joint replacement for AVN or in overlap syndromes inflammatory arthritis
- Periarticular musculature may be quite weak i.e. quadriceps in THA or TKA
  - May increase the risk of hip dislocation
  - Will make postoperative rehabilitation challenging at times

Preoperative Assessment Cardiovascular Disease

- Increased risk of CV disease in inflammatory disorders, best studied in RA and SLE
- Increased risk probably comparable to patients with diabetes
- To use ACC/AHA recommendations for preoperative testing, an inflammatory condition should be considered a clinical risk factor

Preoperative Assessment Pulmonary Disease

- Patients with inflammatory connective tissues disorders are at risk for many types of lung disease and a low threshold for evaluation of underlying lung disease is prudent preoperatively
- Pulmonary hypertension can be particularly problematic in joint arthroplasty as during manipulation of bone and soft tissues, debris can enter the circulation causing pulmonary distress and at worst ARDS and death.

Preoperative Assessment Anesthesia

- All patients scheduled for B TKR see anesthesia preop
- Consideration for anesthesia consult for small mouth aperture (scleroderma)
- Cervical spine instability
- Severe aortic stenosis

Regional vs. General Anesthesia

- **Regional Anesthesia**
  - Less VTE after total joint arthroplasty
  - Less blood loss after lower extremity joint arthroplasty
  - Less postop confusion
  - Possibly less infectious complications after lower extremity joint arthroplasty
  - Concern about interfering with diagnosis of peripheral nerve injury or compartment syndrome

Perioperative Assessment- Medications

- Generally weigh risk on infection verses disease flare
- Call for Public Comment- American College of Rheumatology and the Association of Hip and Knee Surgeons: Clinical Practice Guideline for perioperative management of rheumatic disease medications in total joint arthroplasty of the hip and knee

Perioperative Assessment of Medications-Methotrexate (MTX)

- Well studied in the perioperative period
- Prospective study—incidence of surgical site infections was highest (15%) in the group that discontinued MTX, compared with 2% in the group continuing MTX. Flares were also high in the group discontinuing MTX (Grenan Ann Rheum Dis 2001)
- Has been confirmed in multiple studies
- Continuing MTX during the periop period seems safe

Perioperative Assessment of Medications-Leflunomide

- Long half-life
- Studies with opposing results
  - No increased risk of infection (Fuerst Rheum 2006)
  - Increased risk of infection (Tanaka J Clin Rheum 2003, Jenks J Rheum 2007)
  - Consider a prolonged (2- week) period off leflunomide in patients with an increased risk of infection such as diabetes or corticosteroid use

Perioperative Assessment of Medications-TNF Inhibitors (TNFi)

- TNFi have transformed the treatment and outcomes in many inflammatory conditions
- There is real concern of an increased risk of infection with the use TNFi although the –science seems to lag behind.
- Guidelines by various National Societies vary
- Given the uncertainty, it seems reasonable to hold TNFi based on half-life preoperatively and to restart 10-14 days postoperatively when the wound is assessed and is felt to be healing without infection
- Implant fixation with antibiotic-laden cement, for high-risk patients, should be considered.

Anti-TNFα Therapy Increases Risk of Skin Infection

- Persistent colonization with *S. aureus* more common in TNFi treated patient

Perioperative Assessment of Medications-Rituximab

- Monoclonal antibody that targets the CD20 B-cell antigen.
- Compared with TNFi, rituximab is associated with a lower risk for bacterial infections.
- Rituximab has been shown to be safe in patients with prior recurrent bacterial infections (Toussirot Joint Bone Spine 2010).
- Preoperative screening of immunoglobulin levels in patients at high risk of surgical site infection might be considered, but no studies address this.
- Implant fixation with antibiotic-laden cement, for high-risk patients, should be considered.

Perioperative Assessment of Medications-Abatacept

- Human fusion protein of CTLA-4 and immunoglobulin and down regulates T-cell activation
- The risk of infection in patients is not significantly increased over baseline nonbiologic-treated RA (Simon Arthritis Res Ther 2010)
- Dosed as a monthly infusion or a weekly subcutaneous injection, and conservative timing of surgery should be at the end of the dose cycle

Perioperative Assessment of Medications-Tocilizumab

- Humanized monoclonal antibody that targets the IL-6 receptor.
- Retrospective study that compared 161 orthopedic surgical patients who had received tocilizumab with those taking DMARDS found no increase in infection, but wound healing seemed delayed in 20 patients. The usual elevation in CRP and temperature associated with surgery was not seen (Mornohara Mod Rheum 2012).
- Postoperative patients may also be receiving analgesics, further decreasing the clinical insight into a postoperative infection.
- Discontinuing Tocilizumab based on drug half-life of 11 to 13 days preop seems appropriate.

Perioperative Assessment of Medications -Tofacitinib

- Janus activated kinase 3 (JAK3) inhibitor which has an essential role in cytokine signal transduction and regulates lymphocyte differentiation and survival
- Adverse event include anemia, neutropenia, and upper respiratory infections (Kremer Arthrit Rheum 2009).
- Insufficient information is currently available to make recommendations for perioperative management.

Perioperative Assessment of Medications -Anakinra

- IL-1 receptor antagonist that is approved in RA.
- There are no current data regarding anakinra and perioperative complications
- Holding the drug 1-2 days before significant surgery and restarting 10-14 days postoperatively seems reasonable.

Perioperative Assessment of Medications- Nonsteroidal anti-inflammatory medications

- Increase risk of bleeding
- Theoretic concern of slowing bony in-growth into prosthesis, but has not been seen clinically (Hofmann Clin Orthop Relat Res 2006)
- Conservatively, discontinue NSAIDs using a formula based on doubling the drug half-life provides adequate safety
- Do not discontinue ASA 81mg daily

Perioperative Assessment Medications-Corticosteroids

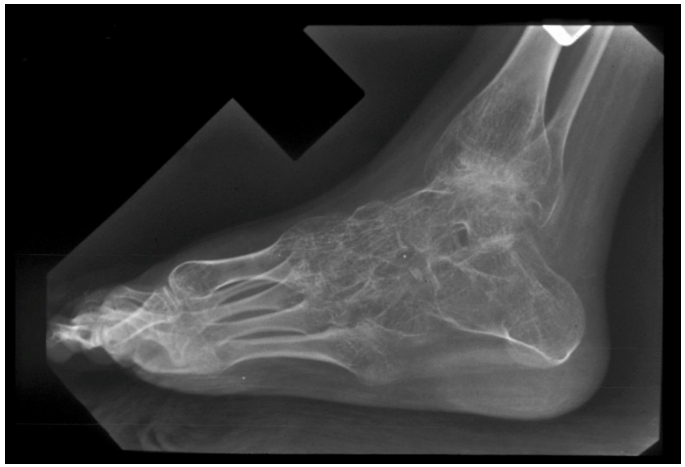
- Infection remains strongly associated with corticosteroid use, even at low doses (Grijalva JAMA 2011)
- Study has demonstrated that preop Corticotropin testing did not predict who would need "stress dose steroids" (Glowniak Surg 1997)
- Studies have confirmed the safety of administering patients' daily dose of steroid dose in the setting of orthopedic surgery (Friedman RJ JBJS 1995)
- Patients with signs of adrenal insufficiency intraop or postop can be treated with hydrocortisone.

Perioperative Assessment Medications-Corticosteroids

- Perioperative surgical site infections and wound healing may benefit from a more restricted approach to perioperative corticosteroid administration.

Surgical Staging

- In patients with an inflammatory arthropathy, it is very important to evaluate the whole patient and in particular, the whole musculoskeletal system



Surgical Staging

- Combine operations whenever possible
- Nondominant side first
- Correct most painful joint first (examine last)
- Lower extremities before upper extremities
- THR before TKR
- Feet: pain-free plantigrade feet, then forefoot then hindfoot
- Wrist then hand, then elbow, then shoulder

Surgical Staging

- Plan rehab before surgery

Surgical Staging

- Preoperatively
  - Dental Care
  - Close Assessment of skin for breakdown
  - Examine other prosthetic joints for subtle signs of infection

Preoperative Assessment
Who is a candidate for Bilateral Total Knee Replacements?

- HSS hosted
  - Consensus Conference on Perioperative Guidelines for Bilateral Total Knee Arthroplasty (B TKA)

    (Memsoudis, Russell, Sculco)
  - The Carlyle Hotel, NY, NY
  - September 8-9, 2012

Consensus Conference BTKA Symposium

- 6 White papers were written
- Sent out to faculty for comment
- Discussed at Conference
- Summary paper written and published in CORR

Consensus Conference BTKA Symposium

- Comparative risk of simultaneous BTKA compared to UTKA or staged BTKA
- Who is a candidate and what are medical contraindications
- What is an appropriate workup
- Optimal hiatus between staged BTKA when simultaneous not deemed appropriate
- Orthopedic/Rehab indications for BTKA
- Economic implications of simultaneous BTKA vs. staged UTKA

Exclusion Criteria for B TKA

- Patients > 75 years
- All ASA III patients
- Active ischemic heart disease
- LVEF < 50%
- Pulm Disease: moderate to severe pulm HTN, O2 dependent pulm disease, steroid dependent asthma, exercise limiting COPD
- BMI > 40
- Creatinine >1.6
- Child's Class B or greater
- Poorly controlled diabetes
- Cerebral vascular disease or history of stroke
- Major peripheral vascular disease involving the lower extremities with stents or vascular bypass

Perioperative Management
Fat Emboli Syndrome

- Usually seen in long bone fractures, but can see in THR > TKR, but probably more common in Bilateral procedures. The use of cement also seems to increase the risk.
- Full spectrum includes cutaneous, CNS, pulmonary, and hemodynamic consequences.
- Patients often present with fever, hypoxia, and confusion and can progress to ARDS and multi-organ failure and death.
- If PFO is present increases risk of CNS involvement.

Perioperative Management Fat Emboli Syndrome

- Felt to be related to mechanical force of fat into the circulation associated with an inflammatory response.
- Care traditionally has been supportive.
- Data on potential benefits of perioperative cortiocosteroid use has been inconclusive (Sen Mus Sur 2012).
- Recent study suggests corticosteroids may reduce IL-6 levels, which may be associated with a decreased perioperative inflammatory response after B TKR (Jules JBJS 2012).

Perioperative Management Fat Emboli Syndrome

- Inhaled corticosteroids hold promise for prevention of fat emboli syndrome (Sen RK Eur Trauma Emerg Sur 2016)

Summary

- Patients with rheumatic diseases are often the most difficult patients to manage perioperatively, given their multiple comorbidities
- Physicians must look at the “whole patient” and assess all aspects of the patient to provide the best perioperative care……

Thanks

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