Pre-Operative Services Teaching Rounds 2
Jan 2011

Deborah Richman MBChB FFA(SA)
Director – Pre-Operative Services
Department of Anesthesia
Stony Brook University Medical Center, NY
drichman@notes.cc.sunysb.edu

- **Asthma**
  - Pathophysiology
  - History
  - Physical
  - Labs
  - Medications
- **Hip surgery**
  - anesthesia
  - positioning

Case: 46 yr old male for total hip arthroplasty

- HPI – avascular necrosis, pain and limp
- PMH
  - asthma since childhood
    - Steroid dependent
    - Frequent ER visits
  - Smoker till 4 weeks ago (1pack/day x 20years)
- PSH
  - none

Case (cont)

- Meds:
  - Albuterol,
  - Spiriva,
  - Oral steroids - just finished tapering.

- Examination:
  - Cushingoid facies
  - Occasional expiratory wheeze over both lung fields

What do we do?

- Optimised?
- Elective surgery
- ?Risk

Well controlled asthma is not a risk factor for post-operative pulmonary complications

Asthma

- Incidence
  - 300 million worldwide
  - Higher in western countries
- Definition
  - chronic inflammatory disorder of the airways
  - Reversible –partly or completely
  - Airflow obstruction
  - Especially at night or early am

Pathophysiology

- Smooth muscle contraction
  - Contactile agonists from inflammatory cells
    - Mast cells
    - Eosinophils
    - Lymphocytes
  - Neural mechanisms
  - (bronchial hyper responsiveness.)
- Airway wall thickening/edema
- Mucus plugging
- Airway remodelling

Classification

- Intermittent
- Persistent
  - Mild
  - Moderate
  - Severe

From uptodate®

Classifying asthma severity and initiating treatment in youths greater than or equal to 12 years of age and adults

Components of severity		Classification of asthma severity (≥12 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8-19 yr 85 percent 20-39 yr 80 percent 40-59 yr 75 percent 60-80 yr 70 percent	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily, and not more than 1x on any day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 >80 percent predicted • FEV_1/FVC normal	• FEV_1 ≥80 percent predicted • FEV_1/FVC normal	• FEV_1 >60 but <80 percent predicted • FEV_1/FVC reduced 5 percent	• FEV_1 <60 percent predicted • FEV_1/FVC reduced >5 percent
Risk	**Exacerbations requiring oral systemic corticosteroids**	**0-1/year (see footnote)**	**≥2/year (see footnote)**		
		Consider severity and interval since last exacerbation			
		Frequency and severity may fluctuate over time for patients in any severity category			
		Relative annual risk of exacerbations may be related to FEV_1			
Recommended step for initiating treatment		Step 1	Step 2	Step 3 And consider short course of oral systemic corticosteroids	Step 4 or 5
		In 2-6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.			

Favoring asthma vs COPD

- Triggers present
- Age of onset is younger
- Episodic
- Family History of atopy

Is this patient optimized?

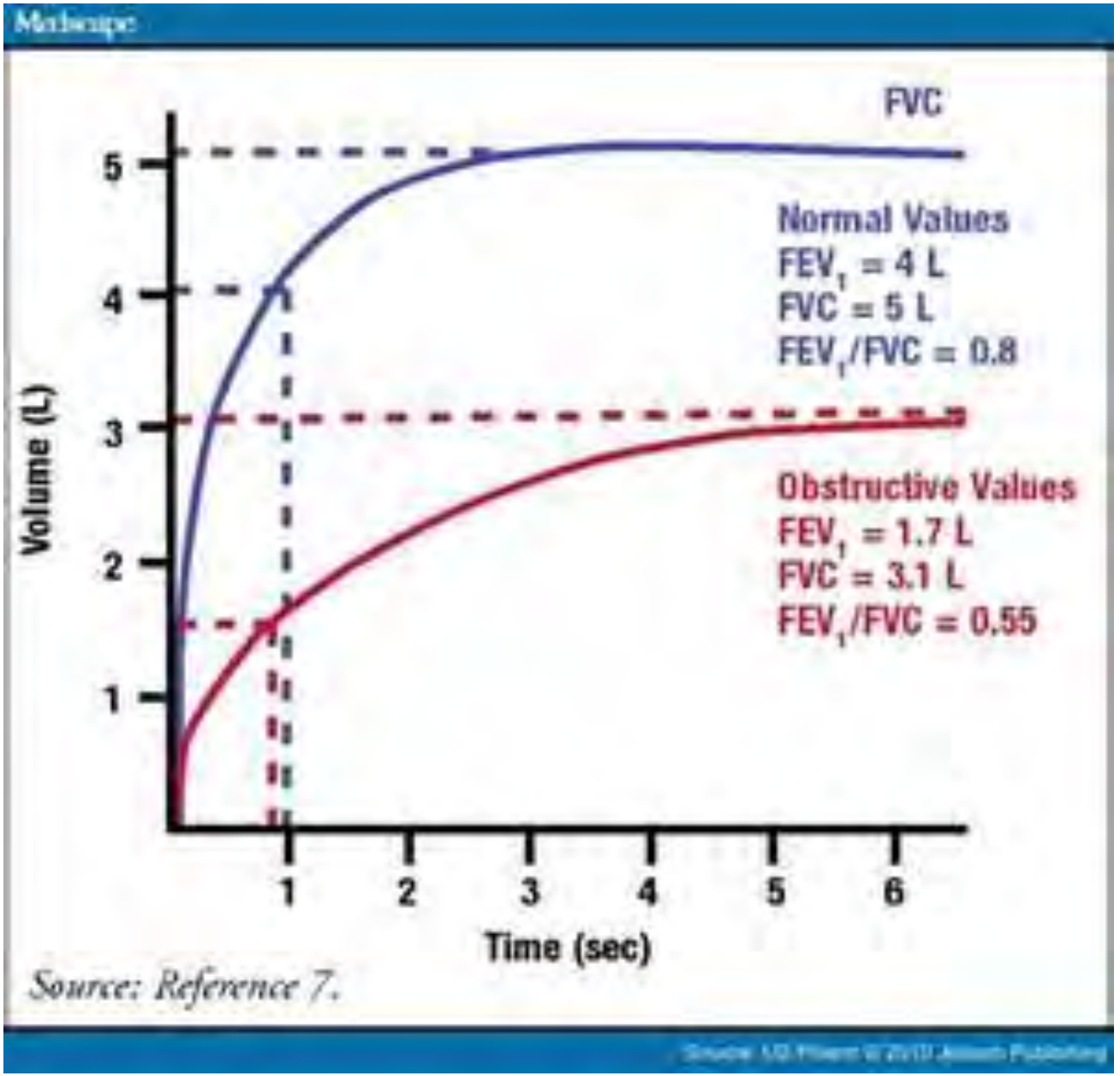
- Shortness of breath
- Wheezing
- Cough
- Chest tightness
- Rescue inhaler use
- Early morning waking
- Sputum - ?productive
- Admissions
- ER visits
- PO steroids

Classic triad of asthma

When last were you better?

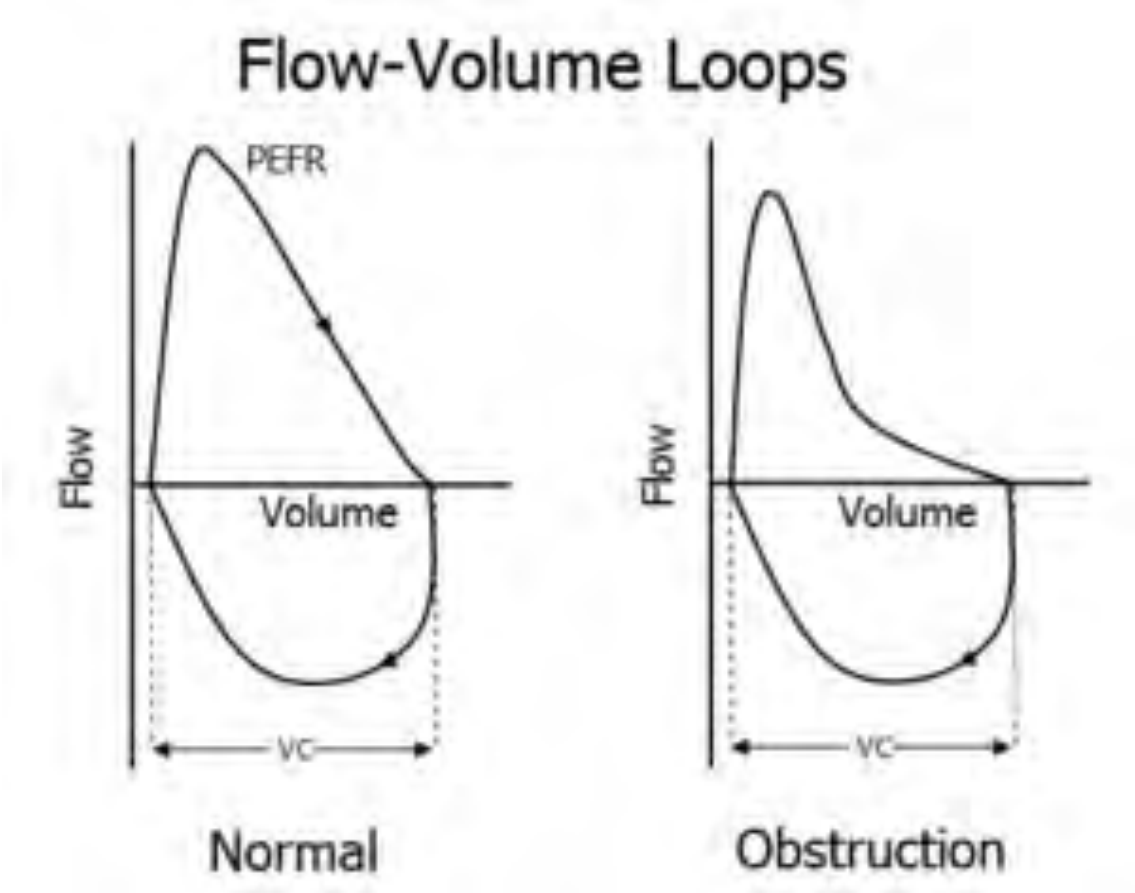
Further testing

- CXR
- Labs
- PFTs


FVC
Normal Values
FEV1 = 4 L
FVC = 5 L
FEV1/FVC = 0.8
Obstructive Values
FEV1 = 1.7 L
FVC = 3.1 L
FEV1/FVC = 0.55
Volume (L)
1
2
3
4
5
1
2
3
4
5
6
Time (sec)
Source: Reference 7.

Expiration:

Inspiration:



PFTs

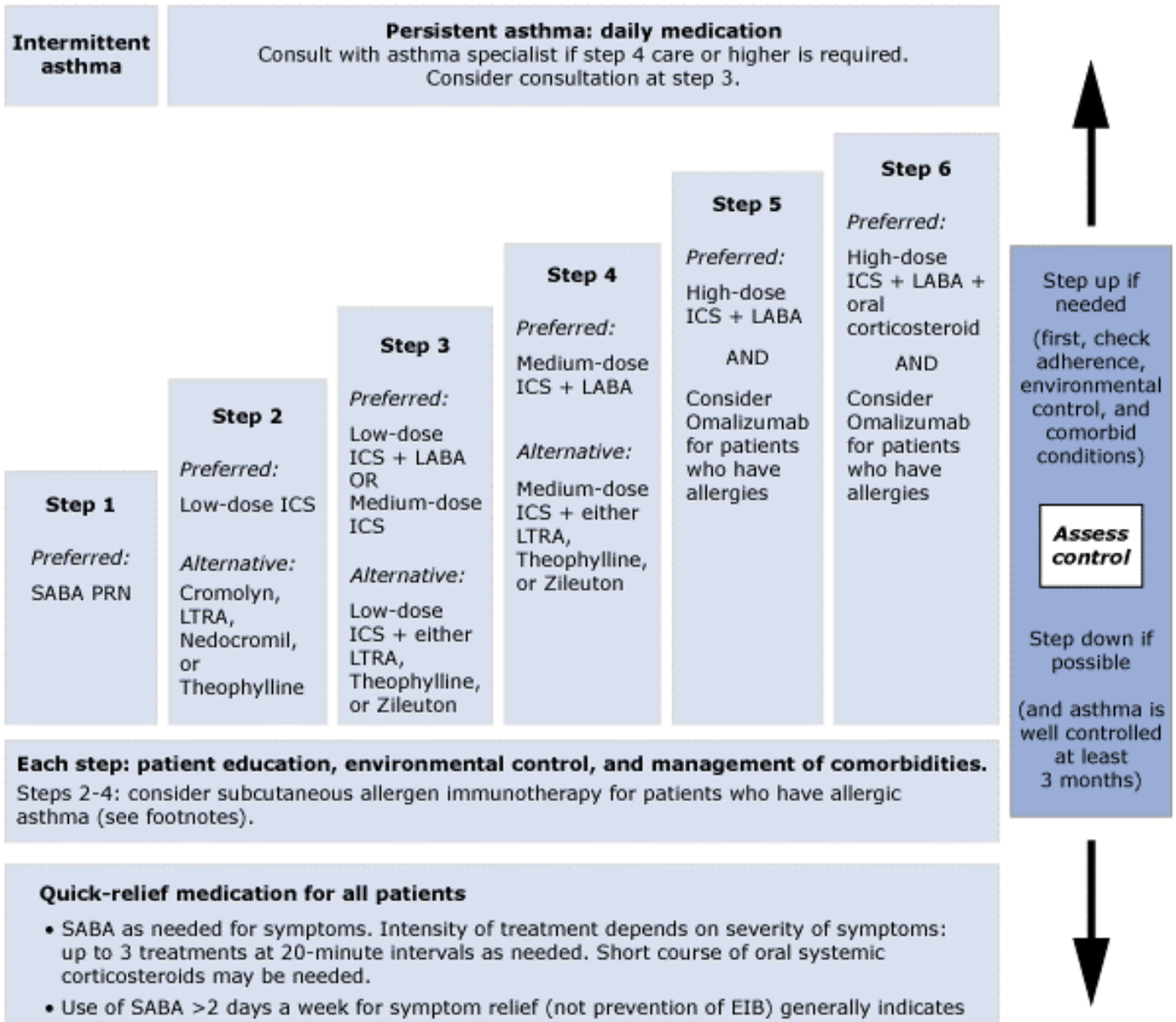
- Obstruction:
  - Peak expiratory flow rate ↓
  - FEV_1 ↓
  - FEV_1 / FVC ratio ↓ below 70%
  - FVC ↓
- Reversibility is significant if there is >12% improvement of FEV_1 with bronchodilator.

Treatment

- Treat Triggers
  - URI
  - Food
  - Environmental
  - Medications
  - GERD
- Prophylaxis
  - Influenza vaccine
- Medications:

Classifying asthma severity and initiating treatment in youths greater than or equal to 12 years of age and adults

Components of severity		Classification of asthma severity (≥12 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8-19 yr 85 percent 20-39 yr 80 percent 40-59 yr 75 percent 60-80 yr 70 percent	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3-4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily, and not more than 1x on any day	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV_1 between exacerbations • FEV_1 >80 percent predicted • FEV_1/FVC normal	• FEV_1 ≥80 percent predicted • FEV_1/FVC normal	• FEV_1 >60 but <80 percent predicted • FEV_1/FVC reduced 5 percent	• FEV_1 <60 percent predicted • FEV_1/FVC reduced >5 percent
Risk	**Exacerbations requiring oral systemic corticosteroids**	**0-1/year (see footnote)**	**≥2/year (see footnote)**		
		Consider severity and interval since last exacerbation			
		Frequency and severity may fluctuate over time for patients in any severity category			
		Relative annual risk of exacerbations may be related to FEV_1			
Recommended step for initiating treatment		Step 1	Step 2	Step 3 And consider short course of oral systemic corticosteroids	Step 4 or 5
		In 2-6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.			


Intermittent asthma
Persistent asthma: daily medication
Consult with asthma specialist if step 4 care or higher is required.
Consider consultation at step 3.
Step 1
Preferred:
SABA PRN
Step 2
Preferred:
Low-dose ICS
Alternative:
Cromolyn, LTRA, Nedocromil, or Theophylline
Step 3
Preferred:
Low-dose ICS + LABA OR Medium-dose ICS
Alternative:
Low-dose ICS + either LTRA, Theophylline, or Zileuton
Step 4
Preferred:
Medium-dose ICS + LABA
Alternative:
Medium-dose ICS + either LTRA, Theophylline, or Zileuton
Step 5
Preferred:
High-dose ICS + LABA
AND
Consider Omalizumab for patients who have allergies
Step 6
Preferred:
High-dose ICS + LABA + oral corticosteroid
AND
Consider Omalizumab for patients who have allergies
Step up if needed
(first, check adherence, environmental control, and comorbid conditions)
Assess control
Step down if possible
(and asthma is well controlled at least 3 months)
Each step: patient education, environmental control, and management of comorbidities.
Steps 2-4: consider subcutaneous allergen immunotherapy for patients who have allergic asthma (see footnotes).
Quick-relief medication for all patients
• SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.
• Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.

Treatment preoperatively – no difference to usual management

- *Anti – bronchospasm*
  - Bronchodilator – Long and short acting beta agonist
    - (anticholinergic – ipratropium = atrovent/ tiotropium = spiriva)
    - (theophylline – phosphodiesterase inhibitor)
- *Anti – inflammatory*
  - Inhaled steroids
  - systemic steroids,
  - leukotriene receptor antagonist (montelukast=singulair)
  - chromolyn sodium
  - (Xolair – anti IgE)

Treatment – points to consider

Compliance

Inhaler technique

(Consider po steroids if surgery urgent)

- Remove triggers

Case

- Optimised?
- Treatment?
  - *Smoking*
  - *Environment*
  - *Beta agonists*
  - *Steroids*
- Pulmonary consult:

Added inhaled steroid/long acting beta agonist and montelukast

THR

- Sir John Charnley – innovations since the 1960's
- OA
- Trauma
  - Including old infection
- Congenital dislocated hip
- Pediatric
  - Slipped Upper Femoral (Capital) Epiphysis
  - Perthe's (Legg-Calve-Perthe's)
- RA
- Avascular necrosis
- Other

Positioning – left lateral

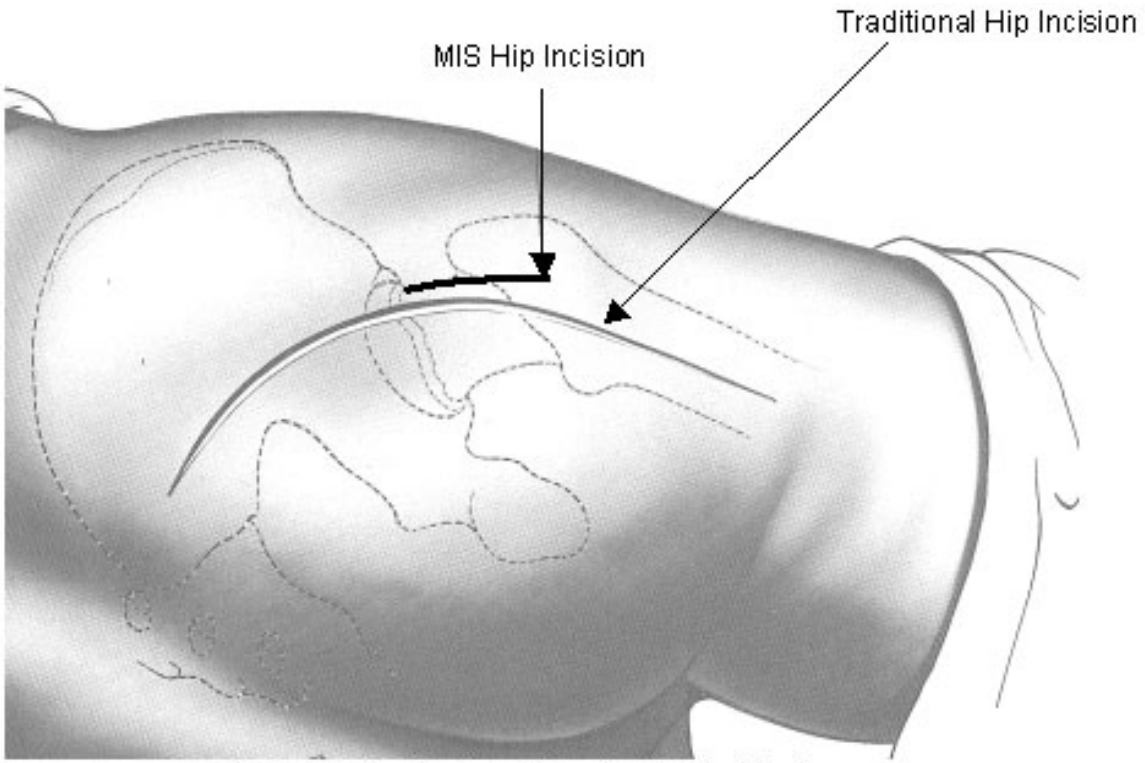


Diagram of patient positioned with left side down

Hip X-Ray

Normal hip

Avascular necrosis of hip

Prosthesis


Metallic replacement for head and neck of femur
Plastic and metallic replacement for acetabulum (hip socket)
Artificial Hip Joint

Xray of THR

Xray of THR

Cement

- Advantages
- Disadvantages

THR - Outcomes

- >90% working pain free at 10-15 years without complications

Complications

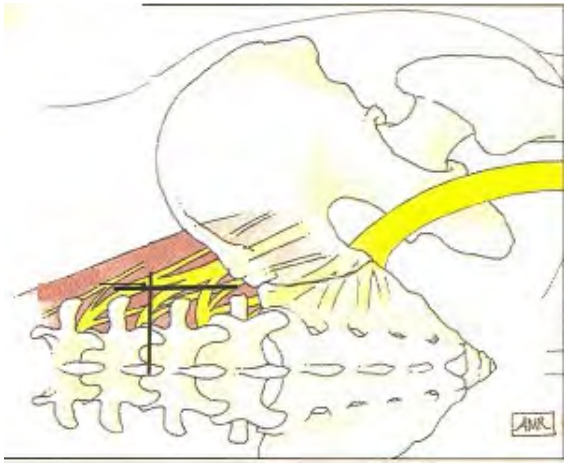
- Acute
  - Fracture
  - Bleeding
  - Nerve injury
  - Cement hypotension
  - Fibrin, fat, air embolus
- Subacute
  - Dislocation
  - DVT

Complications

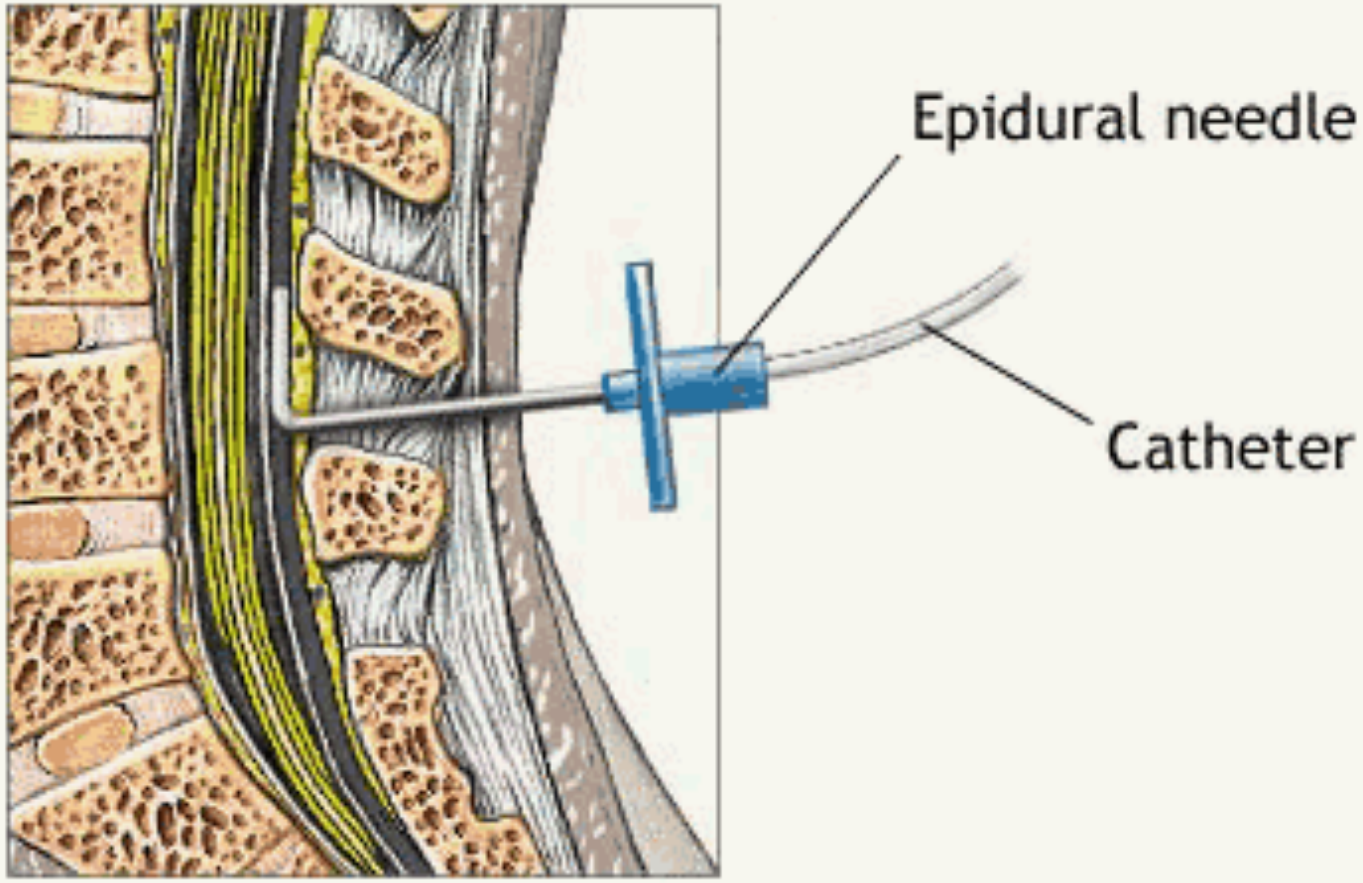
- Chronic
  - Infection
  - Fracture
  - Loosening
  - Heterotrophic ossification

Anesthesia

- GA
- Spinal / epidural combination
- Lumbar plexus block
- (femoral block)




L1
L2
L3
L4
L5
1
2


Epidural needle
Catheter

Epidural

- Benefits
  - Analgesia –
    - Intraop
    - postop
  - DVT
  - Blood loss
  - Cement
- ?POCD

- Risks
  - Bleeding
  - Nerve damage
  - Infection
  - Hypotension
  - Opiate side effects

Take home points

- Asthma: not risk factor if well controlled
- Trigger and medication management
  - Long acting Beta agonist and inhaled steroids
- Maybe optimized and wheezing
- Epidural
  - Definite advantage in hip and knee replacements