Peri-operative and Anesthesia Care for Total Knee Arthroplasty

Jennifer Szerb MD, FRCP Anesthesia
Associate Professor
Dalhousie University
Sept 30th, 2011

Conflict of Interest

- Pfeizer-
- Honoraria-for 4 Presentations and an Ultrasound Workshop.
- Received Financial Support for A Strategic Planning Session for Regional Anesthesia Program.
- Educational Grant
- Sonosite-
- Financial Support and Provision of Equipment for Ultrasound Workshops.

The challenges!!

- Comorbid Disease
- Poor Functional Class
- Obstructive Sleep Apnea
- Chronic Pain, Opioid Tolerance

Co-morbid disease

Trends in Demographics, Comorbidity Profiles, In-Hospital Complications and Mortality Associated With Primary Knee Arthroplasty

The Journal of Arthroplasty Vol. 24 No. 4 2009.

National Hospital Discharge Survey 2000-2004

- HTN-53.44%
- Diabetes-14.66%
- Dyslipidemia-7.76%
- Obesity-7.68%
- Pulmonary Disease-10.33%
- Coronary Artery Disease-10.81%

What is the 30 day cardiac event rate (death or MI) from Total Knee Arthroplasty?

Boersma E, et al. Perioperative cardiovascular mortality in noncardiac surgery: Am J Med 2005;118:1134–1141.

Low-risk <1%	Intermediate-risk 1–5%	High-risk >5%
▪ Breast ▪ Dental ▪ Endocrine ▪ Eye ▪ Gynaecology ▪ Reconstructive ▪ Orthopaedic—minor (knee surgery) ▪ Urologic—minor	▪ Abdominal ▪ Carotid ▪ Peripheral arterial angioplasty ▪ Endovascular aneurysm repair ▪ Head and neck surgery ▪ Neurological/ orthopaedic—major (hip and spine surgery) ▪ Pulmonary renal/ liver transplant ▪ Urologic—major	▪ Aortic and major vascular surgery ▪ Peripheral vascular surgery

Poor Functional Capacity

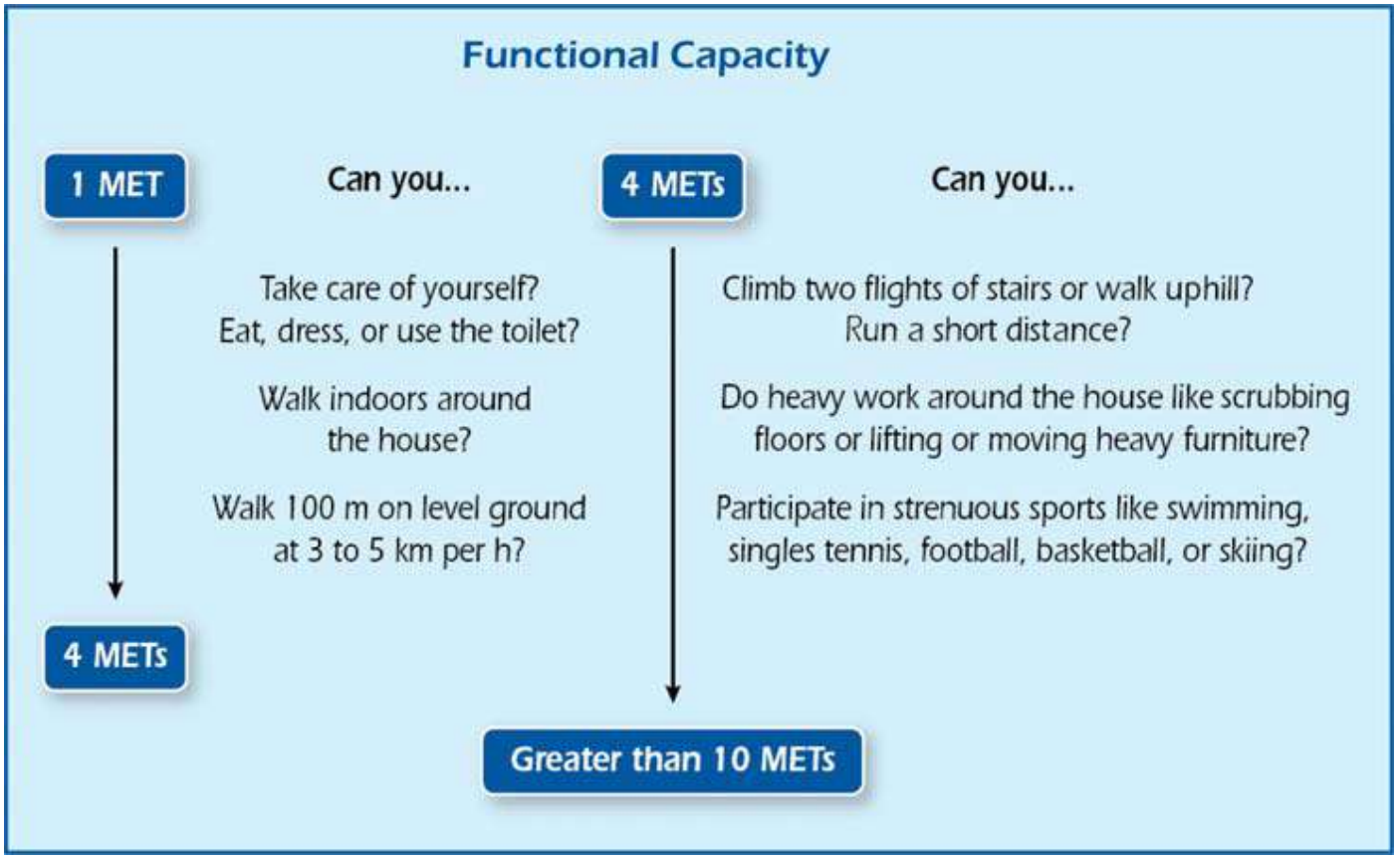
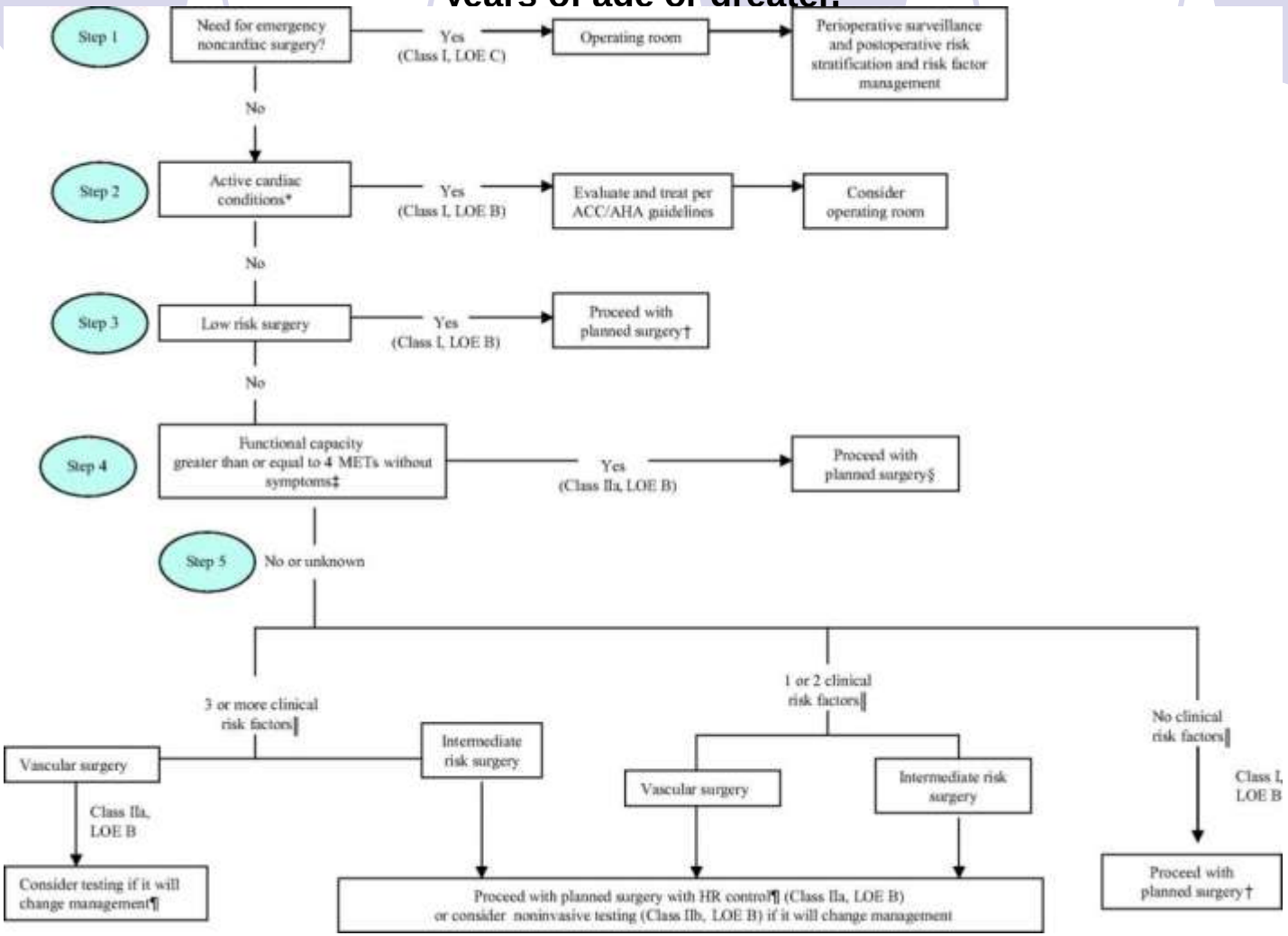


Figure 1. Cardiac evaluation and care algorithm for noncardiac surgery based on active clinical conditions, known cardiovascular disease, or cardiac risk factors for patients 50 years of age or greater.



Fleisher L A et al. Circulation 2007;116:e418-e500

American Heart Association
Learn and Live

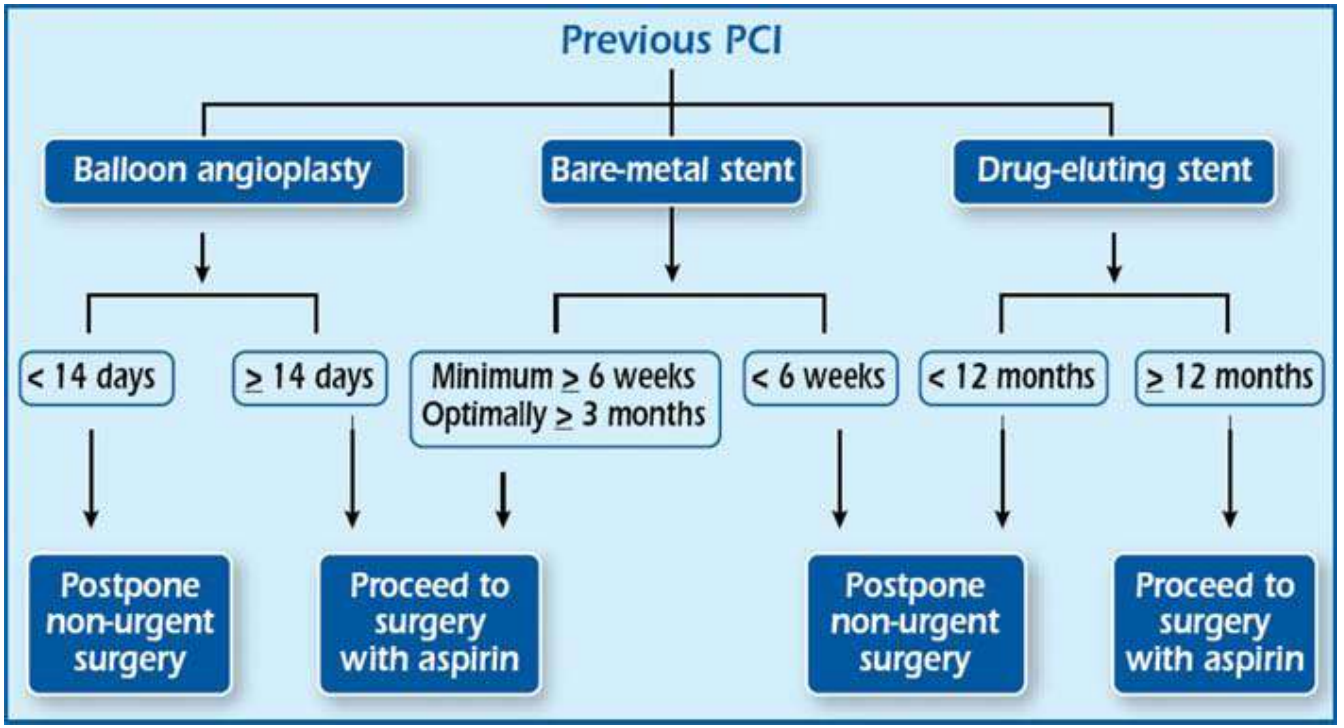
Non-Invasive testing for LV dysfunction, myocardial ischaemia, and heart valve abnormalities

European Heart Journal (2009) 30, 2769–2812

- The overall theme is that the diagnostic algorithm for risk stratification of myocardial ischaemia and LV function should be similar to that proposed for patients in the non-surgical setting with known or suspected IHD.

Stents-

European Heart Journal (2009) 30, 2769–2812



British Soc Indications for Peri-operative Echocardiography

- Documented IHD with reduced FC < 4 METS
- Unexplained SOB: absence of clinical signs of heart failure: ECG and or CXR abnormal
- Murmur in an asymptomatic individual in whom clinical features or other investigations suggest severe structural heart disease (25% people>65 yrs have aortic stenosis)

Obstructive Sleep Apnea

Moderately severe OSA (AHI >15) is present in 11.4% and 4.7% of men and women,

42-55% of MEN and 40% of WOMEN with BMI> 40 have OSA

BMI is the strongest predictor of OSA

It is estimated that the average life span of a patient with untreated OSA is 58 years, much shorter than the average life span of 78 years for men and 83 years for women

- upper airway collapse,
- exacerbation of hypoxemia and hypercapnia,
- cardiac arrhythmias and ischemia,
- difficulties in airway management,
- increased rate of postoperative infections, as well as other adverse events
- Increased ICU admissions
- Prolonged length of stay.
- DEATH

Table 4

Screening for obstructive sleep apnea before surgery: why is it important?.
Chung, Frances; Elsaid, Hisham

Current Opinion in Anaesthesiology. 22(3):405-411, June 2009.
DOI: 10.1097/ACO.0b013e32832a96e2

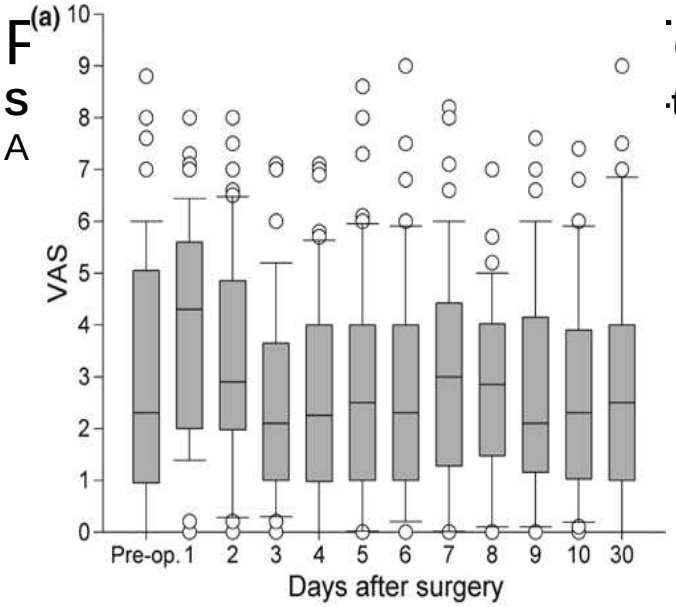
Serial number	Questions	Questions	Answer	Answer
1	Snoring: Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?		Yes	No
2	Tired	Do you often feel tired, fatigued, or sleepy during daytime?	Yes	No
3	Observed	Has anyone observed you stop breathing during your sleep?	Yes	No
4	Blood pressure	Do you have or are you being treated for high blood pressure?	Yes	No
5	BMI	BMI more than 35	Yes	No
6	Age	Age over 50 years	Yes	No
7	Neck circumference	Neck circumference greater than 40 cm	Yes	No
8	Gender	Male	Yes	No

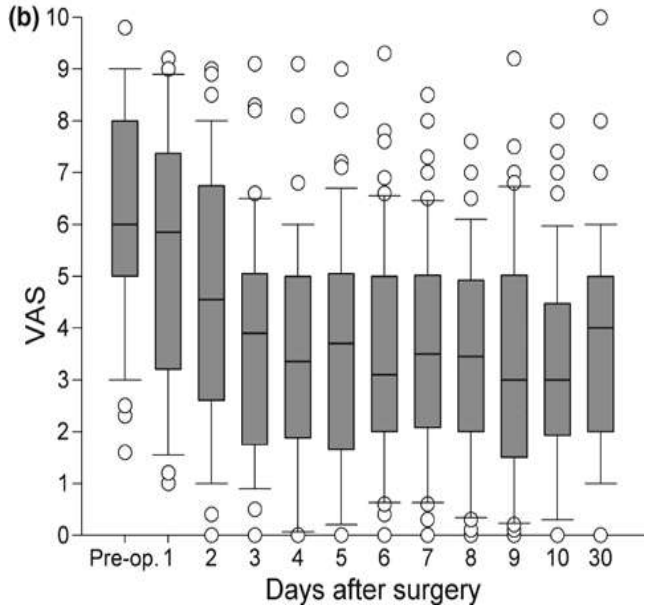
High risk of OSA, answering yes to three or more items. Low risk of OSA, answering yes to less than three items. Adapted from [13••].

Table 4 STOP-Bang scoring model

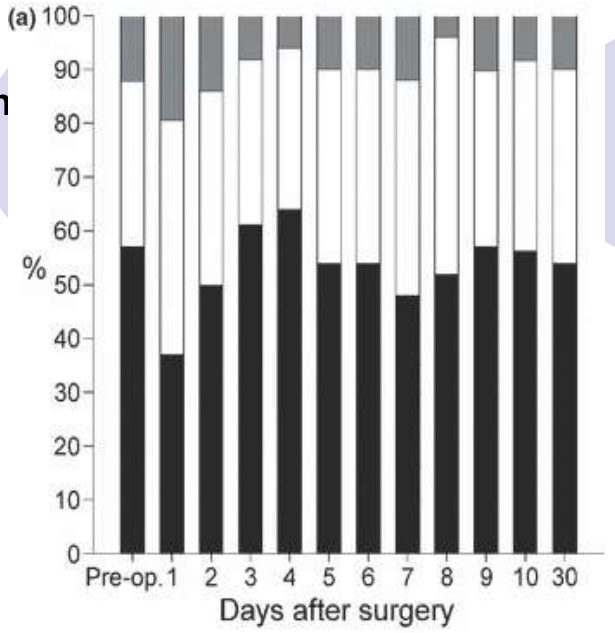
- Patients with moderate to severe OSA, particularily those with major co-morbidities, having non-urgent invasive surgery, who are not already on CPAAP/BiPAP, will be postponed pending specialist referral, investigation and consideration for CPAP therapy.
- Patients must remain in a monitored environment for the first post-operative night if:
- i) they have mod-severe OSA by clinical or sleep studies and have had major invasive surgery and will require opioids.
- ii) they have mod-severe OSA and they have had airway or major head and neck surgery or surgery that prevents them from using their usual CPAP the first night
- iii) they experience apneas (>10 sec.), bradypneas or significant desaturations (< 90%) during the extended PACU observation period. These are called **Recurrent PACU respiratory events**. See supporting document for definitions. Note: It may be appropriate to discharge such patients to the ward unmonitored if resources permit an extended observation in PACU beyond the 3-4 hours (up to 6-8 hrs) and no further desaturations or apneas occur. Individual physician discretion will be permitted

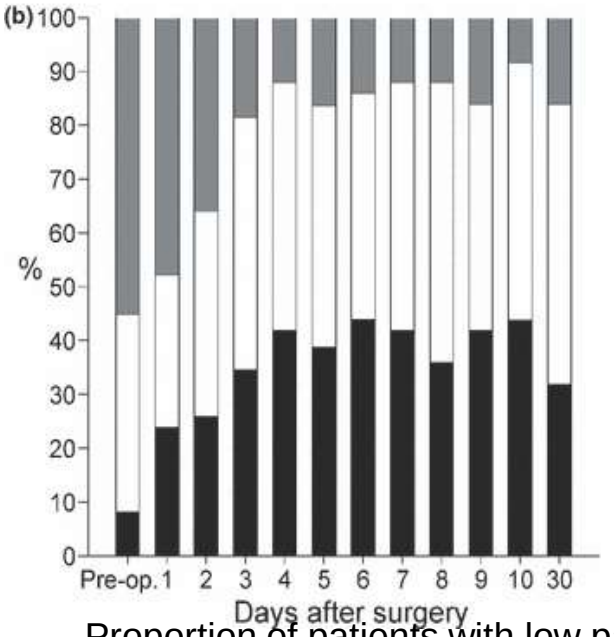
F
S
A
otal Knee
track hip and kn





Postoperative pain at rest (a) and when walking (b) following TKA in 50 patients.





Proportion of patients with low pain-black, Moderate pain-white, and severe pain-grey at rest (a) and (b) while walking

- TKA patients can be considered to have chronic pain.
- High pre-operative pain at rest and a low pain threshold, assessed by the use of an electrical stimulus has been shown to correlate with pain 18 months following total knee arthroplasty. Journal of Bone and Joint Surgery - British Volume, Vol 90-B, Issue 2, 166-171
- For opioid tolerant patients-continue pre-op opioids and add 50 to 100% more than average non-opioid tolerant patient for acute pain management. Opioids are used in combination with acetaminophen, celebrex, and gabapentin both preoperatively and post-operatively.
- Use regional anesthesia wherever possible, which would include neuraxial anesthesia and peripheral nerve block. Occasionally consider a continuous nerve block catheter, or the addition of buprenorphine to the local anesthetic.
- If patient is on NSAIDS-switch to Celebrex and continue this for 2 weeks post-operatively.

- The END!