

# Patient Selection in Ambulatory Surgery

**Arnaldo Valedon, MD, MBA**  
**Medical Director**  
**Outpatient Perioperative Services**  
**WellSpan Health, PA**

**IAAS Teach the Teacher Course**  
**Prague 2023**

# Learning Objectives

- Review current evidence-based guidelines to help determine which patients can safely undergo elective outpatient surgery



# Preoperative Testing

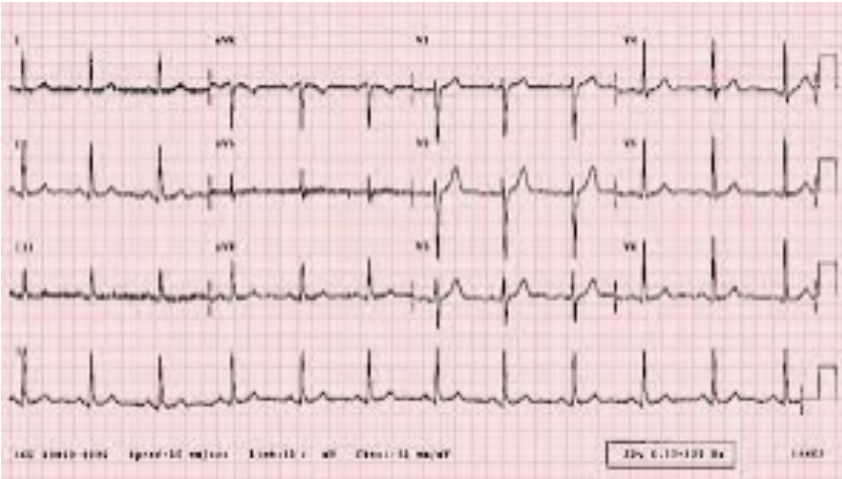
- **Ambulatory and Minimally Invasive Cases**
  - **NO ROUTINE TESTING**
- **Ambulatory, moderately invasive, rare major blood loss or marked hemodynamic changes**
  - **NO ROUTINE TESTING FOR HEALTHY PATIENTS**
  - **Pointed testing MAY be needed for specific conditions (e.g., Obstructive Sleep Apnea)**
- **Exceptions:**
  - **Creatinine-** if injection of contrast dye is planned
  - **Pregnancy test-** offered to all child-bearing and consents for the test



# Preoperative Testing



- Studies show increased abnormalities with advancing age. NOT predictive of post op complications
- Geographic location of surgery is the strongest predictor of preop laboratory testing



# Co-Morbidities Possibly Excluding Patients from an ASC

BMI > 50	Severe or Moderate/Severe Aortic Stenosis	CVA < 90 days	Poorly-controlled seizure disorder
Severe or Moderate/Severe Mitral Valve Disease	Severe Pulmonary Hypertension	Central sleep apnea with Hypoventilation	Severe pulmonary disease, e.g., home oxygen use, frequent hospital visits, significant dyspnea, when moderate risk surgery is planned
MI < 60 days	S/P CABG <30 days	Dialysis requirement, when moderate risk surgery is planned	S/P CABG <30 days
Coronary stents: Bare metal- Insertion < 30 days ; Drug eluting < 6 months	Left Ventricular Assist Devices and External Defibrillators	H/o difficult intubation ??	H/o Radical neck surgery ??



# Co-Morbidities Possibly Excluding Patients from an ASC

## BMI > 50

- Super obese (BMI  $\geq 50$  kg/m) have increased risk of perioperative complications: Independent risk and associated with comorbidities<sup>1,2</sup>

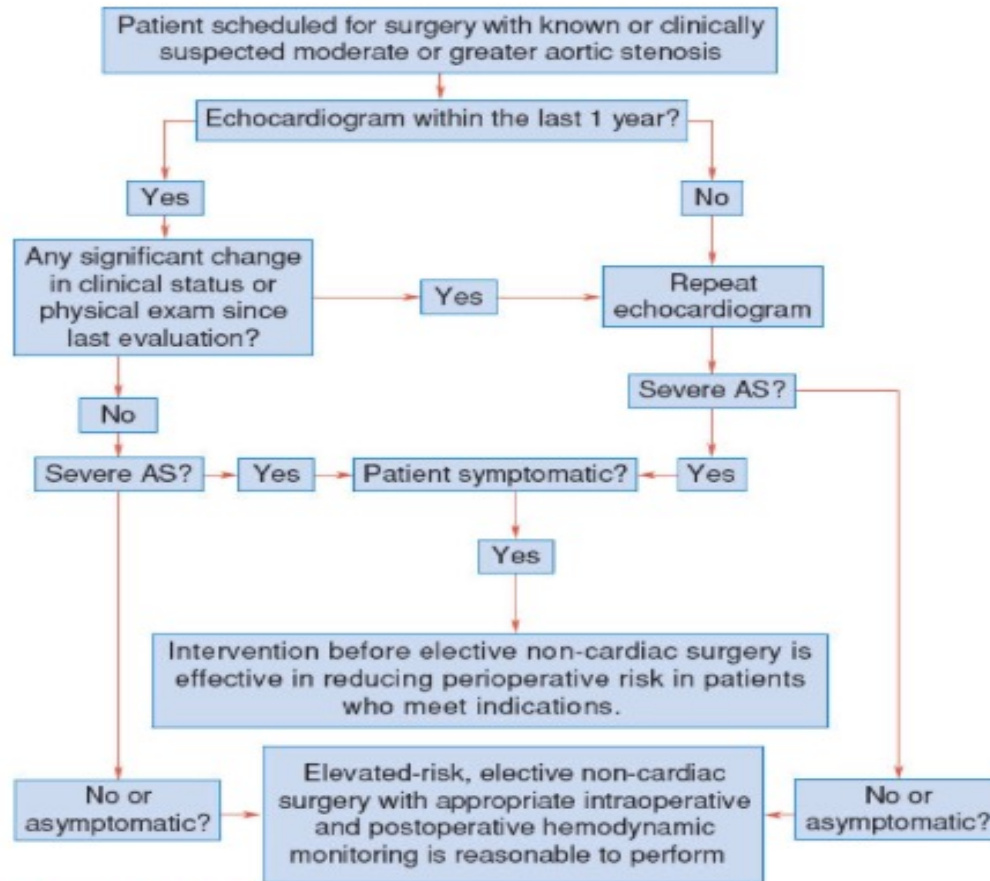
### Examples:

- Increased risk of wound infection<sup>3</sup>
  - Greater intraoperative blood loss<sup>3</sup>
  - Longer operation time<sup>3</sup>
  - Chronic low-grade inflammation and wound healing<sup>4</sup>
- Patients with BMI <40 kg/m can safely undergo ambulatory surgery, provided their comorbidities are optimized before surgery<sup>1</sup>.
  - BMI 40-50 kg/m: outcomes data for patients limited<sup>1</sup>
    - Consider other factors such as obstructive sleep apnea.



1. Moon, T. and Joshi, G., 2016. Are morbidly obese patients suitable for ambulatory surgery?. *Current Opinion in Anaesthesiology*, 29(1), pp.141-145.  
2. Joshi, G 2015. AAAHC/IQI Toolkit. Ambulatory Surgery and Obesity in Adults: Preventing Complications.  
3. Ri, M., Aikou, S. and Seto, Y., 2017. Obesity as a surgical risk factor. *Annals of Gastroenterological Surgery*, 2(1), pp.13-21.

# Co-Morbidities Possibly Excluding Patients from an ASC



sis 4  
chemia

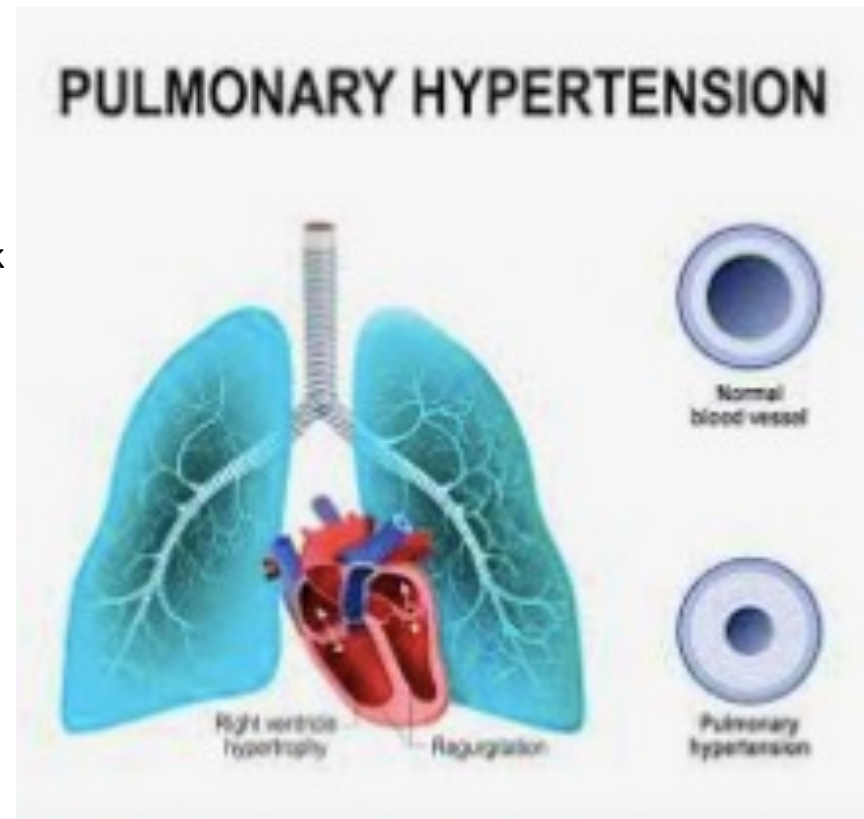
**Figure 3.3** Preoperative management

4. Fleisher, L., Fleischmann, K., Auerbach, A., Barnason, S., Beckman, J., Bozkurt, B., Davila-Roman, V., Gerhard-Herman, M., Holly, T., Kane, G., Marine, J., Nelson, M., Spencer, C., Thompson, A., Ting, H., Uretsky, B. and Wijeyesundera, D., 2014. 2014 ACC/AHA Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. *Journal of the American College of Cardiology*, 64(22), pp.e77-e137.

# Co-Morbidities Possibly Excluding Patients from an ASC

## Severe Pulmonary Hypertension

- WHO Classification: Groups 1-5<sup>5</sup>
  - Group 1-Pulmonary Arterial Hypertension<sup>5</sup>
    - May tolerate minor and intermediate risk procedures well.<sup>6</sup>
  - Groups 3 (PH due to lung disease or chronic hypoxia) and 4 (chronic pulmonary embolism)
    - Perioperative mortality as high as 40%<sup>6</sup>



5. Pulmonary Hypertension News. 2022. *Pulmonary Hypertension WHO Classification*. [online] Available at: <https://pulmonaryhypertensionnews.com/pulmonary-hypertension-who-classification/> [Accessed 7 March 2022].

6. Sweitzer, B., 2018. *Preoperative Assessment and Management*. 3rd ed. Elsevier, pp.1-278.



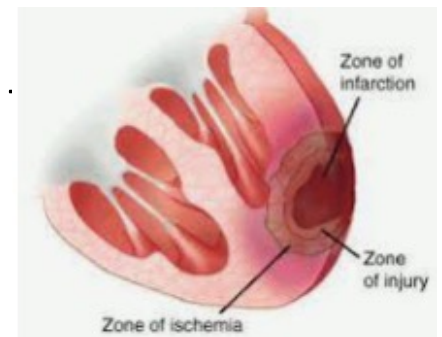
# Co-Morbidities Possibly Excluding Patients from an ASC

## Myocardial Infarction < 60 days

- Historically, re-infarction rate for patients undergoing non-cardiac surgery within 3 mo of MI estimated at 5%, with high associated mortality rate<sup>7</sup>.
- AHA: non-cardiac surgery is acceptable six weeks after MI <sup>7</sup>
  - Pathophysiology of resolution?
  - Therapeutic response?
  - Worse outcome predictors?
    - cardiac failure
    - increases in B-type natriuretic proteins
    - persistent ischemia, (evaluated by elevations in and ST-segment depression)

7. Semark A, Rodseth RN, Biccard BM. When is the risk acceptable to proceed to noncardiac surgery following an acute myocardial infarction? *Minerva Anesthesiol*. 2011 Jan;77(1):64-73. PMID: 21273967.

8. Stafford, J., Drusin, R. and Lalwani, A., 2015. When is it safe to operate following myocardial infarction?. *The Laryngoscope*, 126(2), pp.299-301.

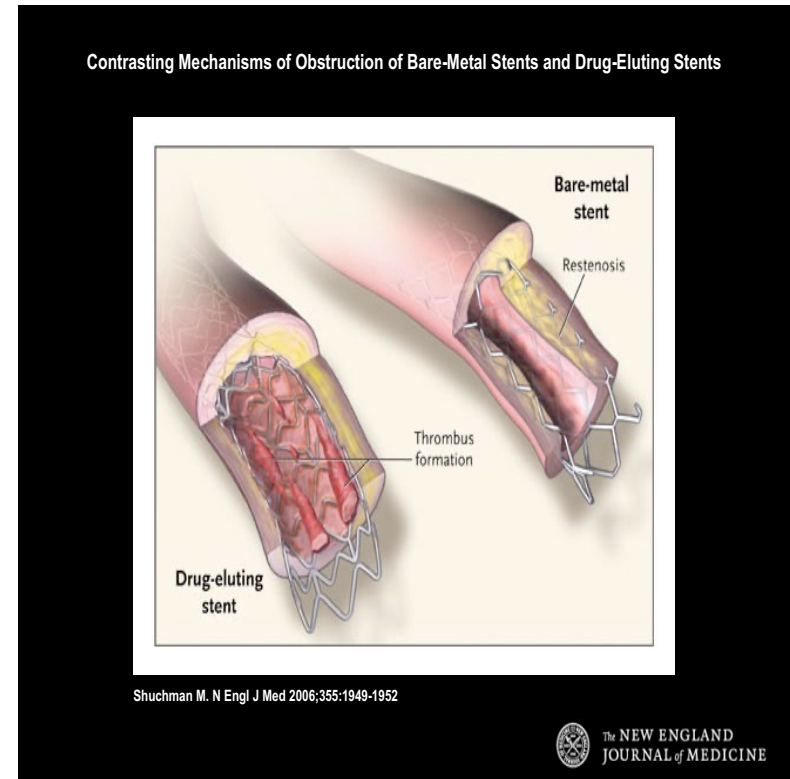


• Different surgeries carry independent cardiac risks <sup>7</sup>

# Co-Morbidities Possibly Excluding Patients from an ASC

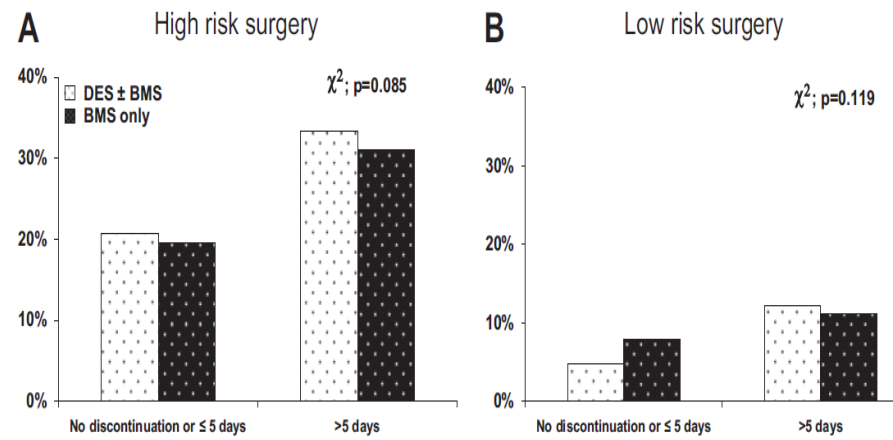
## Coronary Stent Insertion: Bare metal < 30 days ;New Generation Drug-Eluting <6 months

- Perioperative risk <30 days from stenting to surgery is very high irrespective of stent type
- Elective surgical procedures should be postponed >6 months after DES implantation. (Window could be safely shortened, if needed, to 3–6 months); Older generation DES >12 months
- Increased risk of MI and cardiac death after DES in comparison with patients without ischemic heart disease seems confined only to 1st month after DES-PCI



# Co-Morbidities Possibly Excluding Patients from an ASC

**Coronary Stent Insertion: Bare metal < 30 days ;New Generation Drug-Eluting <6 months**



**Conclusions** Patients with coronary stents undergoing an invasive procedure are at high risk of perioperative myocardial infarction including stent thrombosis irrespective of the stent type and major bleeding. Interruption of OAT more than 5 days prior to an invasive procedure is a key player for MACCE.

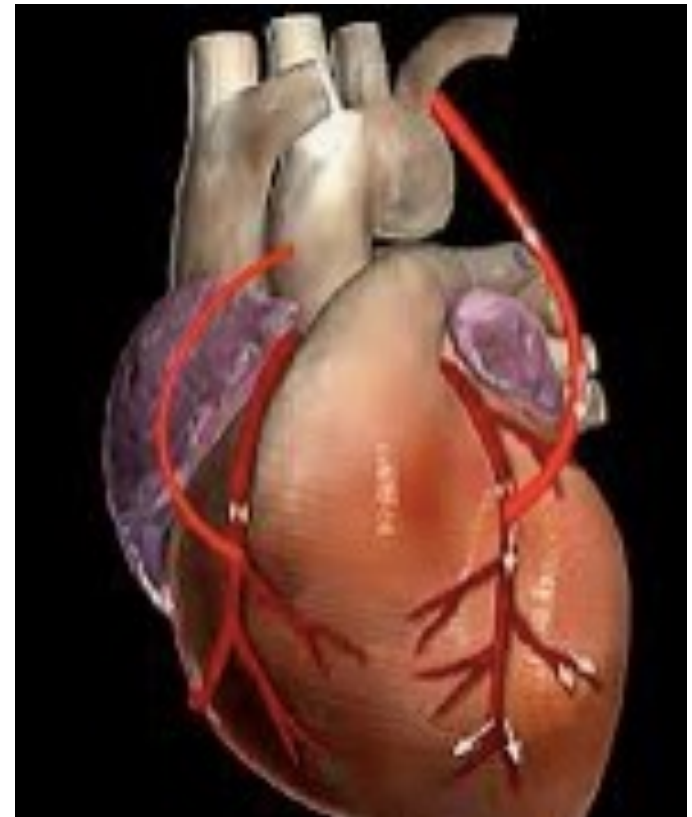
*Heart* 2011;**97**:1566

Slide Courtesy of B.Sweitzer

# Co-Morbidities Possibly Excluding Patients from an ASC

## **Coronary Artery Bypass Surgery (CABG) <30 days**

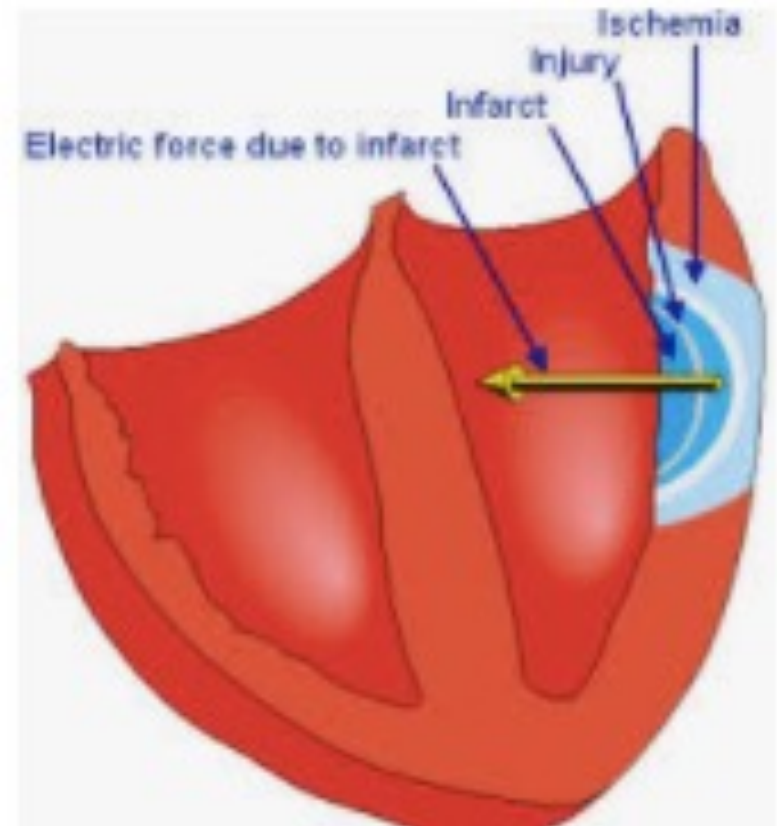
- Concern: Major Adverse Cardiac Events (MACE) : total death, myocardial infarction, coronary revascularization, stroke, and hospitalization because of heart failure.
- Surgery causes hemodynamic, endocrine, and inflammatory disturbances contributing to an increased overall risk of death and adverse cardiac events
- About 13% of Post-CABG patient have readmission within 30 days
  - Infection and sepsis (range: 6.9–28.6%)
  - Cardiac arrhythmia (4.5–26.7%)
  - Congestive heart failure (5.8–15.7%)
  - Respiratory complications (1–20%)
  - Pleural effusion (0.4–22.5%)



## Co-Morbidities Possibly Excluding Patients from an ASC

Stress test positive for ischemia and further testing (e.g., cardiac cath) planned but not completed

- Surgery is known to cause hemodynamic, endocrine, and inflammatory disturbances contributing to an increased overall risk of death and adverse cardiac events.



# Co-Morbidities Possibly Excluding Patients from an ASC

## **Left Ventricular Assist Devices and External Defibrillators**

- Patients may not have a pulse
- CPR is controversial due to risk of dislodgement of equipment



## Co-Morbidities Possibly Excluding Patients from an ASC

### Cerebrovascular Accident < 3 months

- Cerebral autoregulation impaired following stroke, particularly during the first 3 months after occurrence<sup>9</sup>.
- Risk of perioperative stroke= 0.3% overall (mostly ischemic, not hemorrhagic)
- elective noncardiac surgery be deferred at least 6 months after a prior stroke, and possibly as long as 9 months to reduce the risk of perioperative stroke in patients undergoing noncardiac surgery<sup>9</sup>.

<sup>9</sup> Beneson C., Glance L., Derdeyn C., Fleisher L., Holloway R., Messé S., Mijalski C., Nelson M., Power M. and Welch B., 2021. Perioperative Neurological Evaluation and Management to Lower the Risk of Acute Stroke in Patients Undergoing Noncardiac, Nonneurological Surgery: A Scientific Statement From the American Heart Association/American Stroke Association. *Circulation*, 143(19).

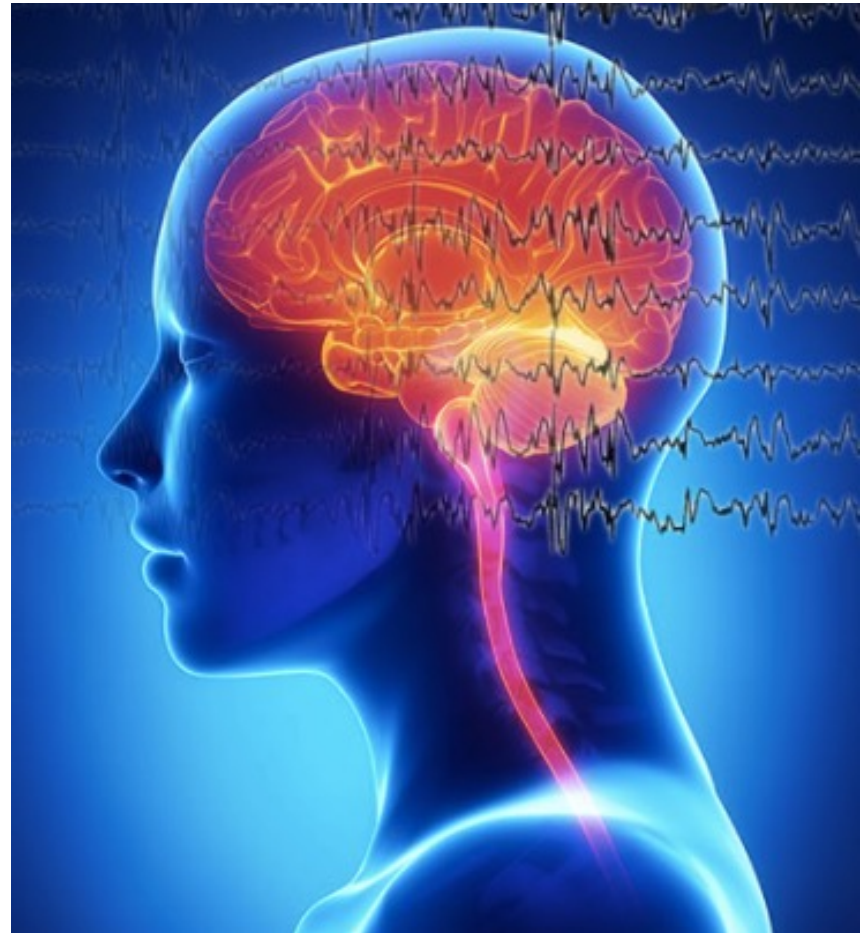
**Table 2. Adjusted Odds Ratios of 30-Day Ischemic Stroke Events Stratified by Stroke Before Surgery and Time Elapsed Between Stroke and Surgery**

Source	Crude events, n	Sample size, n	Event rate, %	Odds ratio (95% CI)
No prior stroke	368	474046	0.078	1 (Reference)
Prior stroke anytime	210	7137	2.94	16.24 (13.23–19.94)
Stroke <3 mo prior	103	862	11.95	67.60 (52.27–87.42)
Stroke 3–<6 mo prior	21	469	4.48	24.02 (15.03–38.39)
Stroke 6–<12 mo prior	16	898	1.78	10.39 (6.18–17.44)
Stroke ≥12 mo prior	70	4908	1.43	8.17 (6.19–10.80)

# Co-Morbidities Possibly Excluding Patients from an ASC

## Poorly-controlled Seizure Disorder

- Mortality rate in epileptics undergoing surgery similar to non-epileptics<sup>10</sup>
- Postoperative complications in epileptics higher than non-epileptics<sup>10</sup>
  - Stroke is a common and significant postoperative complication in epileptics with previous hospitalizations and ED visits
  - Pneumonia
  - Septicemia
  - Acute renal failure

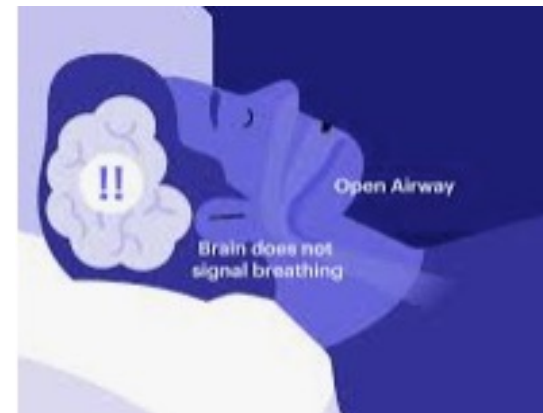




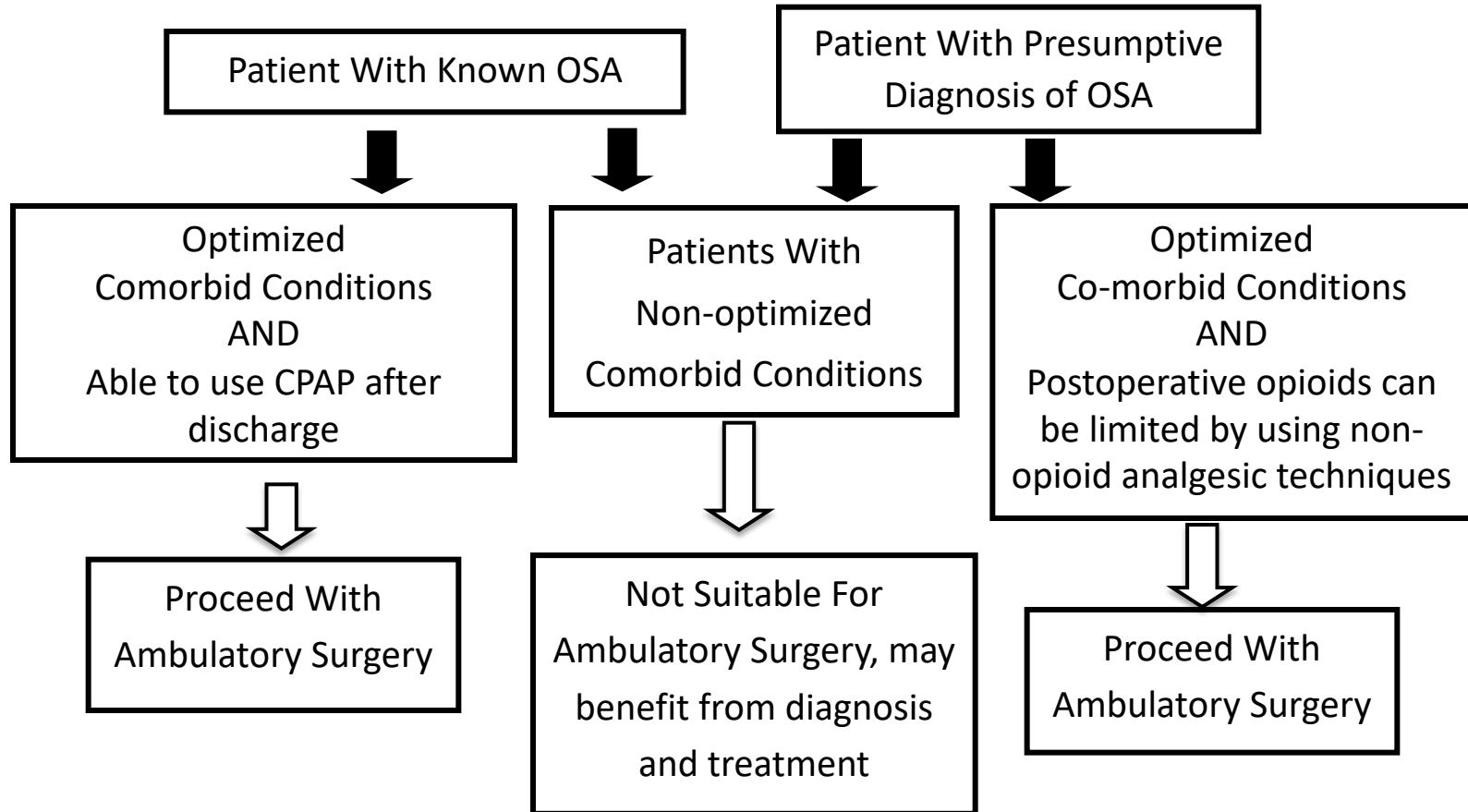
# Co-Morbidities Possibly Excluding Patients from an ASC

## **Severe OSA when significant post-op opioid use is expected/ Central Sleep Apnea**

- Concern: increased perioperative complications including post-discharge death
  - **Central sleep apnea with snoring:** patients should be treated as patients with OSA
  - **Central sleep apnea:** precautions for these patients will relate to their underlying comorbidities
  - **Central sleep apnea with hypoventilation syndrome:** patients may require unanticipated assisted ventilation intra and post-op.



# Preoperative Selection of a OSA Patient For Ambulatory Surgery



**No guidance can be provided for airway surgery**

Joshi GP et al: Anesth Analg 2012; 115: 1060-8

Slide courtesy of G.Joshi

# Co-Morbidities Possibly Excluding Patients from an ASC

## Severe Pulmonary Disease

(e.g., home oxygen use, frequent hospital visits, significant dyspnea when moderate risk surgery is planned)

- Concern: Decreased pulmonary reserve relative to depth of anesthesia needed:
  - **Obstructive** (Reduction in airflow: COPD, Asthma, bronchiectasis) vs
  - **Restrictive** (Reduction in lung volume: interstitial lung disease, neuromuscular disease, marked obesity)
- Positioning: Ability to lay flat?



# Co-Morbidities Possibly Excluding Patients from an ASC

## Dialysis Requirement

(when moderate risk surgery is planned)

- Concern: Patients on chronic dialysis have an increased odds for postoperative mortality following elective surgery across all surgical disciplines



### Postoperative mortality in patients on chronic dialysis following elective surgery: A systematic review and meta-analysis

Dharmenaan Palamuthusingam , Arun Nadarajah, Elaine M. Pascoe, Jonathan Craig, David W. Johnson, Carmel M. Hawley, Magid Fahim

Published: June 26, 2020 • <https://doi.org/10.1371/journal.pone.0234402>

- Adjustment for age and comorbidity attenuated the excess odds but remained higher for patients on chronic dialysis, irrespective of surgical discipline.
- Meta-regression analysis demonstrated an inverse linear relationship between excess mortality risk and study-level mean age

# Co-Morbidities Possibly Excluding Patients from an ASC

## H/O Radical neck surgery? Verified Difficult Intubation?

- Concern: Inability to ventilate/intubate if the depth of anesthesia required demands
  - Baseline: “can’t intubate can’t ventilate” (CICV): 1 in 5000 cases for general anesthesia, but only 1 in 50 000 patients will need an emergency surgical airway<sup>14</sup>



n/o dif



o of

Thank You!

Arnie Valedon, MD

[avaledon@wellspan.org](mailto:avaledon@wellspan.org)