CARDIOVASCULAR EMERGENCIES IN THE POST ANESTHESIA CARE UNIT

Amilcar Avendano MD

OBJECTIVES

- Review differential diagnosis and treatment of arrhythmias in PACU
- Review signs and treatment of congestive heart failure in PACU
- Review signs and treatment of coronary ischemia in PACU
- Review differential diagnosis and treatment of hypotension and hypertension in PACU

OUTLINE

- Ventricular arrhythmias
- Atrial arrhythmias
- Bradyarrhythmias
- Congestive heart failure
- Acute coronary syndrome
- Hypotension
- Hypertension
- Final comments

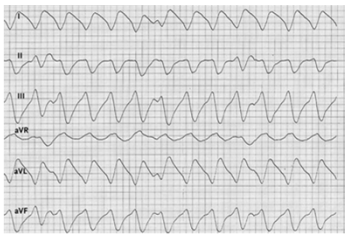
VENTRICULAR ARRHYTHMIAS

- Ventricular tachycardia
- Premature ventricular contractions
- Ventricular fibrillation

VENTRICULAR TACHYCARDIA DIAGNOSIS

- Wide complex
- AV dissociation
- Regular
- Different QRS morphology

VENTRICULAR TACHYCARDIA



VENTRICULAR TACHYCARDIA TREATMENT

- Pulseless: defibrillation and intravenous amiodarone/lidocaine
- Hemodynamically stable: intravenous amiodarone/lidocaine.
- Search for causes: electrolytes, hypoxemia, coronary ischemia
- Transfer to ICU and consult Cardiology

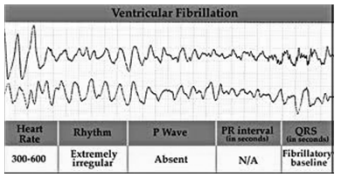
PREMATURE VENTRICULAR CONTRACTIONS

- Common in cardiac patients
- Not harbingers of worse arrhythmias
- Search for causes: electrolytes and hypoxemia
- No need for antiarrhythmics

VENTRICULAR FIBRILLATION DIAGNOSIS AND TREATMENT

- Disorganized electrical activity with no pulse
- Call for help and stat CPR
- Defibrillate
- Start iv amiodarone/lidocaine
- Search for causes: electrolytes, hypoxemia, coronary ischemia
- Transfer to ICU and consult Cardiology

VENTRICULAR FIBRILLATION



Heart Rate	Rhythm	P Wave	PR interval (in seconds)	QRS (in seconds)
300-600	Extremely irregular	Absent	N/A	Fibrillatory baseline

ATRIAL TACHYCARDIAS

- Sinus tachycardia
- Atrial fibrillation
- Atrial flutter
- Supraventricular tachycardias

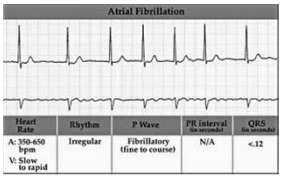
SINUS TACHYCARDIA

- A manifestation of an underlying problem
- Search for a cause: dehydration, fever anxiety, hypotension, bleeding, pain, heart failure, pulmonary embolus, coronary ischemia
- Do not treat with antiarrhythmics
- Treat underlying cause

ATRIAL FIBRILLATION

- Irregularly irregular
- QRS unchanged
- Rate usually below 150 bpm
- Fibrillation waves instead of p in leads II and V1
- Treatment: Amiodarone, digoxin, beta blockers, cardizem

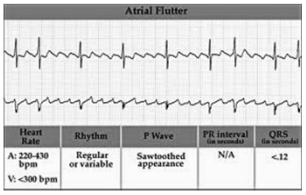
ATRIAL FIBRILLATION



ATRIAL FLUTTER

- Regular
- Rate usually 150 bpm but sometimes 100 or 75 depending on degree of av block
- QRS unchanged
- Treatment: amiodarone digoxin beta blockers cardizem

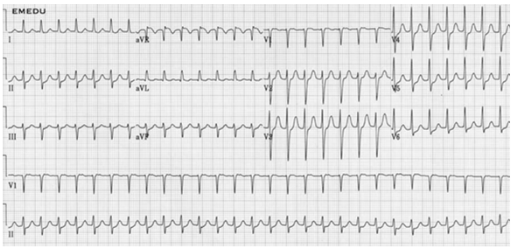
ATRIAL FLUTTER

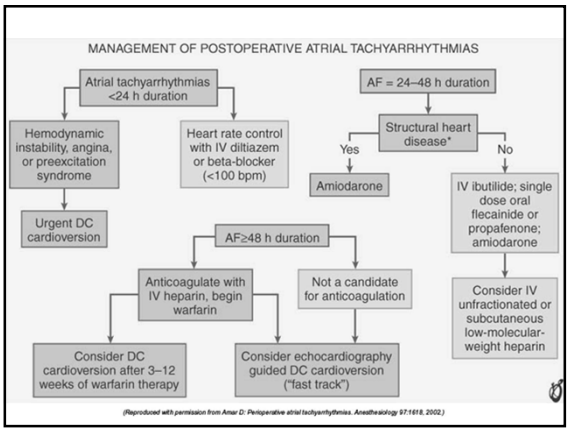


SUPRAVENTRICULAR TACHYCARDIA

- Fixed AV relationship
- QRS usually unchanged
- Regular
- Treatment: adenosine, cardizem, beta blockers, digoxin

SUPRAVENTRICULAR TACHYCARDIA

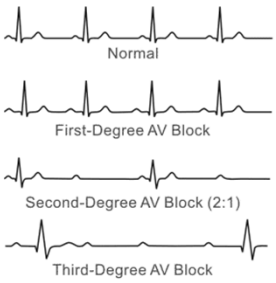




BRADYARRHYTHMIAS

- Different types: asystole, bradycardia, AV block Mobitz I and II complete heart block
- Treatment depends on severity. Temporary pacemaker needed in asystole of more than 3 seconds, bradycardia with rate less than 40 bpm, AV block Mobitz II and complete heart block.
- Types of temporary pacemaker: external and intravenous
- Treatment: atropine and dopamine intravenously

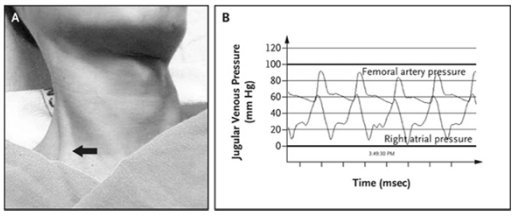
AV BLOCK



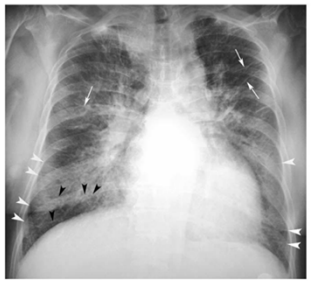
CONGESTIVE HEART FAILURE DIAGNOSIS

- Definition: elevated filling pressure
- Symptoms: shortness of breath, orthopnea, edema, palpitations
- Signs: jugular venous distention, S3, crackles, edema.
- Diagnosis: CXR, Swan Ganz, BNP, echocardiogram, response to treatment
- Types: systolic and diastolic

CONGESTIVE HEART FAILURE



CONGESTIVE HEART FAILURE



CONGESTIVE HEART FAILURE TREATMENT

- Diuretics: lasix, torsemide, bumetanide
- ACE inhibitors and Angiotensin receptor blockers
- Beta blockers
- Digoxin
- Inotropic agents: Primacor and Dobutamine

ACUTE CORONARY SYNDROME DIAGNOSIS

- Spectrum: angina, non ST elevation MI, ST elevation MI
- Angina: chest pain of cardiac origin. May or may not radiate to arm, neck, jaw or back. May be associated with shortness of breath, diaphoresis and nausea
- More common in patients with risk factors: hypertension, hyperlipidemia, diabetes mellitus, peripheral vascular disease
- Diagnosis: clinical picture, ekg and cardiac enzymes (troponin and CPKMB)

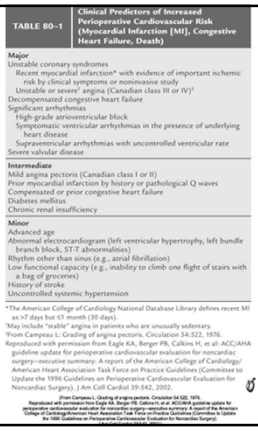


TABLE 80–1 Clinical Predictors of Increased Perioperative Cardiovascular Risk (Myocardial Infarction [MI], Congestive Heart Failure, Death)

Major
Unstable coronary syndromes
- Recent myocardial infarction* with evidence of important ischemic risk by clinical symptoms or noninvasive study
- Unstable or severe† angina (Canadian class III or IV)‡

Decompensated congestive heart failure
Significant arrhythmias
- High-grade atrioventricular block
- Symptomatic ventricular arrhythmias in the presence of underlying heart disease
- Supraventricular arrhythmias with uncontrolled ventricular rate

Severe valvular disease

Intermediate
Mild angina pectoris (Canadian class I or II)
Prior myocardial infarction by history or pathological Q waves
Compensated or prior congestive heart failure
Diabetes mellitus
Chronic renal insufficiency

Minor
Advanced age
Abnormal electrocardiogram (left ventricular hypertrophy, left bundle branch block, ST-T abnormalities)
Rhythm other than sinus (e.g., atrial fibrillation)
Low functional capacity (e.g., inability to climb one flight of stairs with a bag of groceries)
History of stroke
Uncontrolled systemic hypertension

*The American College of Cardiology National Database Library defines recent MI as >7 days but ≤1 month (30 days).
†May include "stable" angina in patients who are unusually sedentary.
‡From Campeau L: Grading of angina pectoris. Circulation 54:522, 1976.
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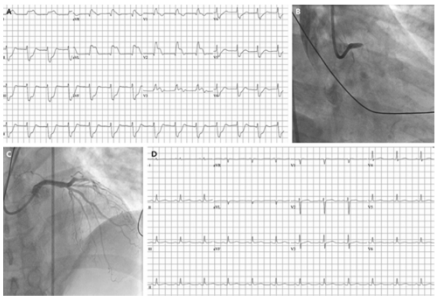
TABLE 80–3	Cardiac Risk* Stratification for Noncardiac Surgical Procedures
High (Reported Cardiac Risk Often >5%)	
Emergent major operations, particularly in elderly people	
Aortic and other major vascular	
Peripheral vascular	
Anticipated prolonged surgical procedures associated with large fluid shifts and/or blood loss	
Intermediate (Reported Cardiac Risk Generally <5%)	
Carotid endarterectomy	
Head and neck	
Intraperitoneal and intrathoracic	
Orthopedic	
Prostate	
Low† (Reported Cardiac Risk Generally <1%)	
Endoscopic procedures	
Superficial procedure	
Cataract	
Breast	

*Combined incidence of cardiac death and nonfatal myocardial infarction.
†Do not generally require further preoperative cardiac testing.
Reproduced with permission from Eagle KA, Berger PB, Calkins H, et al: ACC/AHA guideline update for perioperative cardiovascular evaluation for noncardiac surgery: Executive summary: A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1996 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery). J Am Coll Cardiol 39:542, 2002.

ACUTE CORONARY SYNDROME TREATMENT

- Morphine, oxygen, nitroglycerin and aspirin; if not contraindicated
- Anticoagulation if not contraindicated
- For ST elevation MI: an emergency catheterization is indicated with the idea of implanting a coronary stent within 90 minutes
- Transfer to ICU and Cardiology consult

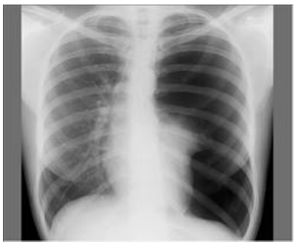
ST ELEVATION MI



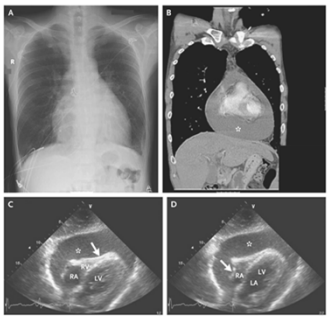
HYPOTENSION DIFFERENTIAL DIAGNOSIS

- Bleeding: Check H/H and look for sources
- Volume depletion: dry tongue, skin changes, reduced urine output, concentrated urine and history of reduced water intake before surgery
- Medication effects: calcium channel blocker, beta blockers, antihypertensives
- Tension pneumothorax: stat CXR
- Cardiac tamponade: stat echocardiogram
- Vagal effect

TENSION PNEUMOTHORAX



CARDIAC TAMPONADE



HYPOTENSION TREATMENT

- Intravenous fluids: Normal saline or lactated Ringer's solution
- Albumin intravenously
- Blood transfusions if bleeding
- Trendelenburg position
- Vasopressors: dopamine, levophed, neosynephrine
- Intraaortic balloon pump for congestive heart failure

HYPERTENSION DIAGNOSIS

- Treat pain and anxiety
- Check blood pressure in both arms
- Patient with chronic hypertension will need reinitiation of antihypertensives
- Be aware of rare causes: pheochromocytoma, renal crisis in scleroderma, refractory hypertension in dialysis patients

HYPERTENSION TREATMENT

- Intravenous labetalol
- Intravenous cardene
- Intravenous esmolol
- Intravenous nitroglycerin
- Topical nitroglycerin and clonidine

FINAL COMMENTS

- Treat patients not numbers
- Investigate the underlying cause of the problem
- When in doubt double check or ask for help
- A good history and physical exam will give you the information
- Be prepared

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