INTRODUCTION:
A coronary care unit (CCU) or cardiac intensive care unit (CICU) is a hospital ward specialized in the care of patients with acute coronary syndromes, Cardiac dysrhythmia, and (in practice) various other cardiac conditions that require continuous monitoring and treatment.
MOST COMMON COMPLICATIONS IN CCU:

- Arrhythmias
- Recurrent Ischemia/Infarction
- Congestive Heart Failure/LV Failure
- Cardiogenic Shock
- Interventricular Septal Rupture
- Free Wall Rupture
- Acute Mitral Regurgitation
- Right Ventricular Infarction
- Pericardial Effusion and Pericarditis
- Infections
- Complications related to MV.

ARRHYTHMIAS

- Different types of arrhythmias and conduction disturbances
  - Premature ventricular contractions
  - VT and V Fib
  - Atrial arrhythmias
  - Bradycardia
- Varying clinical consequences depending upon severity of coronary artery disease, valvular heart disease, LV dysfunction
VENTRICULAR PREMATURE BEATS (PVCS)

- Commonly seen in patients with acute MI
- Usually pursue a conservative approach and do not routinely prescribe antiarrhythmic drugs but instead determine whether recurrent ischemia or electrolyte/metabolic disturbances are present

VENTRICULAR TACHYCARDIA

- When continuous ECG recordings during the first 12 hours of AMI are analyzed, nonsustained paroxysms of VT may be seen in up to 67% of patients
- Hypokalemia and hypomagnesemia may increase the risk of developing VT
- Hemodynamically stable extrasystoles/VT can be treated pharmacologically with lidocaine, amiodarone or procainamide
VENTRICULAR FIBRILLATION

- Ventricular fibrillation occurring in association with marked LV failure or cardiogenic shock entails a poor prognosis, with an in-hospital mortality rate of 40-60%.
- Ventricular fibrillation or unstable ventricular tachycardia should be treated with prompt electrical cardioversion.
- MgSO₄ in patients with Torsades
ATRIAL ARRHYTHMIAS

- Atrial Flutter and Fibrillation
- Atrial flutter – usually transient
- Atrial Fibrillation occurs in 10-20% of patients with AMI
- The increased ventricular rate and the loss of atrial contribution to LV filling result in a significant reduction in cardiac output and hypotension.
- Atrial fibrillation in AMI is associated with increased mortality and stroke
- Can be treated by Amiodarone and correction of electrolyte disturbances if the patient is haemodynamically stable
  - Synchronized cardioversion immediately if hemodynamic instability

SUPRAVENTRICULAR ARRHYTHMIAS

- Paroxysmal Supraventricular Tachycardia
- Requires aggressive management because of the rapid ventricular rate
- Augmentation of vagal tone – manual carotid massage
- Drug of choice – adenosine (in non-AMI patients)
- Alternatives: IV verapamil, diltiazem, metoprolol
**BRADYARRHYTHMIAS**

- Sinus Bradycardia
- Common arrhythmia occurring during the early phases of AMI
- Particularly frequent in patients with inferior and posterior infarction
- Isolated sinus bradycardia, unaccompanied by hypotension or ventricular ectopy, should be observed rather than treated initially
- Atropine should be utilized if hypotension accompanies any degree of sinus bradycardia

**ATRIOVENTRICULAR AND INTRAVENTRICULAR BLOCK**

- **First Degree AV Block**
  - Occurs in less than 15% of patients with AMI admitted to CCUs
  - Generally does not require specific treatment
- **Second Degree AV block**
  - Mobitz Type II
  - Rare conduction defect after AMI
  - Often progresses suddenly to complete AV block
  - Treated with a temporary external or transvenous demand pacemaker
**ATRIOVENTRICULAR AND INTRAVENTRICULAR BLOCK**

- **Complete (Third Degree) AV block**
  - Often develops gradually, progressing from first-degree or type II second-degree block
  - Treat with temporary external or transvenous demand pacemaker

**RECURRENT ISCHEMIA AND INFARCTION**

- Incidence of postinfarction angina without reinfarction is 20-30%
- Reduced incidence with primary PCI
- May be due to occlusion of an initially patent vessel, reocclusion of an initially recanalized vessel, or coronary spasm.
LEFT VENTRICULAR FAILURE

- The single most important predictor of mortality after AMI
- Increased clinical manifestations as the extent of the injury to the LV increases
- Mortality increases with the severity of the hemodynamic deficit
- Treatment:
  - Diuretics
  - Nitroglycerin
  - Vasodilators
  - Digitalis
  - Beta-adrenoceptor agonists
  - Other positive inotropic agents

CARDIOGENIC SHOCK

- Most severe clinical expression of left ventricular failure
- Occurs in up to 7% of patients with AMI
- Low output state characterized by elevated ventricular filling pressures, low cardiac output, systemic hypotension, and evidence of vital organ hypoperfusion
- Medical Management
  - Same as tx for LV failure
  - Intraaortic balloon counterpulsation
  - Revascularization, cardiac assist device and even heart transplantation.
INTERVENTRICULAR SEPTAL RUPTURE (VSR)

- Occurs in 0.2 percent of patients with AMI
- Clinical features associated with increased risk of rupture:
  - Lack of development of collateral network
  - Advanced age
  - Hypertension
  - Anterior location of infarction
  - Thrombolysis
- Higher 30-day mortality (74%) compared to those patients who do not develop this complication (7%)

INTERVENTRICULAR SEPTAL RUPTURE (VSR)

- The size of the defect determines:
  - The magnitude of the left-to-right shunt
  - Extent of hemodynamic deterioration
  - Likelihood of survival
- Associated with complete heart block, right bundle branch block, and atrial fibrillation in 20-30 percent of cases
- Intraaortic balloon counterpulsation, immediate surgery.
FREE WALL RUPTURE

- Usually leads to hemopericardium and death from cardiac tamponade.
- Occasionally, rupture of the free wall of the ventricle occurs as the first clinical manifestation in patients with undetected or silent MI, and then it may be considered a form of "sudden cardiac death."
- The course of rupture can vary from catastrophic, with an acute tear leading to immediate death, to subacute, with nausea, hypotension, and pericardial type of discomfort.
- Survival depends on the recognition of this complication, on hemodynamic stabilization of the patient, and most importantly, on prompt surgical repair.

PSEUDOANEURYSM

- Incomplete rupture of the heart, with organizing thrombus and hematoma, together with pericardium, seal a rupture of the left ventricle.
- With time this area of organized thrombus and pericardium can become a pseudoaneurysm that maintains communication with the cavity of the left ventricle.
**ACUTE MITRAL REGURGITATION**

- Due to partial or total rupture of a papillary muscle
- Rare but often fatal complication of transmural MI
- Complete transection of a left ventricular papillary muscle is incompatible with life because the sudden massive mitral regurgitation that develops cannot be tolerated
- Rupture of a portion of a papillary muscle resulting in severe mitral regurgitation is much more frequent and is not immediately fatal

**RIGHT VENTRICULAR INFARCTION**

- Frequently accompanies inferior LV infarction or rarely occurs in isolated form
- Right-sided filling pressures are elevated, whereas left ventricular filling pressure is normal or only slightly raised
- Cardiac output is often markedly depressed
- Unexplained systemic arterial hypotension or diminished cardiac output or marked hypotension in response to small doses of nitroglycerine in patients with inferior infarction should lead to the prompt consideration of this diagnosis
**RIGHT VENTRICULAR INFARCTION**

- Most patients with RV infarction have ST segment elevation in lead V4R (right precordial lead in V4 position), and sometimes ST segment elevation in V1.

- 2-D echocardiography: abnormal wall motion of the right ventricle as well as right ventricular dilatation and depressed RV ejection fraction.

-Medications routinely prescribed for LV infarction may produce profound hypotension in patients with RV infarction (especially nitroglycerine).

- Initial treatment of hypotension in patients with RV infarction include volume expansion (fluids, fluids, fluids!!)

**PERICARDIAL EFFUSION**

- Generally detected by 2-D echocardiography

- More common in patients with anterior MI and with larger infarcts and when congestive heart failure is present

- Majority do not cause hemodynamic compromise; when tamponade occurs, it is usually due to ventricular rupture or hemorrhagic pericarditis
**PERICARDITIS**

- When secondary to transmural MI, pericarditis may produce pain as early as the first day and as late as 6 weeks after MI.
- Treatment of pericardial discomfort consists of aspirin at doses as high as 650mg every 4-6 hours. (Corticosteroids should be avoided because they may interfere with healing)

**DEEP VENOUS THROMBOSIS AND PULMONARY EMBOLISM**

Importance of DVT Prophylaxis:

- Acute DVT/PE prevention
- Symptomatic proximal DVT can be an extension of distal DVT that was previously asymptomatic.
- Significant number of fatal PE’s NOT preceded by symptomatic DVT.
- Most preventable cause of hospital associated death in medical patients → PE.
**STRESS RELATED MUCOSAL DISEASE**

- It's related to hypoperfusion of the UGI tract with a secondary irritant, usually gastric acid.
- Presented by hematemesis or Melena
- Prevented by:
  - H₂-blockers
  - sucralfate
  - PPIs

**VENTILATOR ASSOCIATED PNEUMONIA**

- Aspiration of oropharyngeal pathogens, or leakage of secretions around the endotracheal tube
- Hematogenous spread from infected intravenous Catheters.
- Bacterial translocation from the gastrointestinal tract lumen.
- 3 or 4 days after intubation
- Increases ICU and hospital stay, time on ventilator and mortality.
VENTILATOR ASSOCIATED PNEUMONIA

Prevented by:

• Patients should be kept in the semi-recumbent position 30–45°.
• Extubate as early as possible.
• Reduction of sinusitis risk by oro-gastric not naso-gastric ryles.
• Reduction of aspiration risk by regular removal of secretions.
• Daily oral hygiene.
• Weekly tubing circuit changes.

INFECTIONS

Strategy for Prevention:

• Handwashing
• Use gloves to prevent contamination of the hands when handling respiratory secretions
• Wear gloves and gowns (contact precautions) during all contact with patients and fomites potentially contaminated with respiratory secretions
• Use aseptic technique
• Prudent Antibiotic use
• Aseptic technique
• Disinfection/Sterilization of items and equipment
• Education of staff infection control awareness
• Keep Environment Clean, Dry and dust free
• Surveillance of nosocomial infection to identify problems areas & set priorities
CARDIAC ARREST

TAKE HOME MESSAGE

• Do no harm
• Be aware of all the potential complications that can arise in CCU, diagnose these complications when they occur, and treat the patient appropriately in a timely manner to reduce morbidity and mortality.
Thank You