



London Health Sciences Centre

Southwest Ontario Regional Base Hospital Program

Acute Coronary Syndrome (ACS)

Tony Jaroszewicz, AEMCA, ACP
Dr. Adam Dukelow, LMD

Objectives

Given this webinar presentation, the paramedic should be able to:

- Define Acute Coronary Syndrome
- Locate and identify the coronary arteries and the section of the myocardium that they feed
- Describe and identify the common signs and symptoms of left sided and right sided myocardium infarct, injury and ischemia
- Summarize the pharmacokinetics and pharmacodynamics of Nitroglycerin, ASA and Morphine
- Relate the proper application of the *Suspected Cardiac Ischemia Chest Pain Protocol*

As evaluated by the learner.

Acute Coronary Syndrome (ACS)

Definition:

- Sudden ischemic disorders of the heart
- Include unstable angina and acute myocardial infarction
- Represent a continuum of a similar disease process
- All have sudden ischemia
- Cannot be differentiated in the first hours
- All have the same initiating events

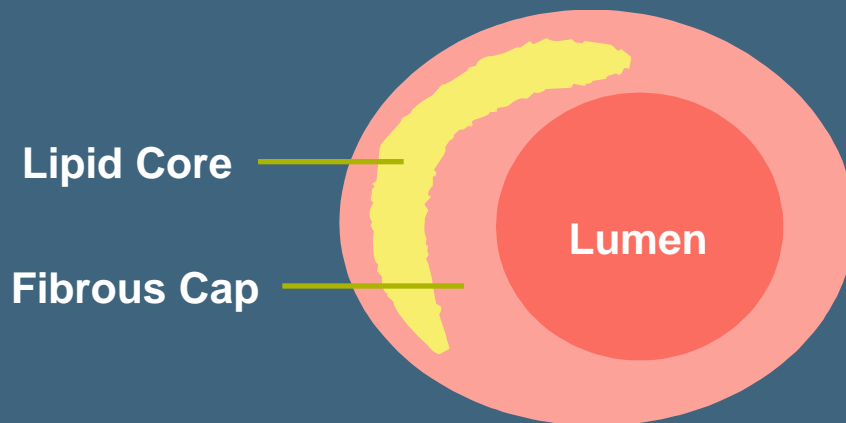
Acute Coronary Syndrome (ACS)

Initiating Events

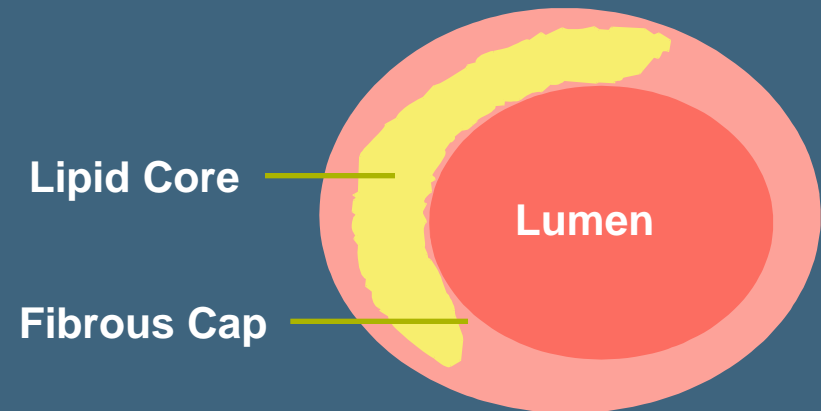
- Plaque rupture
- Thrombus formation
- Vasoconstriction

Initiating Events – Plaque Rupture

Stable

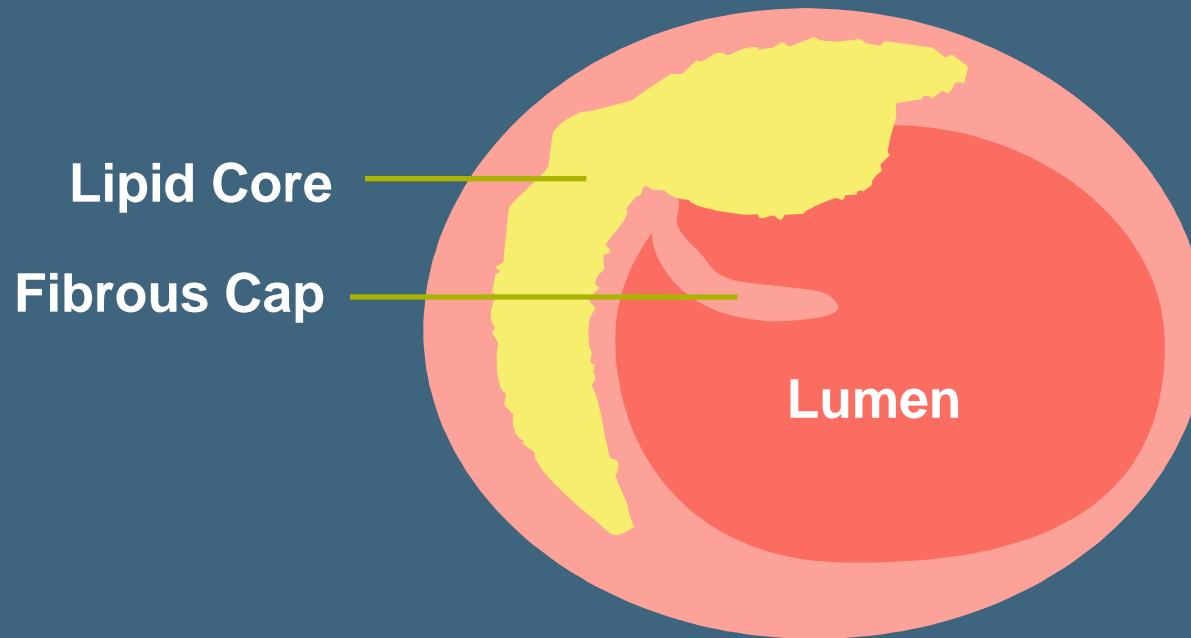


Vulnerable



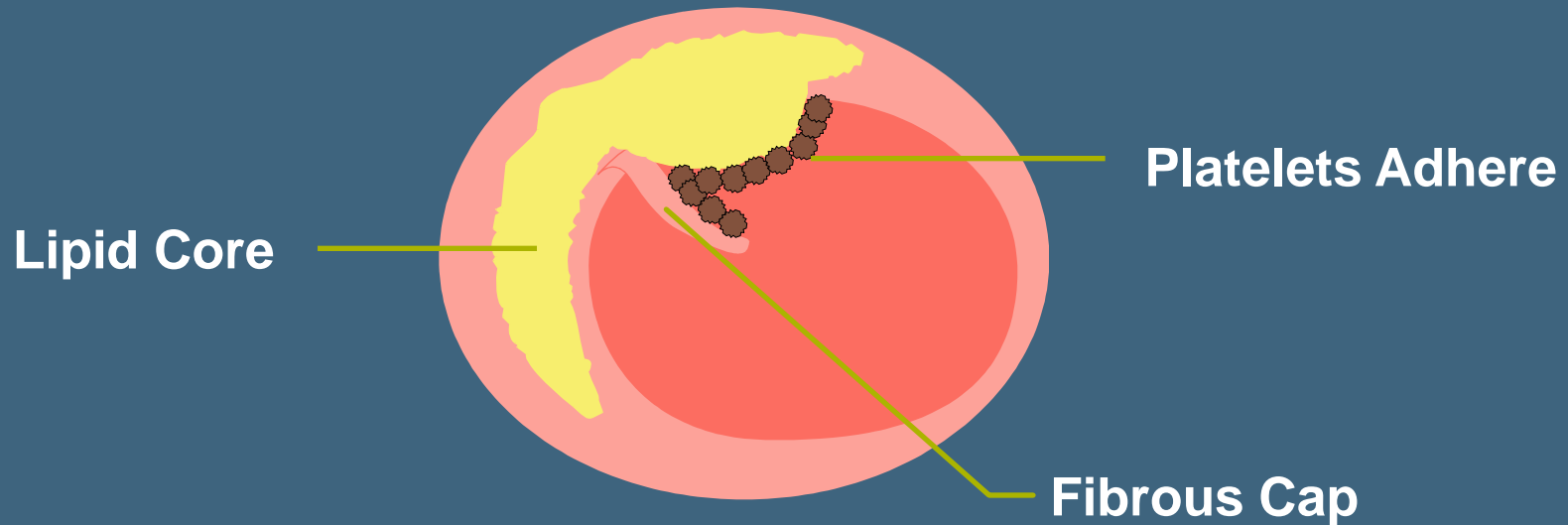
Initiating Events

Plaque Rupture



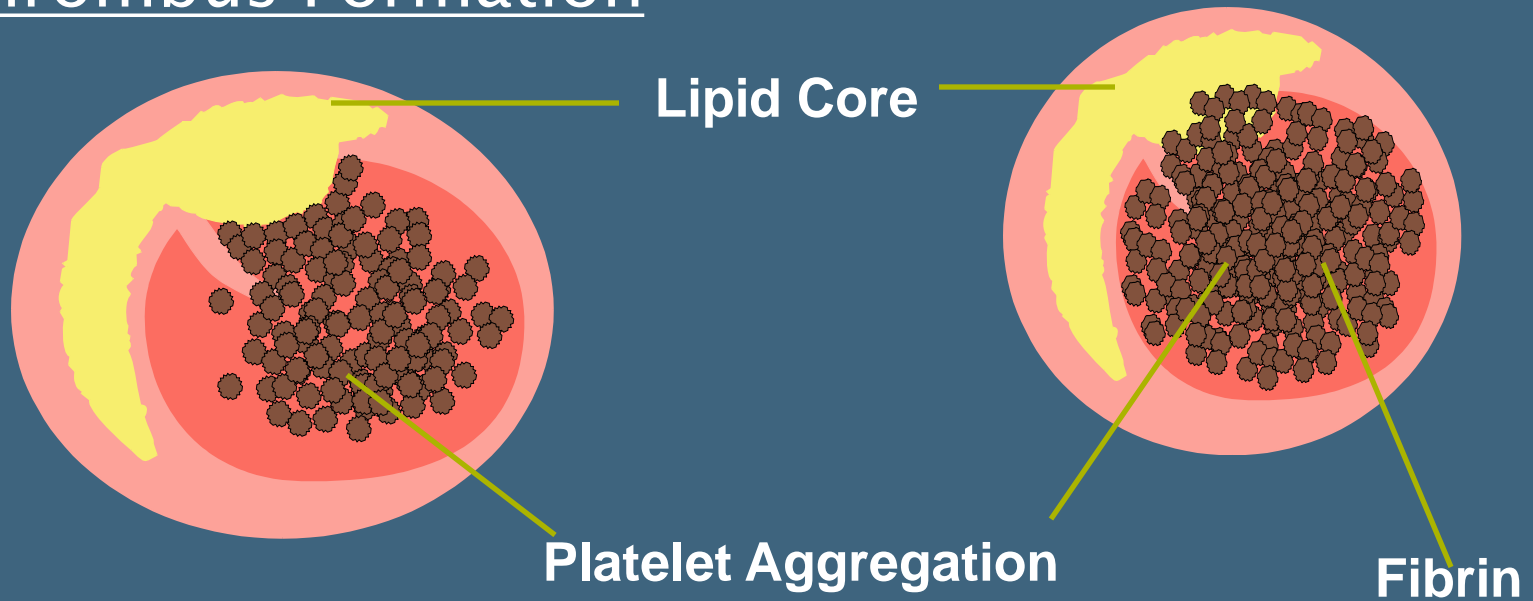
Initiating Events

Thrombus Formation



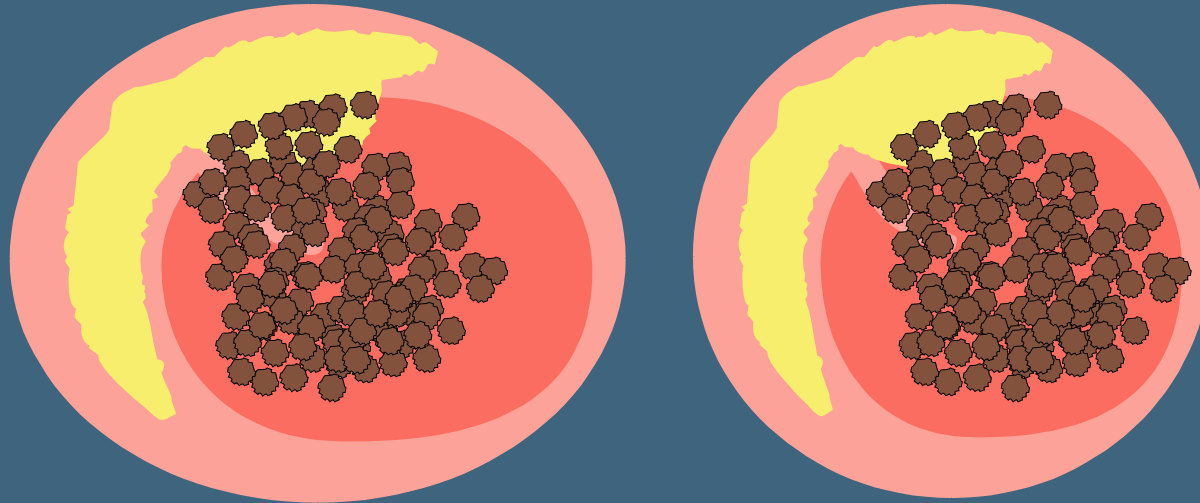
Initiating Events

Thrombus Formation



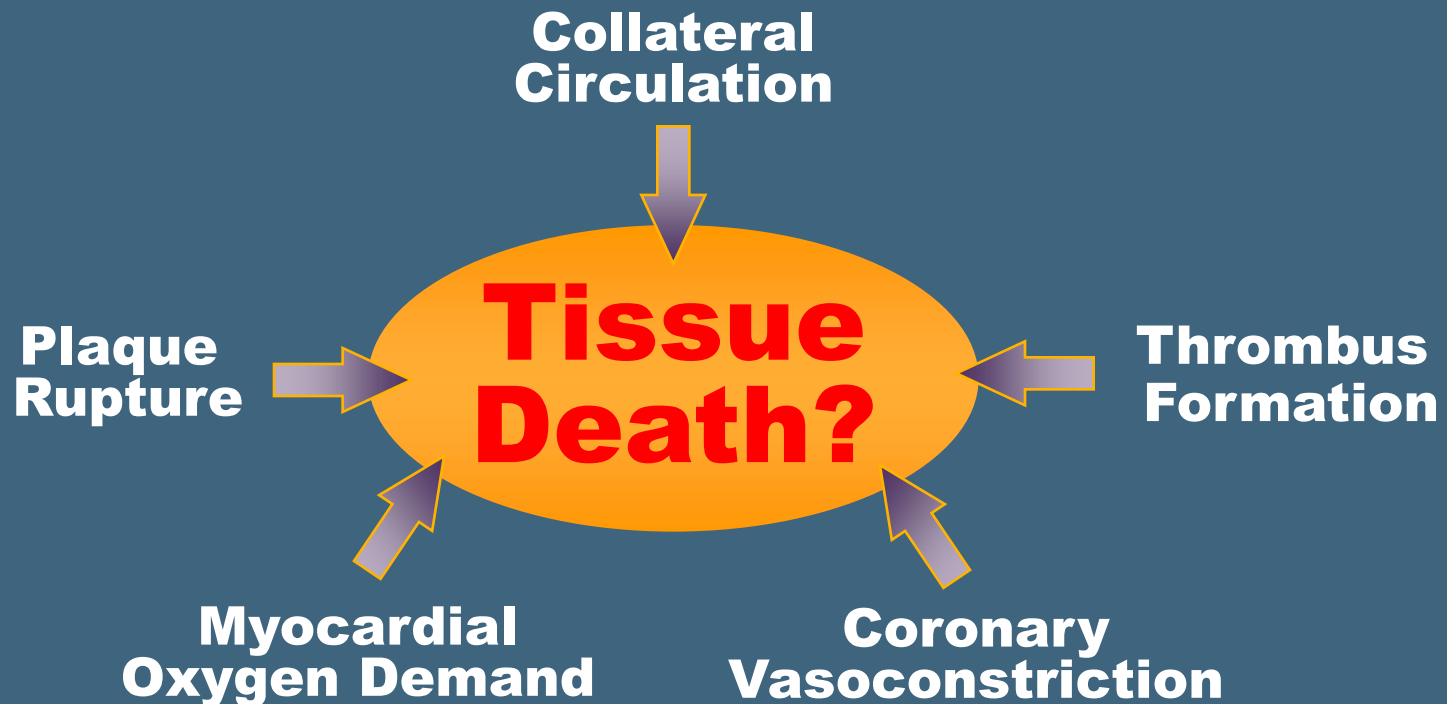
Initiating Events

Vasoconstriction



Acute Coronary Syndrome (ACS)

Will Infarct Occur?

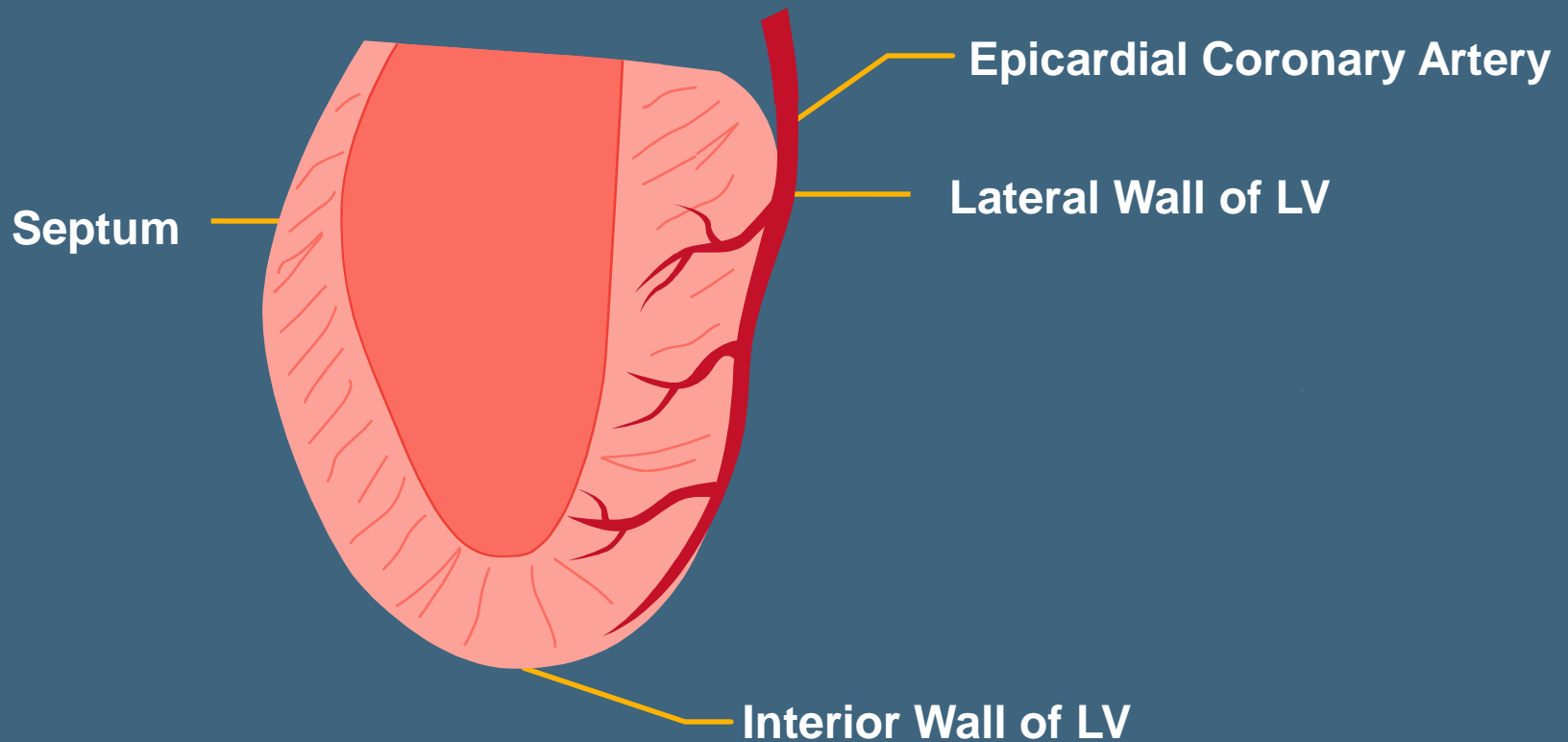


Acute Coronary Syndrome (ACS)

- The Three I's
- **Ischemia**
 - lack of oxygenation
- **Injury**
 - prolonged ischemia
- **Infarct**
 - death of tissue

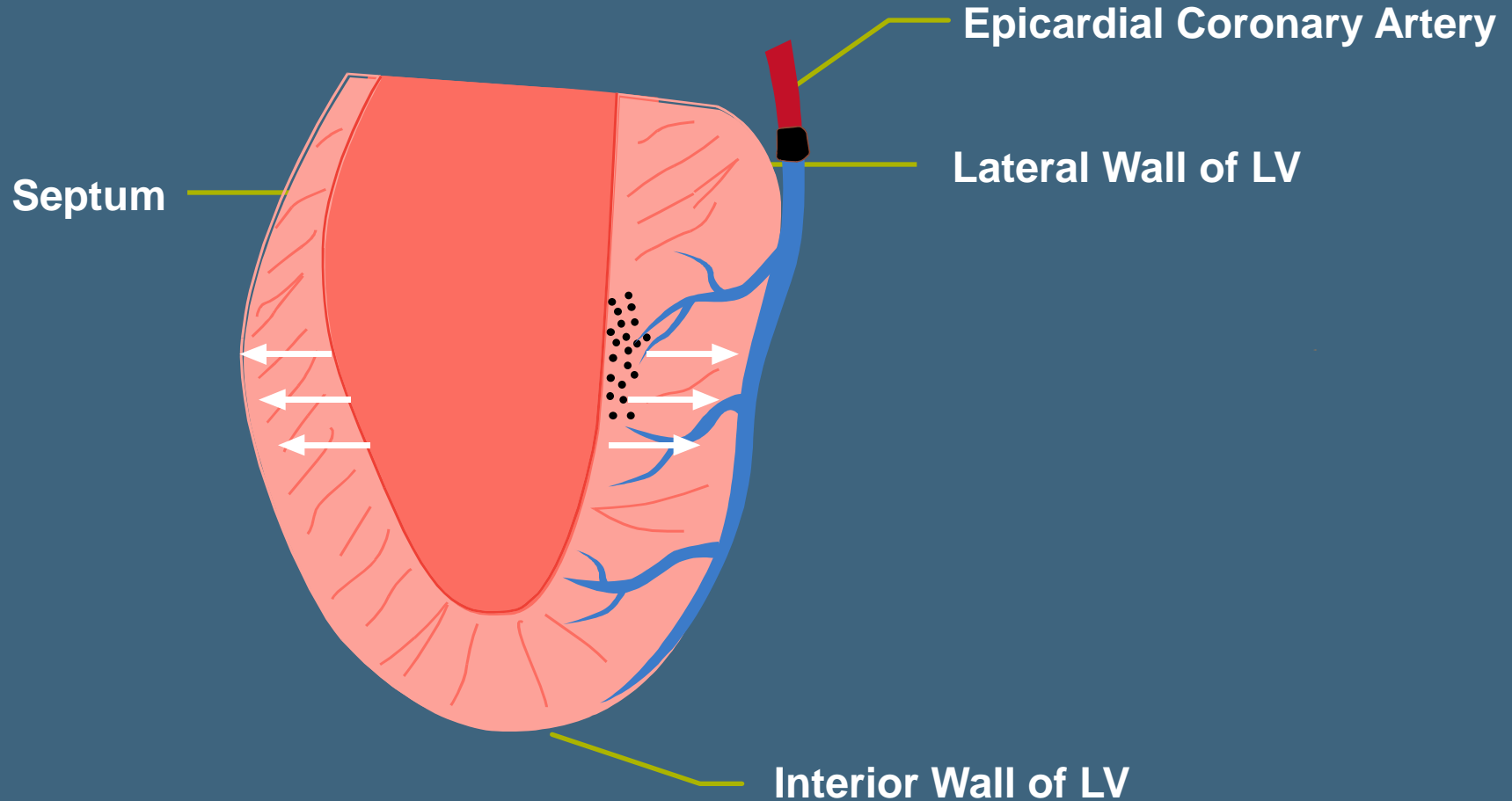
Acute Coronary Syndrome (ACS)

Well Perfused Myocardium



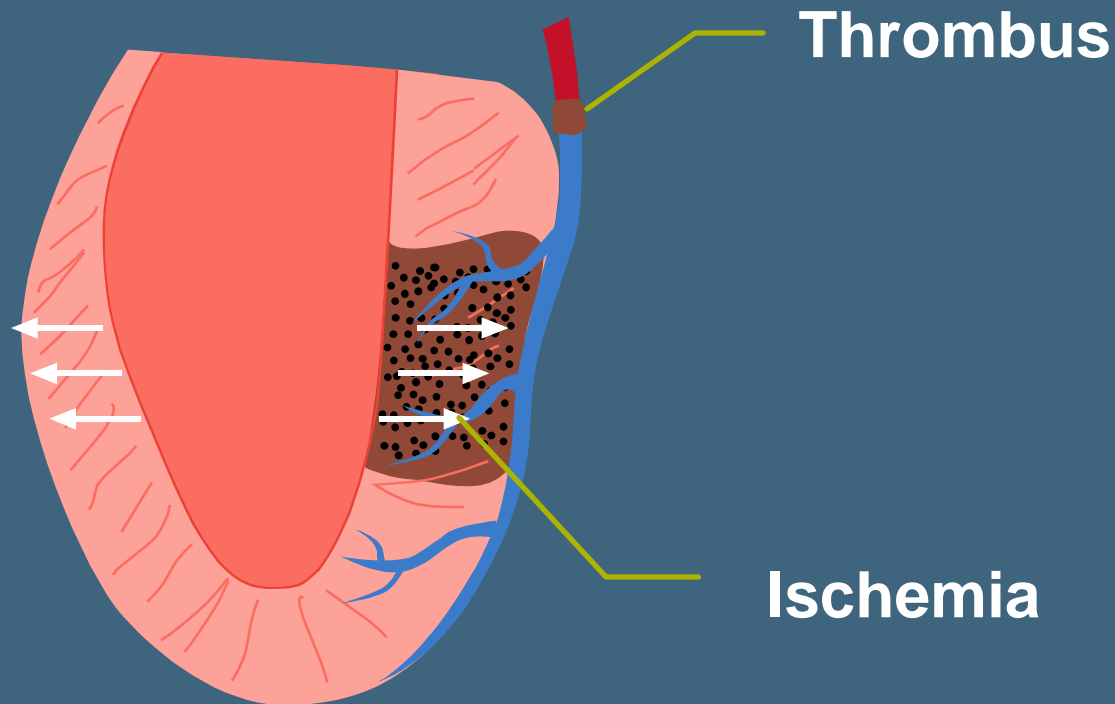
Acute Coronary Syndrome (ACS)

Ischemia



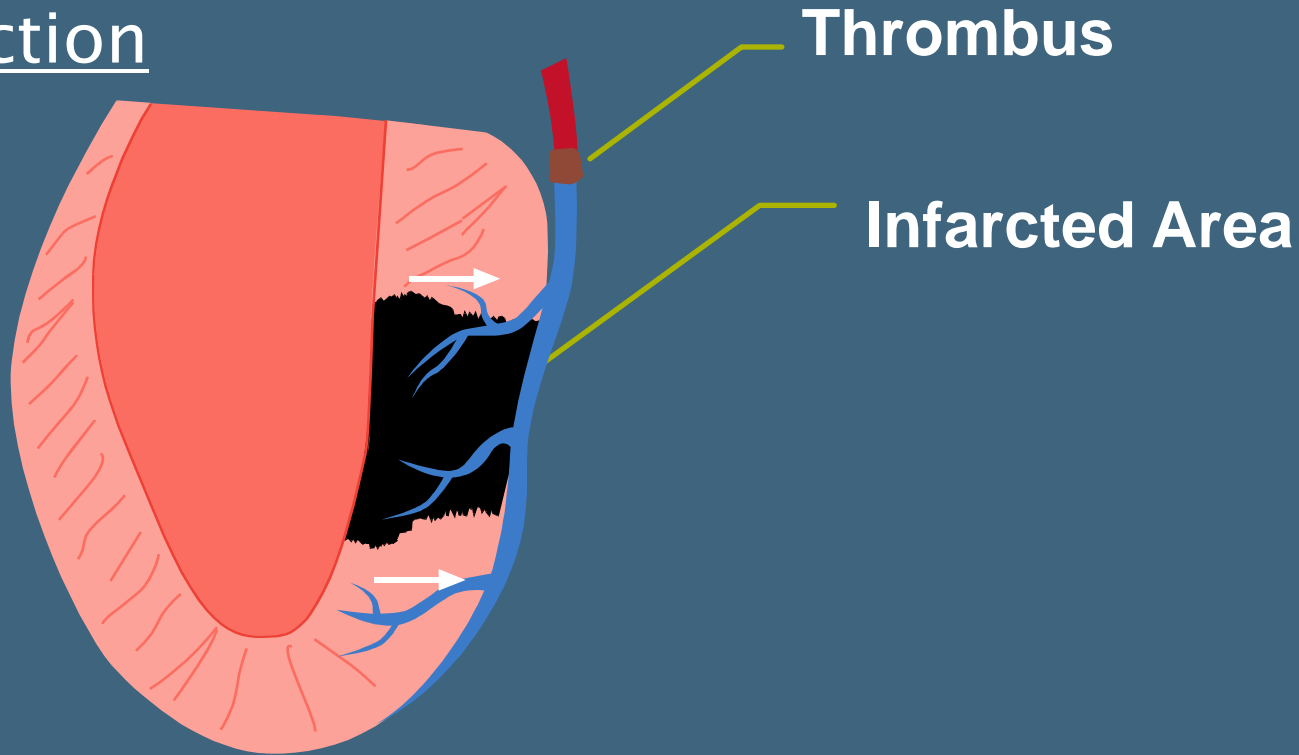
Acute Coronary Syndrome (ACS)

Injury



Acute Coronary Syndrome (ACS)

Infarction



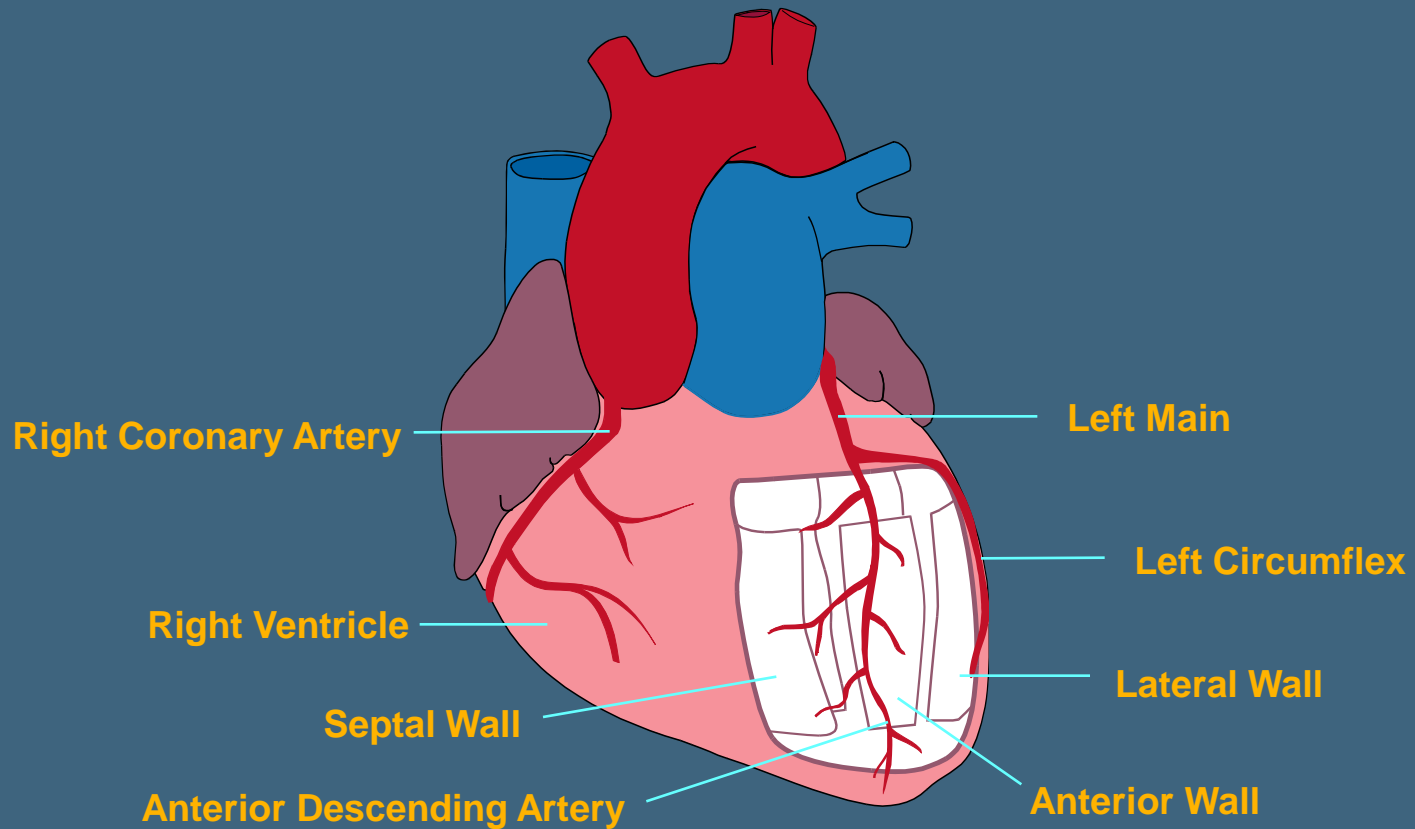
Thrombus

Infarcted Area

Coronary Artery Anatomy

- Varies from patient to patient
- General patterns of distribution exist

Left Coronary Artery

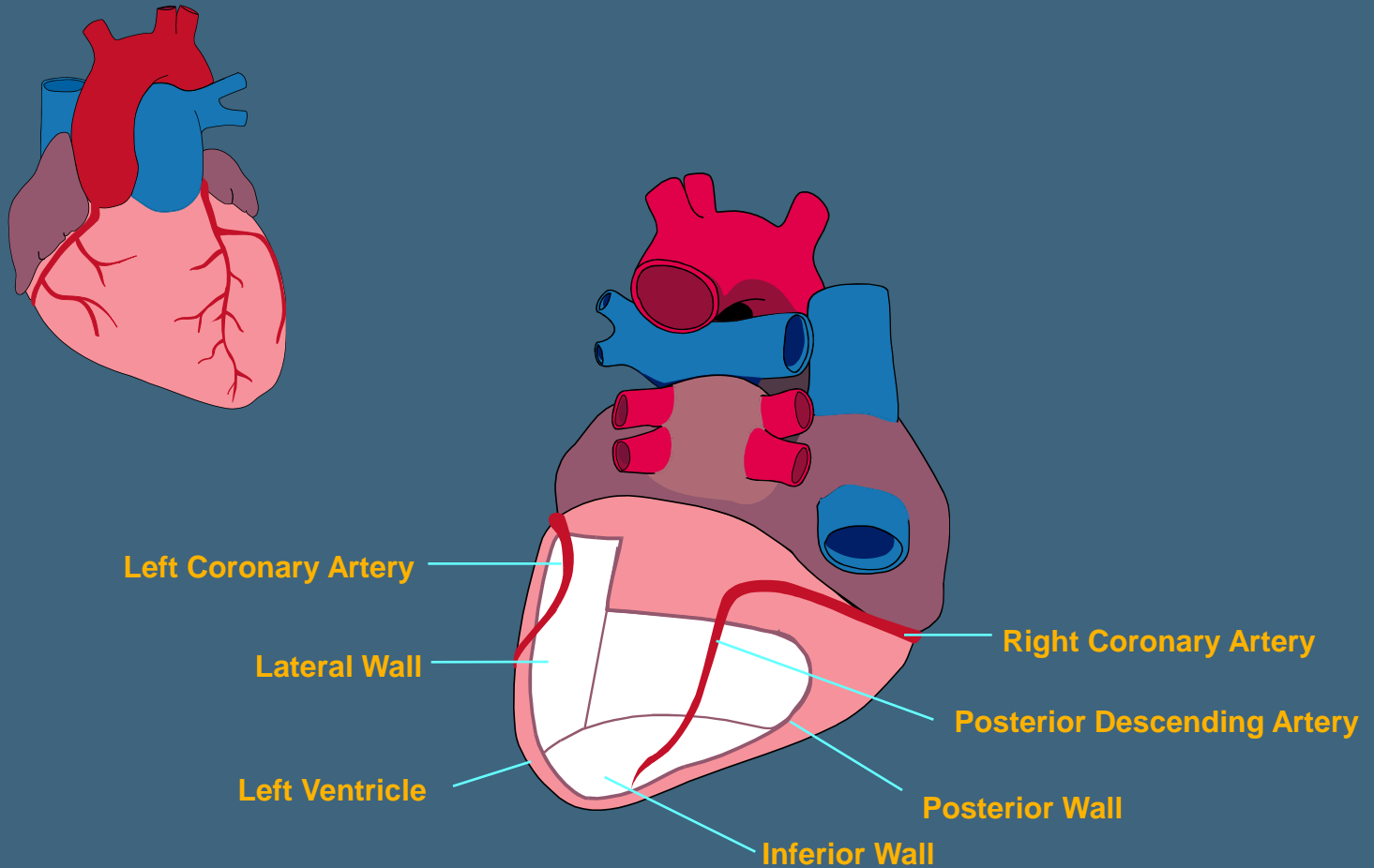


Left Coronary Artery Occlusion

Signs and Symptoms

- ACS Spectrum
- Shortness of breath
- Diaphoresis
- Pulmonary Edema

Right Coronary Artery



Right Coronary Artery Occlusion

Signs and Symptoms

- Dyspnea with clear lungs
- Jugular vein distension
- Hypotension
 - Relative or absolute

Acute Coronary Syndrome (ACS)

** Now we to know how to rapidly recognize and treat ACS **

Immediate Evaluation

- Story
- Risk factors
- ECG

Clinical Presentations of ACS

- Classic anginal chest pain
- Atypical chest pain
- Anginal equivalents

Classic Anginal Chest Pain

- Central anterior chest
- Dull, fullness, pressure, tightness, crushing
- Radiates to arms, neck, back

Classic Anginal Chest Pain

- Consider the following case study
- 48 year old male
 - Dull central CP 2/10, began at rest
- Pale and wet
- Overweight, smoker
- Vital signs: RR 18, P 80, BP 180/110, SaO₂ 94% on room air

Atypical Pain

- Musculoskeletal, positional or pleuritic features
- Often unilateral
- May be described as sharp or stabbing
- Includes epigastric discomfort
- Females often express atypical pain

Atypical Pain

- Consider the following case study
- A 54-year-old female with a history of type 2 diabetes, hypertension, complaining of chest pain, weakness, and fatigue. Her chest pain was pleuritic in nature, worsening with movement and deep breathing. When she was motionless, the pain completely resolved.
- Pale and overweight
- Vital signs: RR 18, P 80, BP 180/110, SaO₂ 94% on room air

Anginal Equivalents

- Dyspnea
- Palpitations
- Syncope or pre-syncope
- General weakness
- DKA

Anginal Equivalents

- Consider the following case study
- 68 year old female
 - Sudden onset of anxiety and restlessness,
 - States she “can’t catch her breath”
 - Denies chest pain or other discomfort
- History of IDDM and hypertension
- RR 22, P 110, BP 190/90, SaO₂ 88% on NC at 4 lpm.

Important Notation

- Note *EXACT* time symptoms began
- Duration of symptoms may effect therapeutic options and destination decisions

Consider Risk Factors

- Evaluated with a high index of suspicion for ACS
- Decision pathways with potential ACS patients

Risk Factors of ACS

- Diabetes
- Smoking
- Hypertension
- Age
- Family history of CAD
- Obesity
- Stress
- Sedentary

General Therapy for ACS

• Assessment

- Expose the chest
- Story and risks
- Monitor & 12-lead
- Vital signs & SaO₂
- Lab draw/cardiac markers

Treatment

- Oxygen
- IV access
- Aspirin
- NTG
- Morphine

Treatment for ACS

- Oxygen
- ASA
- IV Therapy
- NTG
- Morphine

Cardiac Ischemia Directive

- Ischemic Chest Pain
- Angina
- Typical angina/MI Pain
- Nitroglycerin 0.4 mg (6 doses)
- ASA 160 mg (one dose)

Conditions for Nitro

- $Be \geq 40$ kg
- Alert and responsive
- Prescribed and taken Nitroglycerin in the past , or paramedic has started an IV
- No ED medication in past 48 hours
- $SBP \geq 100$ mmHg
- Heart rate ≥ 60 and < 160

Conditions for ASA

- $Be \geq 40$ kg
- Alert
- Responsive
- No allergy to ASA or other NSAID
- No current active bleeding
- No evidence of CVA or head injury – 24 hours
- Previous use of ASA with no adverse reaction if a known asthmatic

Procedure

- Oxygen
- Monitor, vital signs,
- Do not delay treatment to start IV
- If no IV, administer Nitroglycerin only in patients with a history of previous Nitroglycerin use.

Procedure

- Systolic BP is ≥ 100 mmHg
- Heart rate is ≥ 60 bpm and < 160 bpm.
- Nitroglycerin 0.4 mg spray SL, q 5 minutes
- Maximum of six (6) doses.
- Administer ASA 160–162 mg
- 12-Lead if certified

Procedure

- Vital signs before/after each dose
- Stop NTG administration if SBP drops by more than 1 / 3
- Discontinue NTG if vital signs fall outside of parameters
- If required and certified, follow the Intravenous Access & Fluid Administration Protocol

Notes

- Chest pain fully resolves and then recurs, it is treated as a new episode
- Nitroglycerin protocol is repeated, but not the ASA.
- Administer ASA if the patient has already taken their normal dose
- Administer ASA even if the chest pain has resolved

Morphine Sulphate Procedure (ACP Only)

- After three (3) doses of NTG, patient is still c/o chest pain
- No allergies to Morphine Sulfate
- SBP \geq 100 mmHg
- Administer 2 mg Morphine Sulfate IV q 5 minutes if SBP is \geq 100 mmHg and the pain has not been relieved
- Maximum of five (5) doses (10 mg total) of MSO4
- NTG maximum of six doses.
- Contact the BHP if further orders are required

Summary

- ACS is a sudden ischemic disorder of the heart including unstable angina and AMI
- Can involve ischemia, injury, or infarct
- Rapid recognition and treatment is vital for best possible outcome

Questions ?

- **Contact SWORBHP**
 - 519-667-6718
 - ParamedicEducation@lhsc.on.ca

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