



London Health Sciences Centre

Southwest Ontario Regional Base Hospital Program

Acute Coronary Syndrome (ACS)

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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

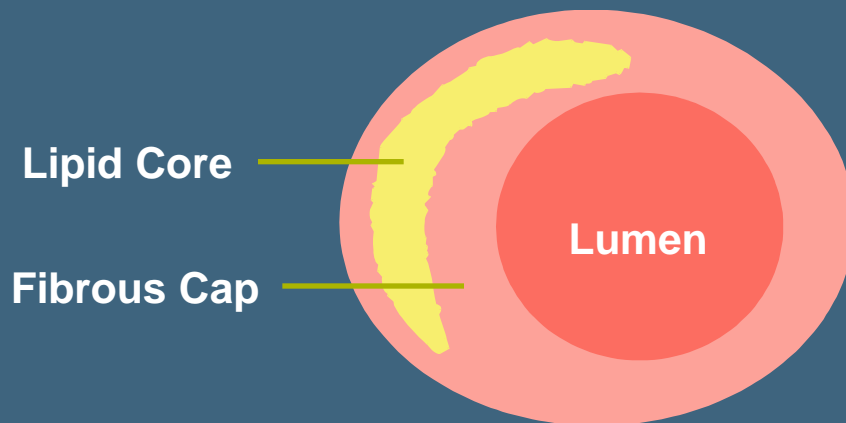
Acute Coronary Syndrome (ACS)

Initiating Events

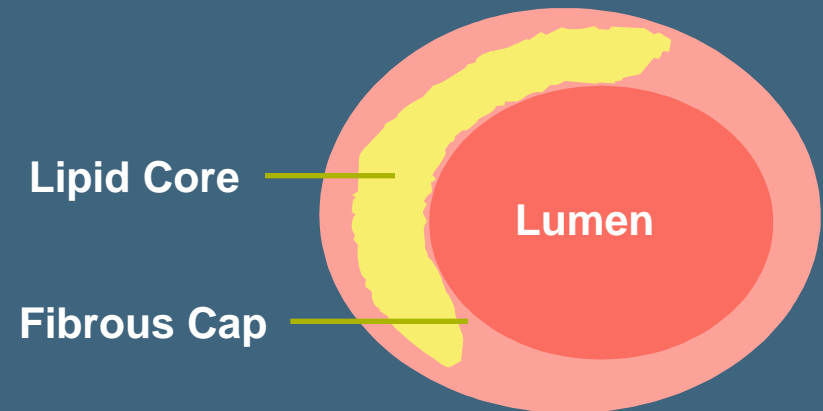
- Plaque rupture
- Thrombus formation
- Vasoconstriction

Initiating Events – Plaque Rupture

Stable

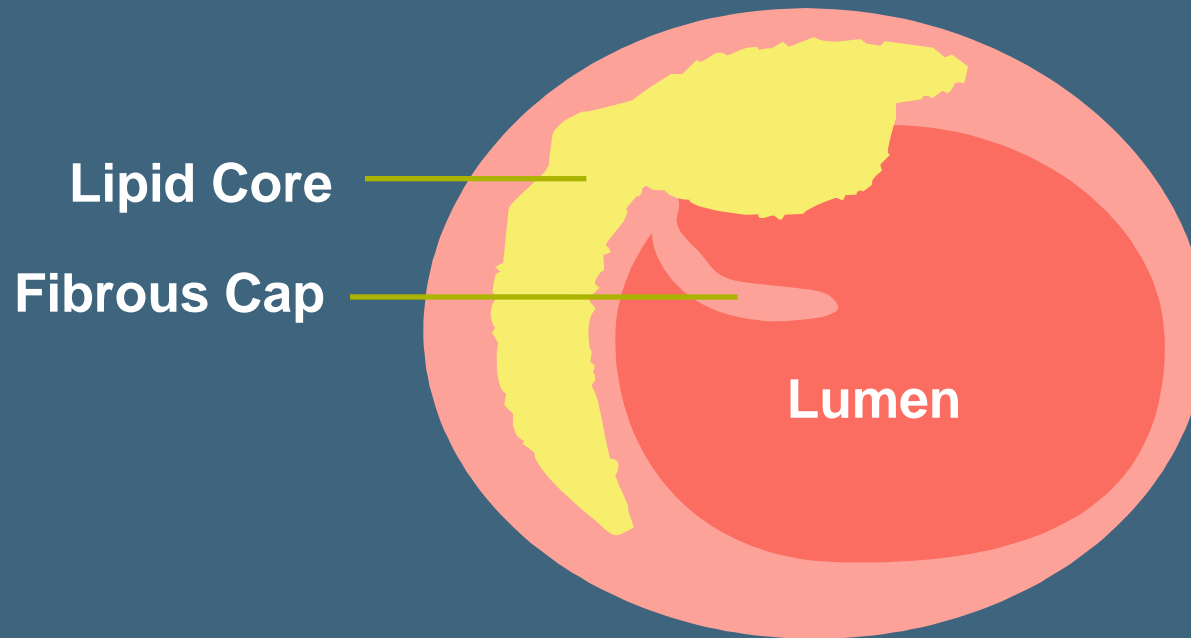


Vulnerable



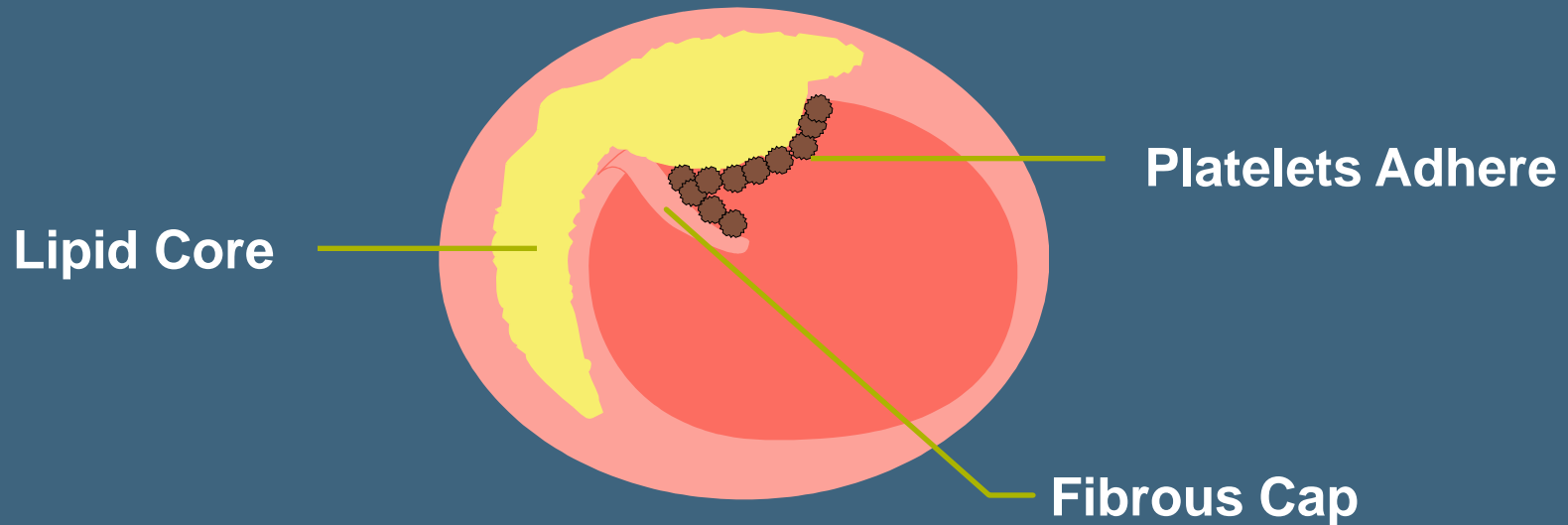
Initiating Events

Plaque Rupture



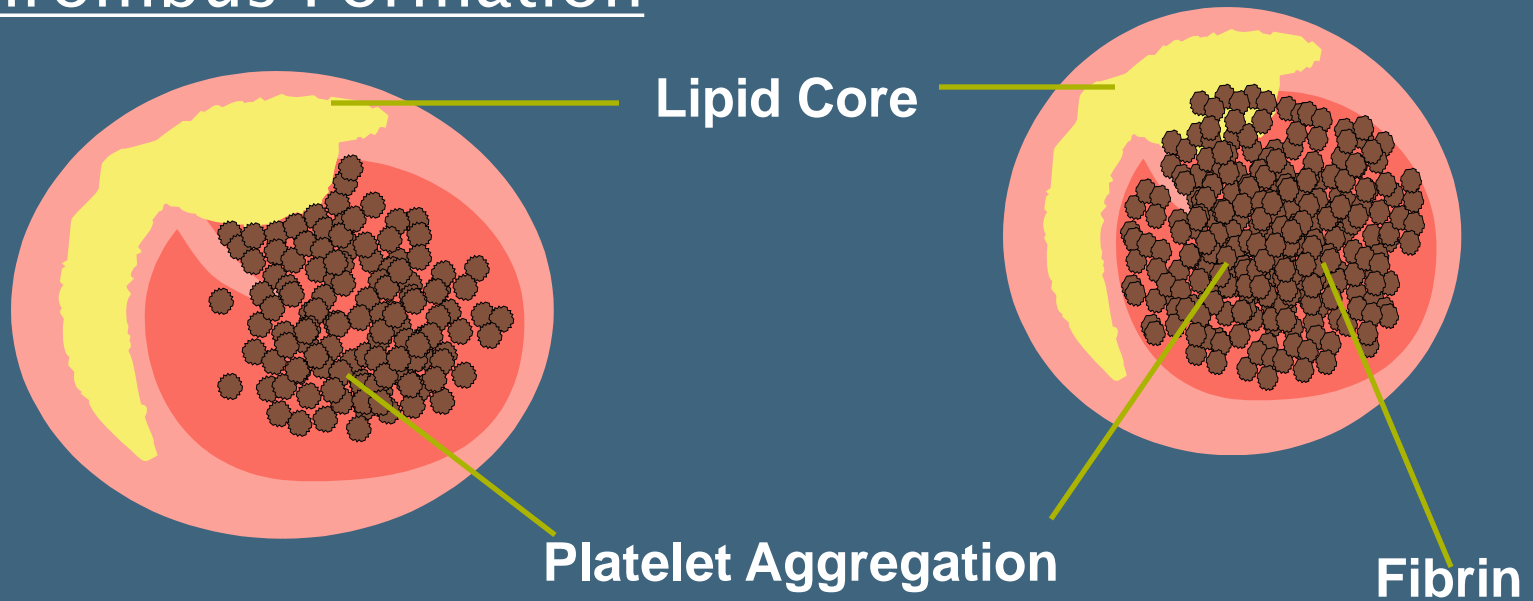
Initiating Events

Thrombus Formation



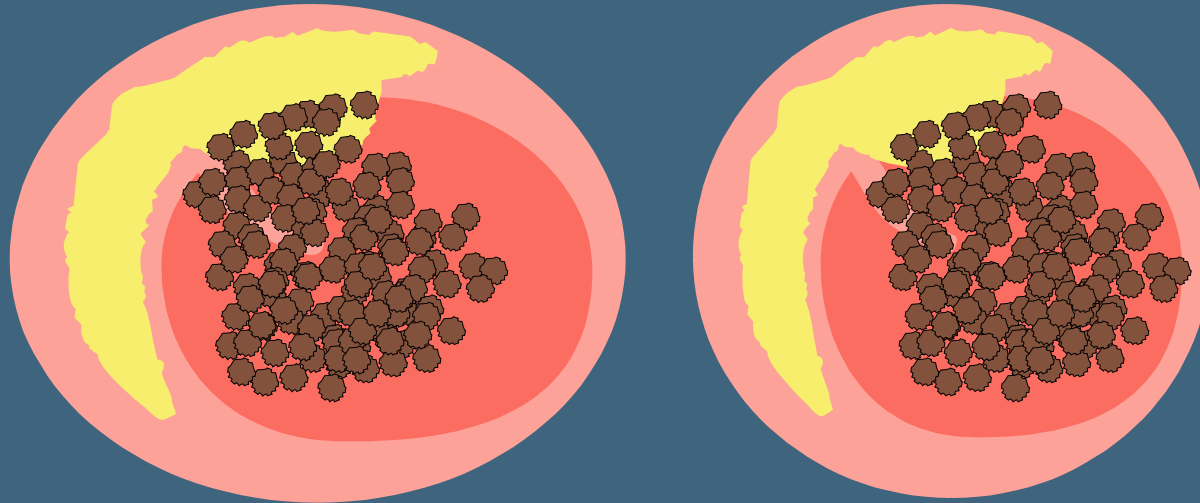
Initiating Events

Thrombus Formation



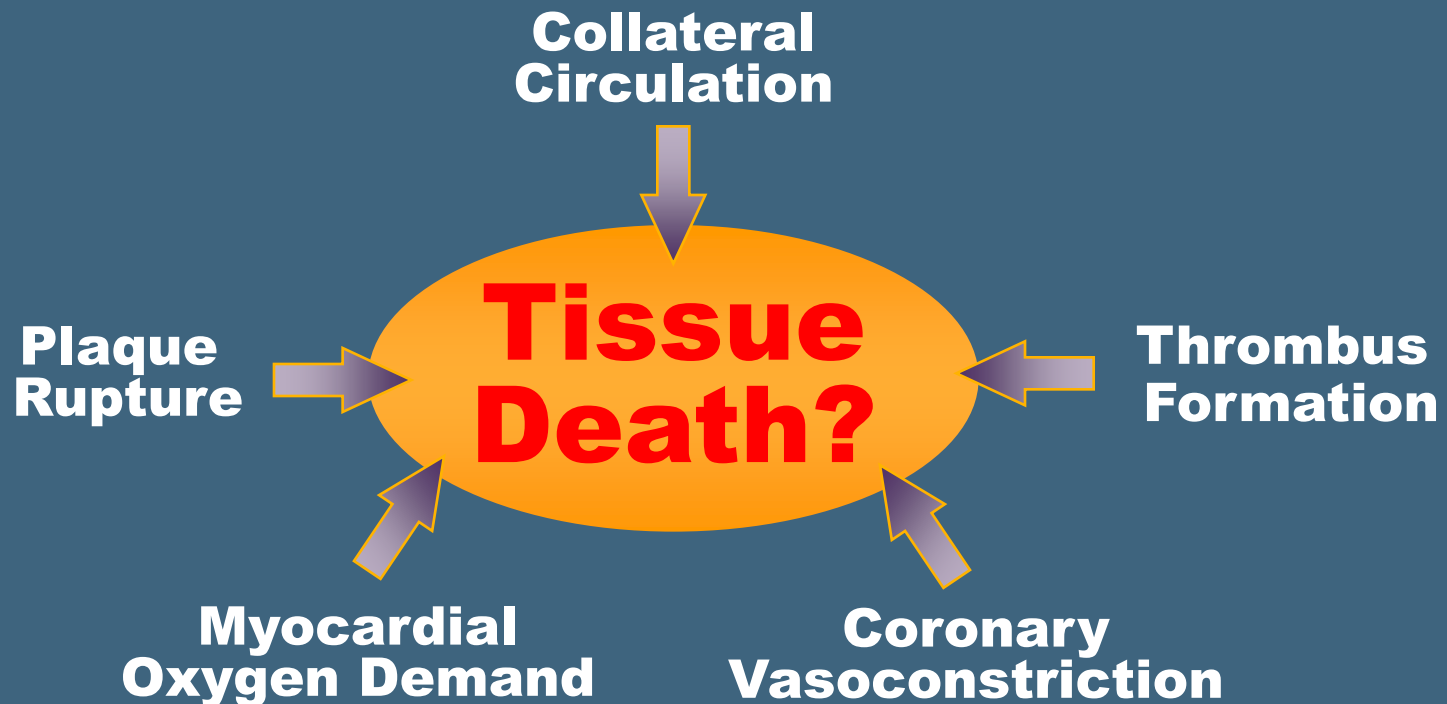
Initiating Events

Vasoconstriction



Acute Coronary Syndrome (ACS)

Will Infarct Occur?

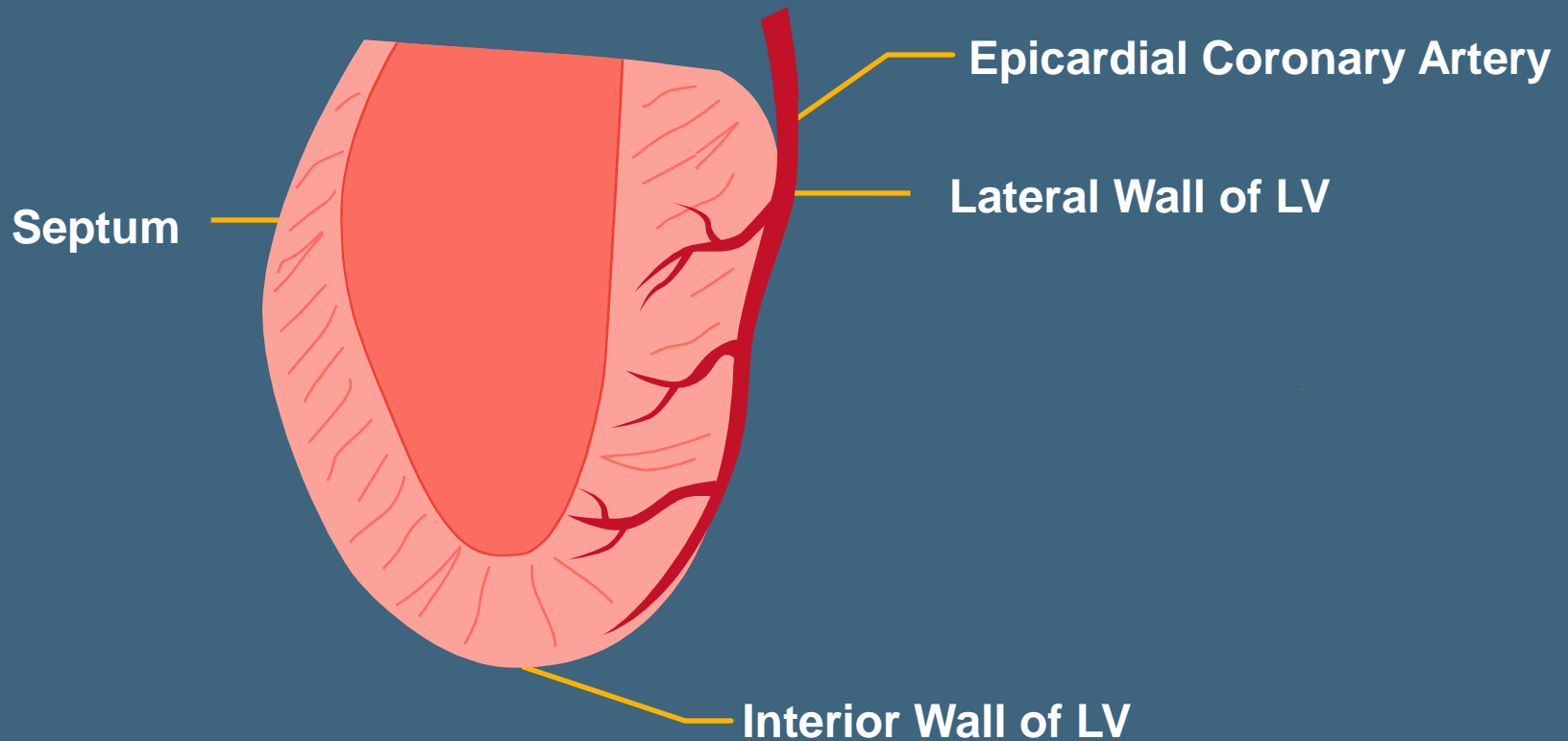


Acute Coronary Syndrome (ACS)

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

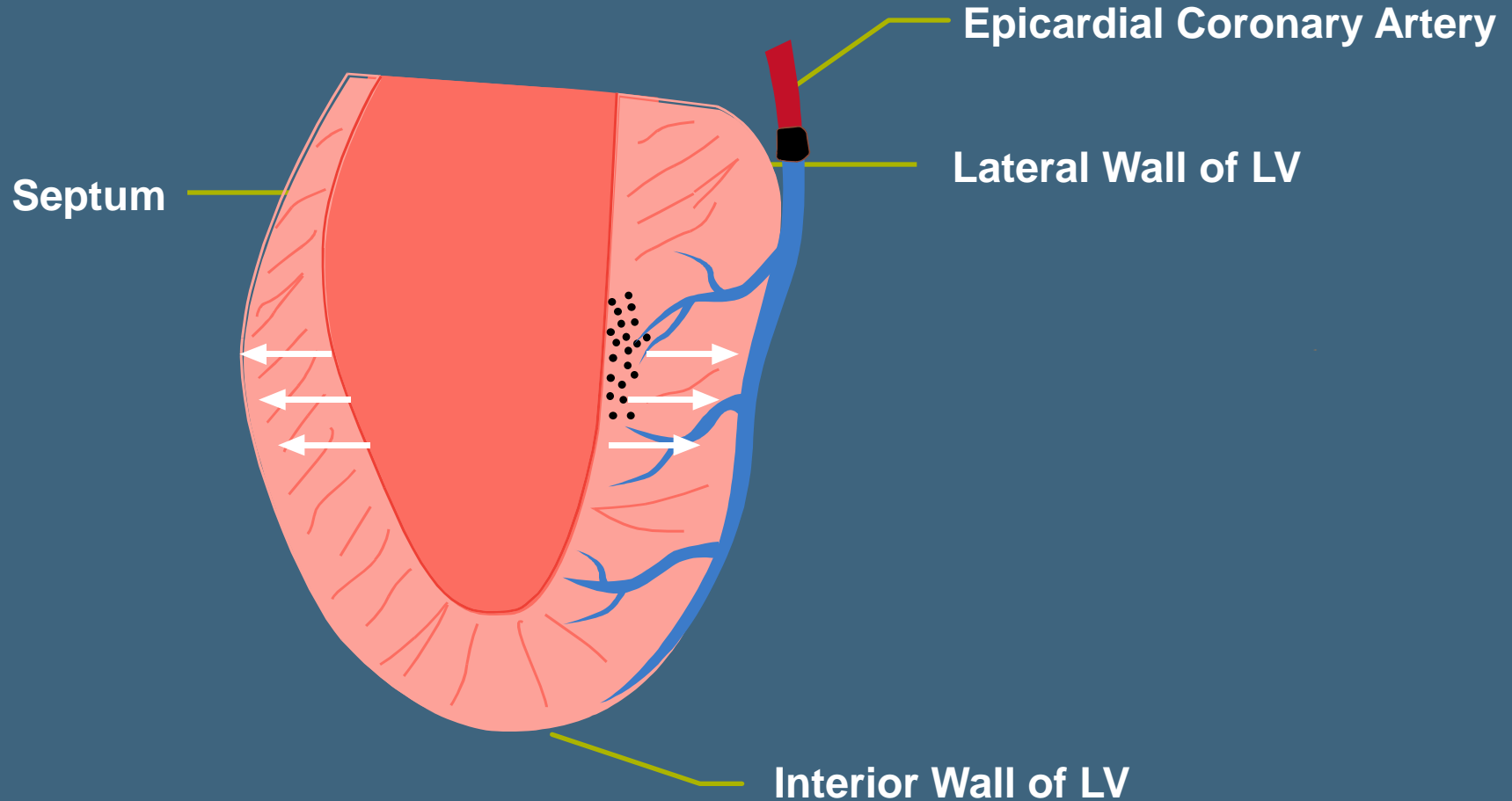
Acute Coronary Syndrome (ACS)

Well Perfused Myocardium



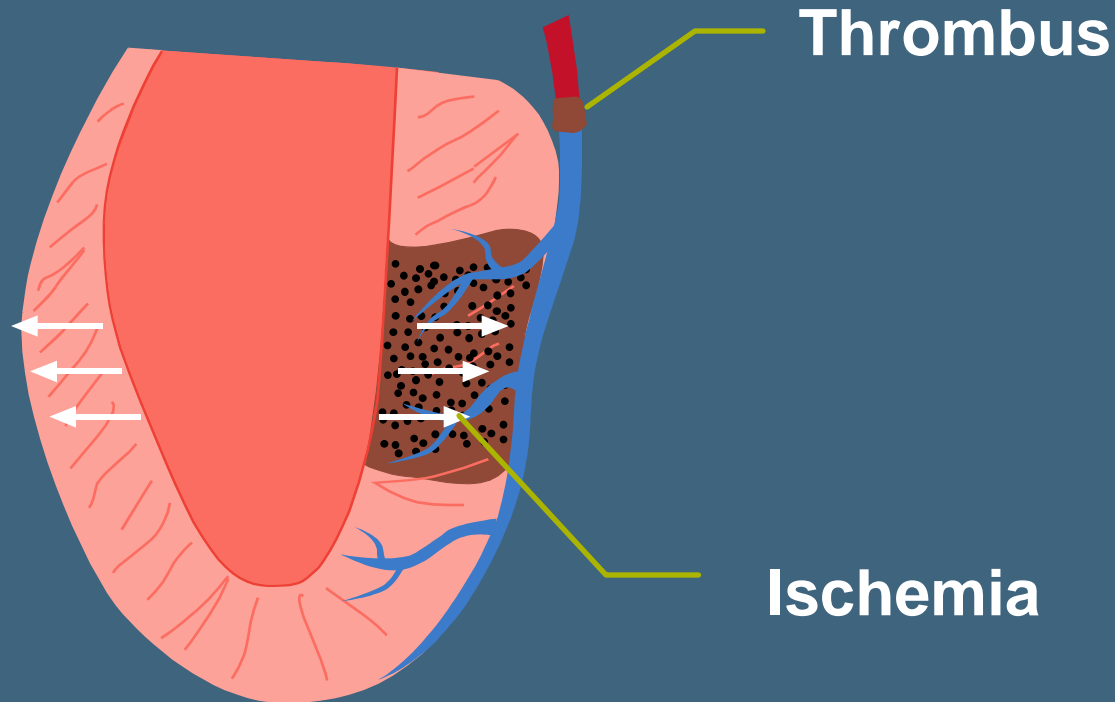
Acute Coronary Syndrome (ACS)

Ischemia



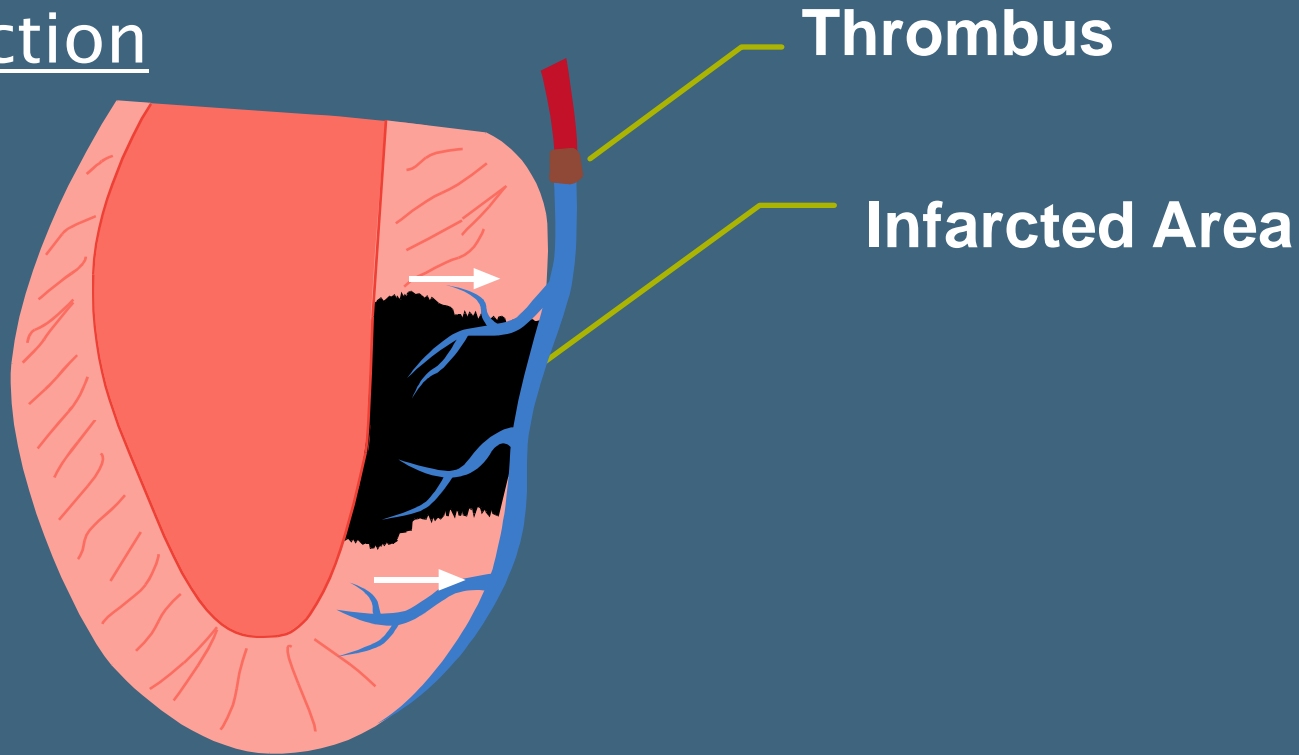
Acute Coronary Syndrome (ACS)

Injury



Acute Coronary Syndrome (ACS)

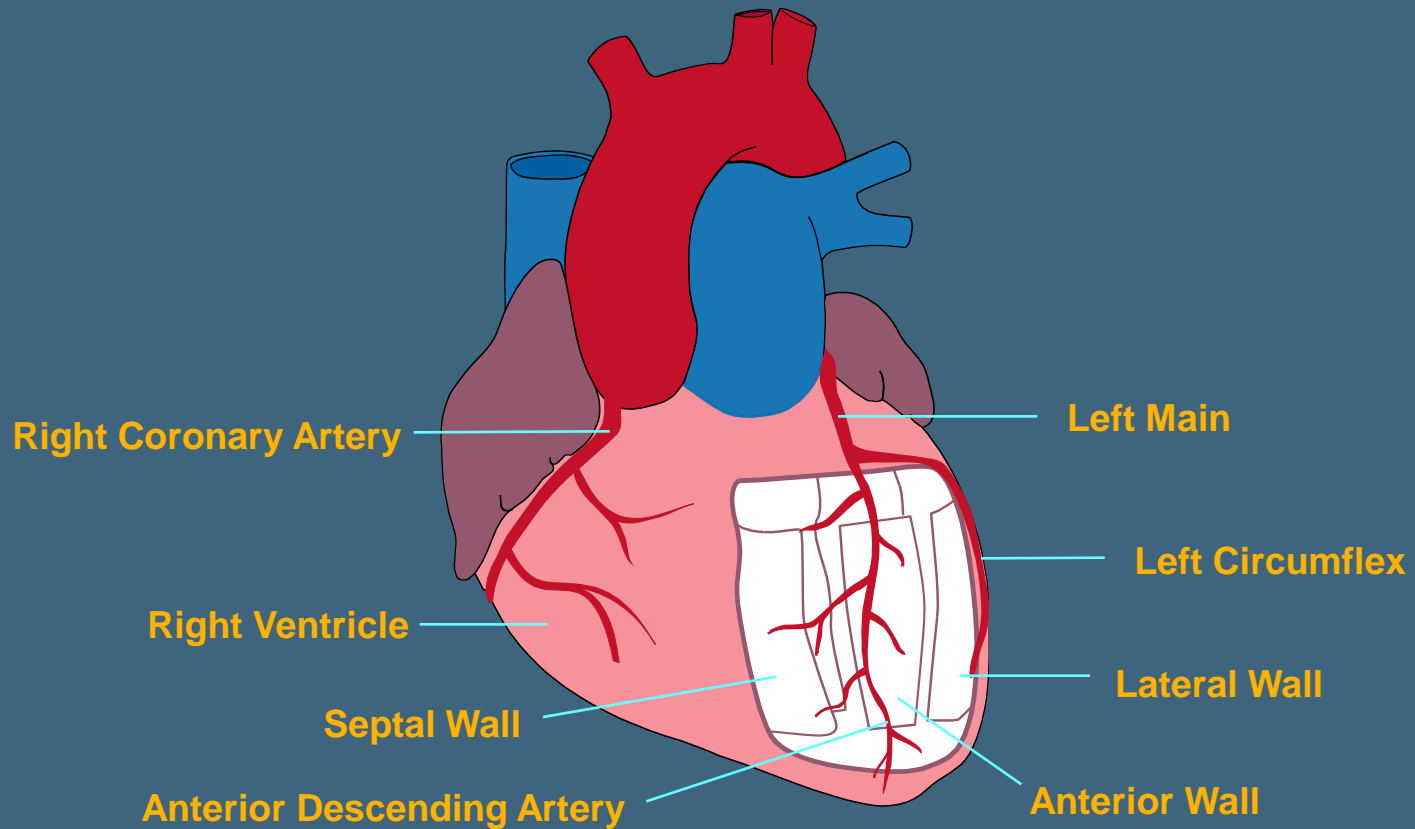
Infarction



Coronary Artery Anatomy

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

Left Coronary Artery

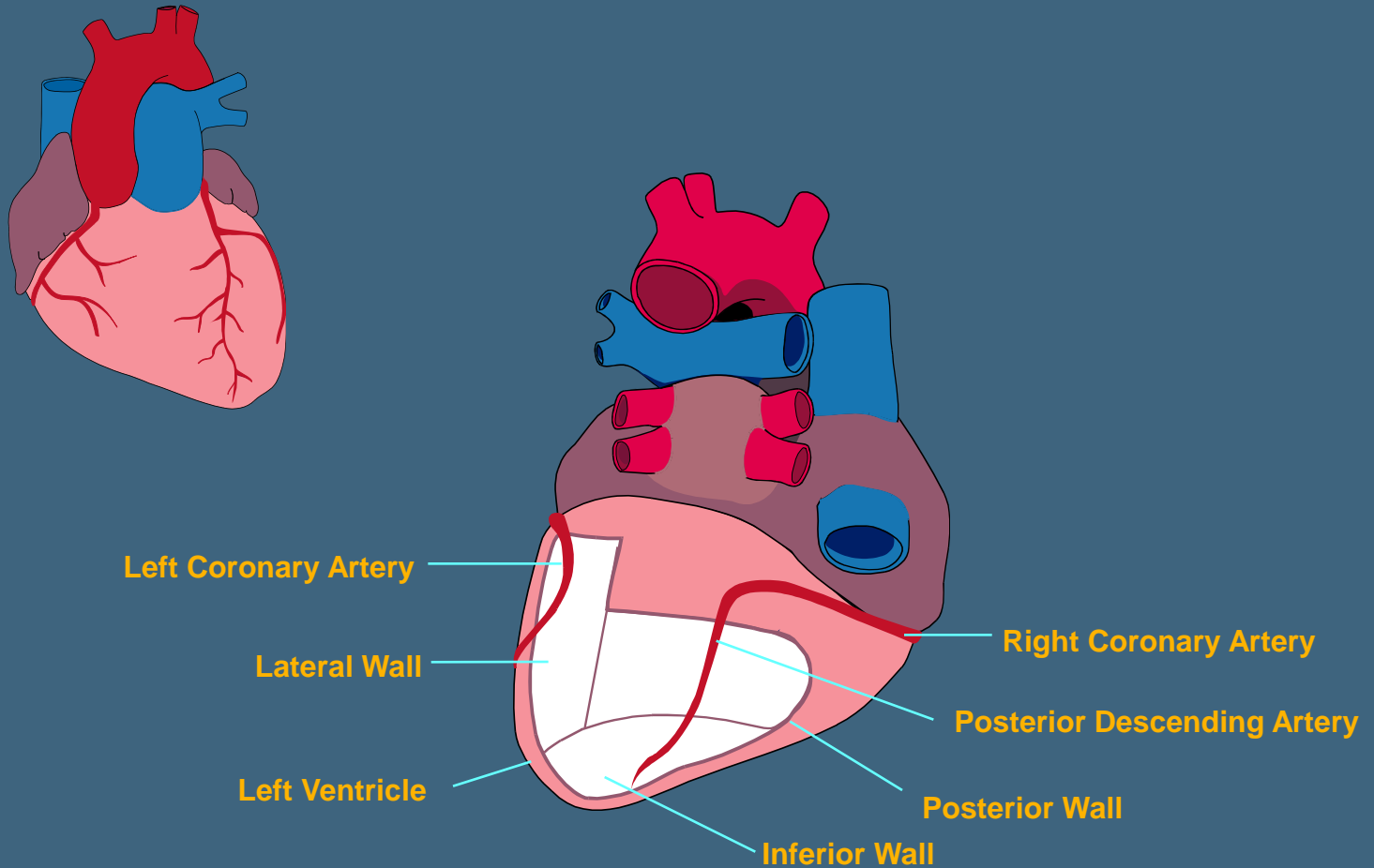


Left Coronary Artery Occlusion

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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