

Coronary Artery Spasm

Risk

- Disease affecting mostly middle- and old-aged men and postmenopausal women
- Gender difference: Higher incidence in women
- Periop CAS: Prevalent in elderly male pts with coronary risk factors
- Teenagers and young adults with illicit substance abuse, primarily cocaine
- Occurs in 1–5% of percutaneous coronary interventions
- Ethnic differences: Higher frequency in eastern populations
- Type A behavior pattern, severe anxiety, and panic disorder
- Age, smoking, and high sensitivity C-reactive protein (marker of inflammation)

Perioperative Risks

- Change of sympathetic activity: may trigger CAS
- CAS can lead to myocardial ischemia.
 - Chest pain and ischemic ST segment changes on ECG
- May be result of or associated with myocardial infarction
 - Coronary thrombosis: May trigger CAS, leading to acute MI, unstable angina, or ischemic sudden death

Worry About

- Cardiogenic shock: Decreased LV and RV compliance and decreased pump function

- In pts with CAS, tachyarrhythmias associated with anterior ST segment elevations, ventricular arrhythmias, and even ventricular fibrillation
- Bradyarrhythmias: More frequent with inferior CAS, potentially resulting in complete atrioventricular block, associated with hypotension and syncope

Overview

- Abnormal constriction of epicardial coronary arteries
- Classical CAS (Prinzmetal for variant or spastic angina):
 - Diagnosed if pt has severe chest pain, usually at rest, with concurrent ST segment elevation on ECG
 - Characterized by spasm of normal coronary arteries on arteriography
- Other forms of CAS:
 - Silent angina (without chest pain), diagnosed with Holter monitoring
 - CAS with concurrent atherosclerotic disease at the site or distant from the organic stenosis
 - Effort angina, unstable angina, or microvascular angina (female prevalence)
 - ECG changes, which may include either ST segment elevation, ST depression, or T wave abnormalities
 - Coronary arteriography: Can demonstrate normal or diseased coronary arteries

Etiology

- The exact mechanism of CAS is unknown. Several contributing factors are thought to play a role:
 - Change in sympathetic activity
 - Vagal withdrawal
 - Coronary thrombosis
 - Smooth muscle dysfunction
 - Compromised endothelium-mediated vasodilation
 - Increased Ca²⁺ sensitivity
 - Reduced endothelial NO activity
 - eNOS gene polymorphism
 - Signs of chronic low-grade inflammation
 - Oxidative stress

Usual Treatment

- Cessation of smoking
- Calcium-channel blockers (primary)
- Long-acting nitrates (short when symptomatic)
- Beta-blockers (when associated with fixed lesions)
- Magnesium supplementation (may have a preventive effect)
- Statin therapy (improving endothelial function)
- Coronary angioplasty (medically intractable)
- Coronary artery bypass surgery (medically intractable)
- Automatic defibrillator implantation (life-threatening arrhythmias)

Assessment Points

System	Effect	Assessment by Hx	PE	Test
GENERAL		Risk factor search: smoking and illicit drug use, especially cocaine		High sensitive C-reactive protein level
CV	Chest pain, myocardial ischemia, cardiogenic shock, ischemic sudden death, arrhythmias	Chest pain at rest or exertion, Hx of rapid heart rate, and Hx of syncope	Palpitations, cold sweat, nausea, vomiting, syncope, hypotension	Coronary arteriography with acetylcholine spasm provocation test ECG, ST segment analysis, Holter, exercise testing TEE or TTE—Wall motion abnormalities, cardiac biomarkers

Key Reference: Yasue H, Nakagawa H, Itoh T, Harada E, Mizuno Y: Coronary artery spasm: clinical features, diagnosis, pathogenesis, and treatment, *J Cardiol* 51(1):2–17, 2008.

Perioperative Implications

Preoperative Preparation

- Continue treatment medication until the morning of surgery.
- Ensure IV nitroglycerin, nicardipine, and beta-blockers are available.
- Have a plan for postop pain control.
- Consider regional or neuraxial techniques.

Monitoring

- Use two-lead (II and V5) ECG and ST segment analysis.
- Consider arterial line.

Airway

- Blunt intubation reflexes and avoid sympathetic surge on intubation.

Preinduction/Induction

- Cardio-stable induction
- Avoidance of hypotension and tachycardia

Maintenance

- Heart rate and BP control (maintain adequate diastolic BP).
- Avoid hypothermia.
- Maintenance of Hct.
- Optimization of supply/demand.

Extubation

- Smooth opioid wake up and extubation
- Heart rate and BP control
- Avoidance of hypercapnia and hypoxemia

Postoperative Period

- Adequate pain control
- Heart rate and BP control

- Treatment of shivering

Adjuvants

- Careful ST segment monitoring throughout periop period
- Immediate recognition and treatment of coronary ischemia by optimizing supply and demand, with special attention to adequate diastolic blood pressure

Anticipated Problems/Concerns

- Anticipate potentially life-threatening arrhythmias.
- Anticipate myocardial ischemia or infarction and LV and RV dysfunction
- Place defibrillator pads for high-risk pts.

Craniofacial Clefts

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Risk

- Cleft lip and palates are the most common birth defects in USA.
- Cleft lip and/or palate incidence in USA is 1:600 newborns.
- Craniofacial clefts are rare, with incidence of 1:1000 births worldwide.
- Increased prevalence with Asians, Latinos, and Native Americans.

- Increased prevalence with exposure to radiation, infections (toxoplasmosis, rubella, and CMV), maternal age, maternal smoking exposure, and vitamin deficiencies.

Perioperative Risks

- Increased risk of airway obstruction, difficult airway management, and adverse airway events in the periop period

- Hemorrhage
- Seizures
- Associated congenital heart disease

Worry About

- Adverse airway events, including hypoxia, difficult intubation, airway obstruction, laryngospasm, bronchospasm, and accidental extubation
- Eating and speech problems