

**Perioperative Implications****Preoperative Preparation**

- Assess for CAD and peripheral vascular disease.
- Beta-blockers and nitrates given periop as tolerated.
- Statins have been associated with improved postop outcomes.

**Monitoring**

- Consider pulm artery catheter, transesophageal ECHO in the presence of large fluid shifts, history of ischemia, and high-risk surgery.

**Airway**

- Pts may have large head and neck and be overweight, making intubation difficult.

**Maintenance**

- Avoid hypothermia and anemia.
- Monitor for ischemia and cardiac failure.
- Insulin increases activity of lipoprotein lipase and releases FFAs.
- Sympathetic stimulation, stress, and catecholamines release FFAs.
- Spinal or epidural anesthesia and beta-blockers reduce FFA levels.
- Heparin releases two triglyceride hydrolases: lipoprotein lipase inhibited by protamine, and hepatic lipase resistant to protamine.

**Extubation**

- During noncardiac surgery, this may be time of greatest risk for ischemia.

**Adjuvants**

- Depend on lipid-drug binding and end-organ disease

**Postoperative Period**

- High incidence of ischemia, tachycardia, and MI for several days after noncardiac surgery.
- Treat pain, hemodynamic, and biochemical abnormalities.

**Anticipated Problems/Concerns**

- Concerns are related to atherosclerotic disease.

## Long QT Syndrome

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**Risk**

- Prevalence of cLQTS: Approximately 1:5000 live births.
- Incidence of cLQTS: 1 in 10,000.
- 60–70% of those diagnosed are females.
- Males under 10 y of age have the highest mortality.
- Pts usually present in childhood with a cardiac event.

**Perioperative Risks**

- Torsades de pointes
- Sudden cardiac death

**Worry About**

- Sympathetic stimulation with laryngoscopy, pain, etc.
- Electrolyte abnormalities: hypokalemia, hypocalcemia, and hypomagnesemia

**Overview**

- cLQTS is diagnosed when the corrected QT interval is >500 ms in the absence of other causes
- Jervell and Lange-Nielsen syndrome is cLQTS associated with deafness; Romano-Ward syndrome is cLQTS without deafness
- aLTQS is most commonly drug induced or caused by an electrolyte abnormality
- Pathophysiology: Arrhythmogenic prolongation of the QT interval caused by mutated genes encoding the cardiac myocyte ion channels

**Etiology**

- Most common gene mutations: LQT1, LQT2, and LQT3.

- aLTQS primarily prolongs the QT interval by blockade of the rapid delayed  $I_{Kr}$ , encoded by *HERG*.
- Drug-induced: succinylcholine, ketamine, atropine, quinolone and macrolide antibiotics, dexmedetomidine, and ondansetron.

**Usual Treatment**

- Beta-blockade is the first line treatment
- In pts who are symptomatic despite beta-blockade, AICD implantation may be considered

**Assessment Points**

System	Effect	Assessment by Hx	PE	Test
CV	Torsades de pointes Ventricular fibrillation Sudden cardiac death	Convulsions, syncope	Tachycardia Tachycardia	ECG ECG
CNS	Syncope	Loss of consciousness	Neurologic exam	
METAB	Electrolyte abnormalities			Electrolyte panel $Ca^{2+}$ , $Mg^{2+}$ , $K^+$

**Key References:** Havakuk O, Viskin S: A tale of 2 diseases: the history of long-QT syndrome and Brugada syndrome, *J Am Coll Cardiol* 67(1):100–108, 2016; Owczuk R, Wujtewicz, Zienciuk-Krajka E, et al.: The influence of anesthesia on cardiac repolarization, *Minerva Anesthesiol* 78(4):483–495, 2012.

**Perioperative Implications****Preoperative Preparation**

- Elicit family history of sudden cardiac death or congenital deafness.
- 12-lead ECG.
- Ensure maintenance of beta-blockade.
- Ensure availability of defibrillator.
- Avoidance of spinal anesthesia superior to the level of T10 due to the increase in sympathetic tone of the unanesthetized fibers.

**Monitoring**

- Standard ASA monitors
- Adequate IV access for resuscitation should pt convert to lethal arrhythmia

**Airway**

- Pt needs to be deeply anesthetized before manipulation of the airway to reduce sympathetic discharge with laryngoscopy.

**Preinduction/Induction**

- Adequate anxiolysis prior to entering the OR to reduce sympathetic discharge associated with preop anxiety

**Maintenance**

- Multimodal analgesia for adequate intraop and postop pain control
- Avoidance of hypothermia and associated shivering
- Avoidance of hyperthermia to reduce sympathetic discharge associated with fever

- Avoidance of medications that further prolong the QT duration
- Avoidance of hypokalemia, hypomagnesemia, and hypocalcemia

**Extubation**

- Consider deep extubation of these pts to reduce sympathetic discharge with emergence.

**Postoperative Period**

- Continue standard ASA monitors.
- Adequate pain control.

**Anticipated Problems/Concerns**

- Conversion to lethal arrhythmia secondary to electrolyte abnormality, sympathetic stimulation, or medications that prolong the QT duration