Carcinoid Tumors & Carcinoid Syndrome

Anesthetic Pearls: Anesthetic Implications of Carcinoid Tumors & Carcinoid Syndrome

Carcinoid Tumors

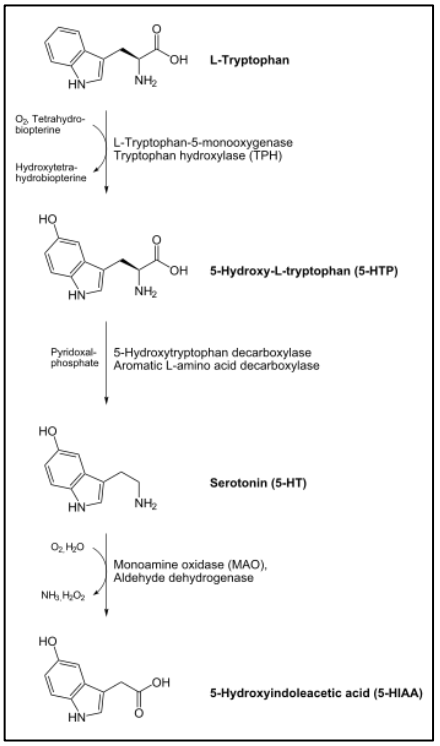
1. Arise from enterochromaffin tissues typically found in the GI tract (not always)
2. Most common tumor of the small intestine (highest incidence in the appendix & ileum)
3. Tumor can appear (rarely) in bronchi and ovaries
4. 5-hydroxyindoleacetic acid (degradation product of Serotonin [5-HT]) is increased in the urine

Carcinoid Syndrome

A. Carcinoid tumor cells release vasoactive substances (5-HT, kallikreins, histamine) which lead to clinical symptoms
B. Under normal circumstances, the vasoactive substances do not cause symptoms because the liver is able to biochemically degrade and inactivate them
C. Symptoms occur when production of these substances overwhelm the ability of the liver to inactivate them
D. Carcinoid syndrome develops in 5% of patients with carcinoid tumors. Tumors of the gut produce symptoms only if they are metastatic to the liver. Tumors outside of the gut (bronchial tree, ovaries) can produce symptoms without metastasis because they bypass the liver.

Signs and Symtpoms

1. Bronchoconstriction / asthma / wheezing
2. Salivation / lacrimation
3. Anxiety & hyperthermia
4. Tricuspid regurgitation or pulmonary stenosis (distortion of valve cusps from mets; left sided valves are spared)
5. Premature atrial contraction (PAC's) and supraventricular tachyarrhythmias.
6. Episodic cutaneous flushing (initially the face & neck) can spread to trunk and upper extremities. During these episodes, blood pressure and cardiac output are usually decreased.
7. Chronic intermittent abdominal pain and diarrhea (secondary to serotonin)
8. Hepatomegaly (from metastasis)
9. Mild hyperglycemia (secondary to the ability of serotonin to mimic the metabolic effects of Epinephrine to stimulate glycolysis and gluconeogenesis)
10. Hypoalbuminemia (diversion of tryptophan from producing proteins to the synthesis of Serotonin)



Anesthetic Management

Cognizant of paroxysmal HTN, tachycardia, hypotension, and bronchospasm due to histamine release, exogenous or endogenous catcholamines, and physical stimuli such as abdominal scrubbing during surgical prep or succinylcholine-induced fasiculations.

I. Pre-Op:

- Pretreat with Octreotide (synthetic analog of Somatostatin; dose 50 mcg IV and 50 mcg SQ) which inhibits the release of vasoactive substances. Also advisable to pretreat with H-1 / H-2 blockers and Methyprenisolone.
- Pre-op hydration is helpful secondary to hypotension during anesthetic induction may stimulate the release of vasoactive substances from the tumor cells. Also patients can have tumor-induced diarrhea and therefore may become dehydrated.

II. Monitoring:

- Arterial line (+/- Flo-Trac) is appropriate (prone to both HTN and hypotension)
- CVL to assess volume status and drug infusion port
- PAC / TEE to assess valvular lesions and right heart failure

III. Anesthesia:

1. Avoid drugs that stimulate the sympathetic nervous system (Ketamine) secondary to catecholamines activate Kallikreins
2. Avoid drugs that induce Histamine release (opioids, relaxants, antibiotics)
3. Avoid drugs that cause endogenous release of catecholamines (Ephedrine)
4. Induction with Fentanyl 250 mcg, Etomidate 10 mg, and Rocuronium 50 mg using Isoflurane for maintenance
5. Increased CNS levels of Serotonin are associated with sedation (anesthetic requirements may be decreased)