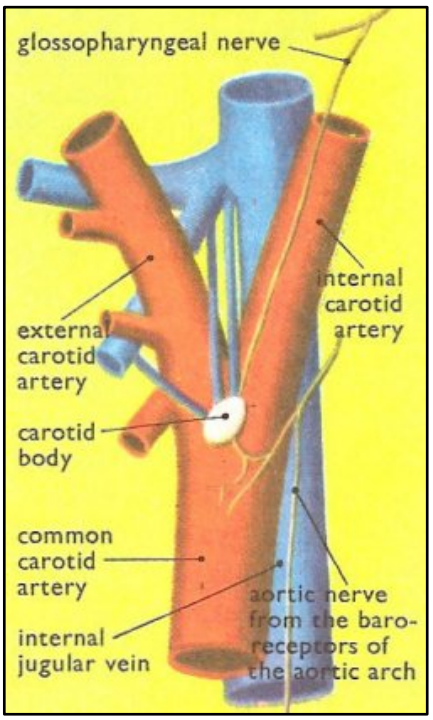
Carotid Body Denervation



Anesthetic Pearls: Anesthetic Implications of Carotid Body Denervation

Location: Bifurcation of the common carotid artery (into external and internal carotid arteries)

Innervation: Glossopharyngeal nerve (CN-9)

Function:

1. Carotid body receptors primarily sense PaO_2 (not SaO_2 or CaO_2).
2. Carotid body increases neural firing when $PaO_2 < 100$ mmHg.
3. When PaO_2 falls below 65 mmHg, carotid firing stimulates increased minute ventilation through both increased TV and RR.
4. Carotid bodies also sense decreased pH (acidosis), but the response is minor.
5. Carotid bodies do sense $PaCO_2$ but not to the degree to alter minute ventilation.

Denervation: Typically by surgical trauma secondary to carotid endarterectomy (CEA) or chemical induced secondary to local anesthetic infiltration

Risk Factors for Adverse Ventilatory Outcomes:

- Total thyroidectomy, bilateral carotid endarterectomy, prior contralateral endarterectomy, use of medications known to depress ventilation, and COPD with heavy dependence on carotid body hypoxic ventilatory drive
- Unilateral loss of carotid body function in unlikely to result in significant ventilatory changes

Symptoms:

A. Unilateral loss of carotid body function impairs the response to mild hypoxia
B. Bilateral carotid body loss results in total central chemoreceptor ($PaCO_2$) drive with resulting decrease in minute ventilation and hypoxia which is particularly significant for patients with COPD and CAD that can lead to somnolence, acidosis, and cardiac irritability

Treatment:

1. Always be vigilant about ventilatory issues in patients having surgery around / near the carotid body
2. Use supplemental O_2 during recovery
3. Try to avoid ventilatory depressant medications for pain control (use Tylenol, NSAIDS)

Prognosis: Carotid body denervation injury may persist up to 10 months post-op and may require prolonged supplemental O_2 in cases of bilateral injury.