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Trigeminal-Cardiac Reflex during Temporal Cranioplasty

Stanlies D'Souza

Baystate Health, dsouzastan@yahoo.com

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Introduction

Stimulation of one of the three branches of the trigeminal nerve can elicit trigeminal cardiac reflex (TCR), resulting most commonly in bradycardia and, more rarely, hypotension. During temporal craniotomy, stimulating the maxillary division of the trigeminal nerve can also elicit this reflex.

Case Description

A 67-year-old female had a temporal cranioplasty under general anesthesia (oxygen, air, sevoflurane, fentanyl, hydromorphone) with an endotracheal tube under positive pressure ventilation aided by rocuronium. During surgical dissection in the temporal region, the patient's heart rate dropped to the low 30s from a mid-50s baseline. This was promptly ameliorated by stopping the surgical stimulus and subsequently performing gentle surgical dissection. The subsequent perioperative course was uneventful.

DISCUSSION

The TCR pathway follows from the ventral trigeminal nucleus, through the short nerve fibers in the reticular formation of the brainstem, and then synapses on efferent cholinergic premotor parasympathetic cardio-inhibitory neurons in the nucleus ambiguus.¹

Suggested Predisposing Factors of TCR¹

- Individuals with high vagal tone
- Preoperative beta blockade
- Hypoxia
- Hypercarbia
- Sudden stimulation

Surgeries that can precipitate TCR

- Maxillofacial surgeries (orbital surgery; eyelid surgery; fixation of mid-facial fractures; orthognathic procedures)
- Temporal craniotomy cranioplasty
- Resection of cerebellopontine angle tumors
- Trigeminal neurolysis
- Microvascular decompression of the trigeminal nerve

Clinical Features of TCR^{1,2,3}

1. Bradycardia
2. Asystole
3. Apnea in spontaneously breathing patients
4. Gastric hypermotility
5. Hypotension

Sinus bradycardia is the most common clinical finding, followed by asystole; hypotension is rarely seen.

Management of TCR^{1,2}

1. Stopping the surgical stimulus is the most effective measure
2. Subsequent gentle surgical stimulus (rather than sudden traction)
3. Glycopyrrolate/atropine or smaller dose of epinephrine in severe cases.
4. Prophylaxis

CONCLUSION

We managed TCR during a temporal cranioplasty by avoiding sudden surgical stimulus, stopping the surgical stimulus and performing gentle surgical dissection for subsequent stimulus.