Cranial Nerve Injuries with CEA: What Are The Risk Factors, How Serious Are They, What Can Be Done to Prevent Them?

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Disclosures

▪ None

Background & Significance

In this study we sought to:

▪ Improve the ability to identify patients at increased risk for CNI
▪ Identify intraoperative steps that lead to CNI injury
   …thereby reducing the incidence of CNI

Risk factors for cranial nerves injury (CNI):

▪ Patient related
  ▫ Demographic
  ▫ Carotid disease
▪ Procedure related

Methods

▪ Data from the 2012 CEA-targeted ACS NSQIP Participant Use Data File
▪ Targeted procedures have more comprehensive data
Methods

Primary outcome variable:
- Development of a postoperative CNI within 30 days of a patient’s index CEA procedure

Univariable and multivariable analysis

Results

A total of 3762 patients analyzed
- 84 (2.23%) patients w/CNI
  - 28 (33%) CNI on the day of operation
  - 28 (33%) CNI on POD 1
  - 25 (30%) CNI after POD 1
  - 3 (4%) NR

Four separate factors that are independently associated with an increased risk of CNI

Intraoperative Considerations
Intraoperative Considerations (CN X)

- Injury to the vagus nerve
  - Recurrent laryngeal nerve palsy
  - Ipsilateral vocal cord paralysis characterized by hoarseness, impaired phonation, and ineffective cough

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Intraoperative Considerations (CN XII)

- Injury to the hypoglossal nerve
  - Ipsilateral deviation of the tongue,
  - Difficulty with initiation of swallowing

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  - Can be facilitated by following ansa cervicalis

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  - The fibers of the ansa cervicalis diverge from the hypoglossal nerve as it crosses the ICA and descend superficial to the CCA and ICA to innervate the strap muscles
A suture tie placed on the divided ansa cervicalis serves as a retractor and allows the hypoglossal nerve to be moved or elevated without being injured.

Division of the inferior or superior roots of the ansa cervicalis does not result in neurologic defects.

If distal ICA exposure needed, dissection of the sternocleidomastoid branch of the occipital artery allows mobilization of the hypoglossal nerve superomedially for better rostral exposure.

Injury to the glossopharyngeal nerve leads to impairment of swallowing.

The glossopharyngeal nerve: located between the IJV and the ICA, passes superficial to the ICA and courses between the ICA and the ECA to enter the base of the tongue.

Distal ICA exposure increases risk of injury.

Dysfunction of the spinal accessory nerve is characterized by shoulder pain, winging of the scapula, and inability to shrug the shoulder.

The spinal accessory nerve runs lateral to the carotid sheath and innervates the trapezius and the sternocleidomastoid muscle.

May be injured by excessive lateral retraction.
The incidence of clinically relevant CNI is low, but is increased in the presence of a bleeding disorder, longer operative time (>90min) older patients (>80y), and reoperation.

Awareness of these factors and careful operative technique may reduce CNI after CEA.