Head & Neck Surgery Course

Surgical anatomy of the neck: nerves

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Nerves in the neck

(summary)
Vagus Nerve, Cranial Nerve X
Origin from brain and exit from cranial cavity of CN X
Physiology

Skeletal muscle innervation of CN X
Physiology

Parasympathetic innervation
Accessory Nerve, Cranial Nerve XI
Origin from brain and exit from cranial cavity of CN XI
Physiology

Skeletal muscle innervation of CN XI
**CN XI: surgical considerations**

- Exit the skull base through jugular foramen
- Like IJV you can find it anterior to the atlas transverse process
- Penetrates deep surface of the SCM (between superior and middle third)
- Exits posterior surface of SCM 1 cm above to Erb’s point
- Traverses the posterior triangle on the levator scapulae
- Enters the trapezius about 5 cm above the clavicle (2 cm above the point where the inferior belly of homoioyd muscle meet the trapezius)
CN XI: relationship with the IJV
CN XI in level II
CN XI in level V
Hypoglossal Nerve, Cranial Nerve XII
Origin from brain and exit from cranial cavity of CN XII
Physiology

Skeletal muscle innervation of CN XII
CN XII: surgical considerations

- Lies deep to the IJV, ICA, CN IX, X, and XI
- Curves 90 degrees and passes between the IJV and ICA
- Lateral to hyoglossus (with ranine veins)
- Deep to mylohyoid
Marginal Mandibular Nerve
Marginal mandibular nerve: surgical considerations

- Most commonly injury dissection level Ib
- Landmark:
  - 1cm anterior and inferior to angle of mandible
- Subplatysmal
- Deep to fascia of the submandibular gland
- Superficial to facial vein
- More than one branch often present
Marginal mandibular nerve: how to preserve it
Cervical plexus
Cervical plexus: anatomy (schematic)

- Ventral rami
- Segmental branches
- Hypoglossal nerve (XII)
- Lesser occipital nerve
- Greater auricular nerve
- Transverse cervical nerve
- Ansa cervicalis
- Accessory nerve (XI)
- Phrenic nerve
- Supraclavicular nerves
Cervical plexus: anatomy (schematic)
Cervical plexus: anatomy (schematic)
Cervical plexus in levels II and III
Cervical plexus in levels II and III
Cervical plexus: intraoperative view
(bilateral neck dissection)
Phrenic Nerve

- Sole nerve supply to the diaphragm
- C3-5
- Anterior surface of anterior scalene
- Under prevertebral fascia
- Posterolateral to carotid sheath
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Phrenic Nerve
Brachial plexus
Brachial plexus: anatomy (schematic)
Brachial plexus: anatomy (schematic)
Brachial plexus in level IV
Brachial plexus in level IV
Brachial plexus in level IV

Sup laryngeal n.

Sup. thyroid a.
Head and Neck Sympathetic Innervation
Sympathetic trunk
Sympathetic trunk
Superior cervical ganglion

- Accessory nerve (CN XI)
- Vagus nerve (CN X)
- Glossopharyngeal nerve (CN IX)
- Internal jugular vein
- Pharyngeal fascia
- Pharyngeal tubercle
- Superior pharyngeal constrictor muscles
- Glossopharyngeal nerve (CN IX, cut)
- Stylohyoid process
- Stylohyoid muscle
- Digastric muscle, posterior belly
- Stylopharyngeus muscle
- Pharyngeal raphe
- Middle pharyngeal constrictor muscles
- Greater horn of hyoid bone
- Pharyngeal plexus containing contributions from Vagus nerve, Glossopharyngeal nerve, Sympathetic fibers
- Interior pharyngeal constrictor muscles
- Cricopharyngeal part
- Thyroid gland
- Interior thyroid artery (cut)
- Right recurrent laryngeal nerve
- Esophagus

Other structures passing through the jugular foramen:
- Accessory nerve (CN XI)
- Vagus nerve (CN X)
- Glossopharyngeal nerve (CN IX)
- Internal jugular vein

Internal carotid artery
- External carotid artery
- Hypoglossal nerve (CN XII)
- Superior cervical ganglion
- Superior laryngeal nerve
- Internal jugular vein (cut)
- Vagus nerve (CN X)
- Common carotid artery
- Sympathetic trunk
- Middle cervical ganglion
- Left recurrent laryngeal nerve
- Interior cervical ganglion
- Right recurrent laryngeal nerve
Middle and inferior cervical ganglion