Triangles of the neck

Ni Posterior triangle: CN XI, cervical plexus skin brs., plexus trunks

Aa Carotid triangle: bifurcation; superior thyroid, lingual, facial aa.

Vv IJV deep to SCM; EJV crosses the posterior triangle to the subclavian v.

Anterior triangle B Midline, anterior border of SCM, inferior border of the mandible P Submental, submandibular, carotid, muscular triangles

Posterior triangle B Posterior border of SCM, trapezius, middle third of the clavicle Fl Prevertebral fascia on splenius, levator scapulae, scalenes P Omohyoid splits it: occipital, omoclavicular triangles

Carotid triangle B SCM, posterior belly of digastric, superior belly of omohyoid C Carotid bifurcation, IJV, vagus n., hypoglossal n., ansa cervicalis

Submandibular triangle B Inferior border of the mandible and both bellies of the digastric C Submandibular gland and nodes, facial a. and v., hypoglossal n.

Submental triangle B Both anterior bellies of the digastric and the body of the hyoid Fl Mylohyoid muscles; submental lymph nodes

SUP Superficial layer · cervical fascia

Ni Platysma: cervical br. of the facial n.; SCM and trapezius: accessory n. (CN XI)

Aa SCM: brs. of the occipital and superior thyroid aa.

Vv EJV runs on the SCM, deep to the platysma

Platysma At Pectoral and deltoid fascia to mandible, skin of mouth F Tenses neck skin; depresses mandible and mouth corners Ne Cervical branch of the facial n.

Sternocleidomastoid At Manubrium and medial third of clavicle to mastoid process F One side: tilts head to same side, turns face to opposite · Both: flex neck, protrude head; accessory inspiration C Congenital torticollis: one SCM fibrosed

Deep cervical fascia L Investing (SCM, trapezius), pretracheal (thyroid, trachea), prevertebral F Planes let structures glide in swallowing; channel infection C Retropharyngeal infection can spread to the mediastinum

Carotid sheath C Carotid a. medial, IJV lateral, vagus n. posterior between them R Ansa cervicalis on it; sympathetic trunk posterior

ANT Suprahyoid and infrahyoid muscles

Ni Anterior digastric, mylohyoid: V3; posterior digastric, stylohyoid: VII

Ni Geniohyoid: C1 fibres via the hypoglossal n.

Ni Infrahyoid: ansa cervicalis (C1–C3); thyrohyoid: C1 via CN XII

Aa Lingual, facial, superior thyroid aa.; vv. to the IJV

Ff Suprahyoid mm. raise hyoid and larynx in swallowing · Thyrohyoid: depresses hyoid; raises larynx if hyoid fixed

Digastric At Anterior belly: digastric fossa; posterior belly: mastoid notch F Depresses mandible; elevates and steadies the hyoid No Tendon slung to the hyoid by a fibrous loop

Stylohyoid At Styloid process to hyoid; split by the digastric tendon F Elevates and retracts the hyoid

Mylohyoid At Mylohyoid line to median raphe and hyoid body F Elevates hyoid, mouth floor and tongue in swallowing No Floor of the mouth; submandibular gland wraps its posterior border

Geniohyoid At Inferior mental spine to hyoid body, deep to mylohyoid F Pulls hyoid anterosuperiorly; depresses mandible if hyoid fixed

Sternohyoid and sternothyroid At Manubrium to hyoid; sternothyroid deeper, to the oblique line F Depress the hyoid (sternohyoid) and larynx (sternothyroid)

Omohyoid At Superior border of scapula to hyoid; intermediate tendon on the IJV F Depresses and steadies the hyoid No Inferior belly divides the posterior triangle

DEEP Scalenes · prevertebral · brachial plexus

Ni Scalenes and longus colli: ventral rami of cervical nn.

Ni Phrenic n. descends on scalenus anterior, lateral to medial

Aa Subclavian a. and plexus pass between scalenus anterior and medius

Vv Subclavian v. crosses the first rib anterior to scalenus anterior

Scalenus anterior At Anterior tubercles C3–C6 to scalene tubercle of first rib F Elevates first rib; flexes neck laterally R Anterior: phrenic n., subclavian v.; posterior: subclavian a., plexus

Scalenus medius and posterior At Medius: posterior tubercles to first rib; posterior: to second rib F Elevate first and second ribs; flex neck laterally R Dorsal scapular n., long thoracic n. (C5–C6) pierce scalenus medius

Longus colli and longus capitis P On anterior vertebral bodies, deep to prevertebral fascia F Flex the neck (colli) and the head (capitis) R Sympathetic trunk lies on them

Brachial plexus in the neck R Ventral rami C5–T1 in the scalene interval T Superior (C5–C6), middle (C7), inferior (C8–T1) C Erb: superior trunk; Klumpke: inferior trunk

Carotid arteries

Ni Carotid sinus br. of CN IX; vagus n. posterior in the sheath

Aa Right CCA from brachiocephalic trunk; left CCA from aortic arch

Vv IJV lateral to the carotid arteries in the sheath

Common carotid artery C Ascends in the carotid sheath; no branches E Divides at superior border of thyroid cartilage (C3–C4) No Compressible on the carotid tubercle (C6)

Internal carotid artery C Posterolateral to ECA at origin; enters the carotid canal B None in the neck

Carotid sinus and carotid body P Sinus: dilated ICA origin; body: in the bifurcation F Sinus: baroreceptor (BP); body: chemoreceptor (O2, CO2, pH)

ANT External carotid artery · branches

Ni Hypoglossal n. crosses ICA and ECA, loops round the occipital a.

Ni External laryngeal n. runs with the superior thyroid a.

Aa Anterior: superior thyroid, lingual, facial; medial: ascending pharyngeal

Aa Posterior: occipital, posterior auricular

Aa Terminal: maxillary, superficial temporal aa. in the parotid

Vv Matching vv. drain to the IJV

External carotid artery C Anteromedial at the bifurcation; ascends into the parotid E Maxillary and superficial temporal aa., at mandibular neck

Superior thyroid artery Ar First anterior branch, near the greater horn of the hyoid B Superior laryngeal a. (pierces thyrohyoid membrane), glandular C Ligate close to the gland: spares the external laryngeal n.

Lingual artery C Loop at the greater horn; passes deep to hyoglossus R Hypoglossal n. superficial to hyoglossus, artery deep

Facial artery C Grooves submandibular gland; crosses mandible at masseter B Ascending palatine, tonsillar, submental, glandular

Occipital and posterior auricular arteries C Posterior branches along the posterior belly of digastric

LAT Subclavian artery · branches

Ni Right recurrent laryngeal n. hooks round the right subclavian a.

Ni Ansa subclavia loops round the first part

Aa Right from brachiocephalic trunk; left from the aortic arch

Vv Subclavian v. anterior to scalenus anterior; vertebral v. to brachiocephalic

Subclavian artery P Three: medial, posterior, lateral to scalenus anterior E Axillary a. at the lateral border of the first rib

Vertebral artery Ar First part: first branch C Enters C6 foramen transversarium; ascends through C6–C1

Thyrocervical trunk Ar First part, at medial border of scalenus anterior B Inferior thyroid, suprascapular, transverse cervical aa. No Inferior thyroid a. closely related to recurrent laryngeal n.

Costocervical trunk and internal thoracic artery Ar Costocervical: second part (left: often first); internal thoracic: first B Costocervical: deep cervical and supreme intercostal aa.

Jugular veins · lymphatics

Ni Great auricular, transverse cervical nn. cross SCM near the EJV

Aa IJV runs with the common and internal carotid aa.

Vv IJV + subclavian v. = brachiocephalic v., posterior to SC joint

Vv Lymph: all nodes drain to deep cervical nodes, jugular trunk

Jugular veins · lymphatics (cont.)

Internal jugular vein C Jugular foramen to sternoclavicular joint, lateral in the sheath T Facial, lingual, pharyngeal, superior and middle thyroid vv. C Central line between the two heads of SCM

External jugular vein Fo Posterior auricular v. + posterior division of retromandibular v. C Crosses SCM obliquely, deep to platysma, to the subclavian v.

Anterior jugular vein C Near the midline; jugular venous arch in the suprasternal space E EJV or subclavian v.

Thoracic duct in the neck C Arches laterally at C7, posterior to the carotid sheath E Left venous angle (IJV + subclavian v.) F Returns chyle and lymph of all but the right upper body No Right lymphatic duct ends at the right venous angle

Deep cervical lymph nodes P Along the IJV, deep to SCM F Final filter for all head and neck lymph K Jugulodigastric (tonsil), jugulo-omohyoid (tongue) C Left supraclavicular (Virchow) node: abdominal cancer

Cervical plexus

Ni Ventral rami C1–C4, deep to SCM, on scalenus medius and levator scapulae
Aa Ascending cervical a. runs medial to the phrenic n.
Vv EJV crosses the cutaneous branches on the SCM

Cutaneous branches E Nerve point: midpoint of the posterior border of SCM B Lesser occipital, great auricular, transverse cervical, supraclavicular

Ansa cervicalis Fo Superior root (C1, via CN XII) + inferior root (C2–C3) S Infrahyoid muscles except thyrohyoid

Phrenic nerve Fo C3–C5, mainly C4 C On scalenus anterior, deep to prevertebral fascia F Sole motor to diaphragm; sensory to pericardium, pleura C Referred shoulder-tip pain; hemidiaphragm paralysis

Cranial nerves IX–XII in the neck

Ni IX, X, XI leave the jugular foramen; XII the hypoglossal canal
Aa Laryngeal aa. accompany the internal and recurrent laryngeal nn.
Vv IJV at the jugular foramen, lateral to IX–XI

Glossopharyngeal nerve C Curves round stylopharyngeus, between ICA and ECA B Stylopharyngeus, carotid sinus, pharyngeal plexus, posterior tongue

Vagus nerve C In the carotid sheath, posterior, between IJV and carotid a. B Pharyngeal, superior laryngeal, cardiac, recurrent laryngeal

Superior laryngeal nerve In Pierces thyrohyoid membrane, sensory superior to vocal folds E With superior thyroid a., motor to cricothyroid C External br. injury in thyroidectomy: weak, monotone voice

Recurrent laryngeal nerve C Right: round subclavian a.; left: round aortic arch P Tracheo-oesophageal groove; enters deep to inferior constrictor S All intrinsic laryngeal mm. except cricothyroid C Hoarseness; bilateral injury: stridor

Accessory nerve C Through SCM, across posterior triangle to trapezius C Node biopsy injury: weak shoulder shrug

Hypoglossal nerve C Crosses ICA and ECA, round occipital a., onto hyoglossus S All tongue muscles except palatoglossus C Tongue deviates to the injured side on protrusion

POST Cervical sympathetic trunk

Ni Preganglionic fibres from T1–T4 ascend; only grey rami in the neck
Aa Inferior thyroid a. near the middle ganglion; vertebral a. near the stellate
Vv Carotid sheath with the IJV lies anterior to the trunk

Cervical sympathetic trunk P On longus colli and capitis, posterior to the carotid sheath F Head, neck, upper limb: vasomotor, sweat, dilator pupillae B Grey rami to C1–C8; cardiac nn. (heart rate up)

Superior cervical ganglion P Near C2 (C1–C3), the largest; posterior to the ICA B Internal carotid n., external carotid nn., cardiac n.

Middle and cervicothoracic ganglia P Middle: C6; stellate: on the neck of the first rib No Ansa subclavia loops round the subclavian a. C Horner syndrome: ptosis, miosis, anhidrosis

ANT Thyroid and parathyroid glands

Ni Recurrent and external laryngeal nn. at risk in thyroid surgery
Aa Superior thyroid (ECA), inferior thyroid (thyrocervical), ± thyroid ima aa.
Vv Superior, middle thyroid vv. to IJV; inferior to brachiocephalic vv.
Vv Lymph: prelaryngeal, pretracheal, paratracheal, deep cervical nodes

Thyroid gland P C5–T1: lobes lateral to larynx and trachea, deep to strap muscles R In pretracheal fascia: moves with swallowing F T3/T4 set metabolic rate; C cells: calcitonin

Isthmus and pyramidal lobe P Isthmus on tracheal rings 2–4; pyramidal lobe toward the hyoid No Pyramidal lobe: remnant of the thyroglossal duct

Parathyroid glands P Two pairs on the posterior surface of the thyroid lobes F Parathyroid hormone raises blood calcium No Superior: near cricothyroid joint; inferior: near inferior pole S Mainly the inferior thyroid a.

ANT Larynx

Ni Sensory: internal laryngeal (superior to vocal folds), recurrent (inferior)
Ni Motor: recurrent laryngeal n., except cricothyroid (external laryngeal n.)
Aa Superior and inferior laryngeal aa. (superior, inferior thyroid aa.)
Vv Laryngeal vv. join the superior and inferior thyroid vv.
Ff Phonation; airway protection (inlet closes in swallowing) · Effort closure (Valsalva); cough reflex

Thyroid cartilage S Two laminae fused at the laryngeal prominence; superior, inferior horns L Oblique line: sternothyroid, thyrohyoid, inferior constrictor

Cricoid cartilage S Complete ring: narrow anterior arch, broad posterior lamina P C6: larynx and pharynx end; trachea and oesophagus begin

Arytenoid cartilages and epiglottis Ar Apex, vocal process (anterior), muscular process (lateral) E Elastic cartilage, stalk on the thyroid angle

Laryngeal cavity P Vestibule, ventricle (between the folds), infraglottic cavity Fo Vestibular (false): protective; vocal (true): phonation No Rima glottidis: narrowest part of the adult larynx

Median cricothyroid ligament P Midline between thyroid and cricoid cartilages C Emergency cricothyrotomy site

Intrinsic laryngeal muscles F Abduct: posterior cricoarytenoid only · Adduct: lateral cricoarytenoid, transverse and oblique arytenoids · Tense: cricothyroid; relax: thyroarytenoid; vocalis fine-tunes

POST Pharynx · trachea · oesophagus

Ni Pharyngeal plexus: motor X (stylopharyngeus: IX); sensory mainly IX and X
Aa Ascending pharyngeal, ascending palatine, tonsillar, inferior thyroid brs.
Vv Pharyngeal venous plexus to the IJV; lymph to deep cervical nodes
Ff Shared air and food passage; swallowing; speech resonance · Tonsils (Waldeyer ring) guard the entry

Nasopharynx P Posterior to the choanae, superior to the soft palate Fe Auditory tube opening, torus tubarius, pharyngeal recess, tonsil

Oropharynx P Soft palate to the tip of the epiglottis Fe Palatoglossal, palatopharyngeal arches; palatine tonsil; valleculae

Laryngopharynx P Epiglottis tip to inferior border of cricoid (C6) Fe Piriform recesses lateral to the laryngeal inlet C Fish bones lodge in the piriform recess

Pharyngeal muscles C Superior, middle, inferior: overlap on the pharyngeal raphe L Stylopharyngeus, salpingopharyngeus, palatopharyngeus F Constrictors propel the bolus; longitudinal raise pharynx, larynx · Cricopharyngeus: upper oesophageal sphincter C Pharyngeal pouch: between thyro- and cricopharyngeal parts

Cervical trachea and oesophagus P Both begin at C6; oesophagus posterior to the trachea R Recurrent laryngeal nn. in the grooves; thyroid lobes lateral F Trachea: airway held open by C-rings; oesophagus: bolus transport