Cranial Nerve IX: Glossopharyngeal Nerve

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One sentence: The glossopharyngeal nerve is part of the lower CNs and has motor, sensory, special senses, and autonomic functions, and while it is difficult to investigate in isolation, it is important for swallowing, taste, and autonomic functions (Fig. 14.1).

Genetic testing	NCV/ EMG	Laboratory	Imaging	Biopsy
	+?		+ and endoscopy	

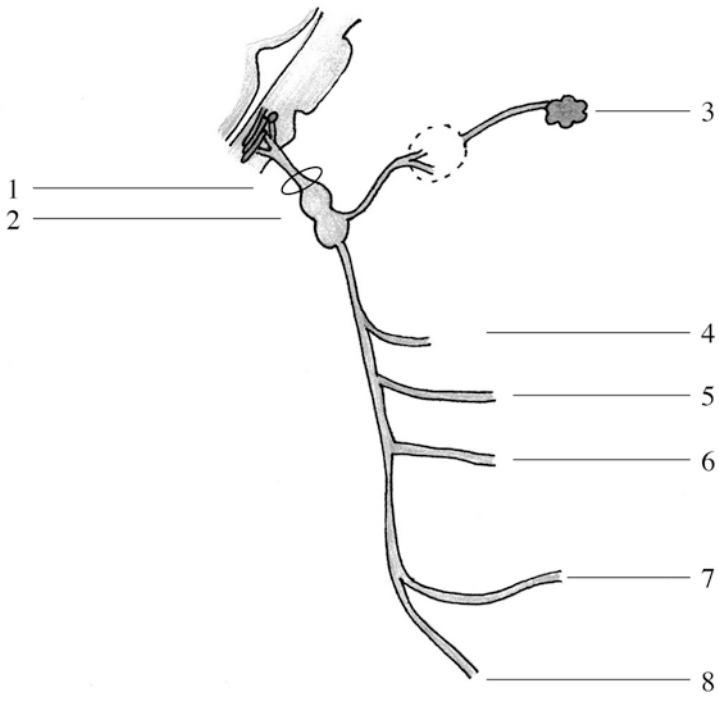

Fig. 14.1 Glossopharyngeal nerve. (*1*) Jugular foramen, (*2*) ganglia, (*3*) otic ganglion, (*4*) nerve to stylopharyngeal muscle, (*5*) pharyngeal branch, (*6*) tonsillar branch, (*7*) lingual nerve, (*8*) carotid body branch

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Symptoms

Lesions can cause minor swallowing difficulties, disturbance of taste, glossopharyngeal neuralgia (rare – pain behind the angle of the jaw, deep within the ear, and side of throat), and abnormal lacrimation ("crocodile tears" and "Bogorad" syndrome), but these symptoms may also be a complication of Bell's palsy with lesions proximal to the geniculate ganglion.

Signs

Taste on the soft palate, pharynx, and posterior third of the tongue is abnormal with decreased saliva production. The gag reflex is reduced or absent, which may result in swallowing and aspiration problems.

Specific Qualities

Motor: Stylopharyngeus muscle.

Sensory: Posterior third of the tongue, skin of the external ear, and the internal surface of the tympanic membrane.

Autonomic: Fibers to stimulate the parotid gland. Visceral sensory sensation, carotid body, and sinus.

Special senses: Taste from the posterior third of the tongue [1].

Other: Branchial. Visceral motor: Otic ganglion, general sensory, special sensory.

Location

Central:

Supranuclear lesion:

Unilateral: No deficit.
Bilateral: Corticobulbar innervation results in "pseudobulbar palsy."
Usually vascular causes.

Brain stem: Swallowing difficulties, bulbar symptoms combined with long tract signs, vascular brain stem lesions (*e.g.*, Bonnier's syndrome); medulla oblongata, pons, and pontine tumors; Wallenberg's syndrome.

Intracranial within the skull:

Inflammatory: GBS, meningitis, "polyneuritis cranialis."

Tumors: Neurinoma; cerebellopontine angle tumors, meningeal carcinomatosis, and schwannomas are rare [2], as is neurofibromatosis and malignant peripheral nerve sheath tumor (MPNST) [3].

Venous thrombosis.

Exit of the skull:

Jugular foramen syndrome (with CN X, XI; Vernet's syndrome), fracture of the base of the skull, metastasis, neurinoma, and other local tumors.

Outside of the skull: *i.e.*, neck.

Iatrogenic: Carotid operations, neck dissection (ENT and neurosurgical procedures), resection of aneurysms. Tonsillectomy is rarely a cause (0.1%). Lesions of the lateral pharyngeal wall.

Embolization of the ascending pharyngeal artery (tumor embolization in base of the skull tumors).

Lesions are rarely isolated and often associated with vagus nerve lesions.

Specific syndromes: Bonnier syndrome, Collet-Sicard syndrome, Villaret syndrome, Eagle's syndrome [4], Drummond syndrome, Frey syndrome.

Combination with Other CNs

Lesion of the jugular foramen.

Base of skull lesions.

Causes and Frequency

Amyloidosis of the pharynx: [5].*Eagle's syndrome*: [4, 6].

Iatrogenic: Anesthesia [7], carotid operations, embolization of the ascending pharyngeal artery (tumor embolization of base of the skull tumors), neck dissection (ENT and neurosurgical procedures), lesions of the lateral pharynx wall, resection of aneurysms; tonsillectomy is rarely a cause (0.1%) [8].

Immune dysphagia: [9].

Infectious: Diphtheria, herpes zoster, poliomyelitis.

Inflammatory/immune-mediated: Cryoglobulinemia, GBS, Miller Fisher syndrome, panarteritis nodosa, sarcoid, serum sickness, systemic lupus erythematodes (SLE).

Metabolic: Amyloid deposition, porphyria.

Motor neuron disease.

Myopathies: dermatomyositis, inclusion body myositis (IBM).

Neoplastic: Leptomeningeal carcinomatosis, leukemia, myeloma, vagal rootlet neuroma [10].

Neuromuscular transmission disorders: Myasthenia gravis, others.

Neuropathies: Diphtheria, GBS, paraneoplastic.*Radiotherapy*: [11].

Surgery: Tonsillectomy [12].

Tardive dyskinesia: Can involve swallowing function.

Tonsillectomy: Post tonsillectomy [12, 13].

Toxic: Tetanus toxin, nitrofurantoin, salvarsan intoxication.

Trauma: Basal fracture of the skull.

Vascular: Brain stem lesions; see topographical lesions.*Other syndromes*:

Baroreceptors can be affected in syphilis and diabetes and autonomic disorders [14, 15].

Baroreflex failure after carotid surgery [14].

Glossopharyngeal neuralgia is a rare occurrence and is much less frequent than trigeminal neuralgia but with several trigger points. The pain radiates into the ear, pharynx, neck, and the base of the tongue. The attacks are brief but can be associated with excruciating pain. Glossopharyngeal neuralgia can be associated with fainting (reflex associated with the vagus nerve, which can cause syncope and bradycardia) [16].

Main Investigations

ENT, US, muscle myofascial release therapy (MRT); swallowing, endoscopy; EMG; baroreceptor testing.

Differential diagnosis: Bulbar muscular disorders, motor neuron disorders, myasthenia gravis, pain, trigeminal neuralgia.

Therapy

Depending on the symptoms:

Specific: *E.g.,* "swallowing," logopedic interventions.

Neuralgia: Pain therapy, *e.g.*, amitriptyline, carbamazepine, gabapentin.

Surgery: See Eagle's syndrome.

Interventions for specific conditions:

Eagle's syndrome: Surgery, various approaches [6].

Glossopharyngeal neuralgia: Decompression [17–19].

Prognosis: Depends on the cause.

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