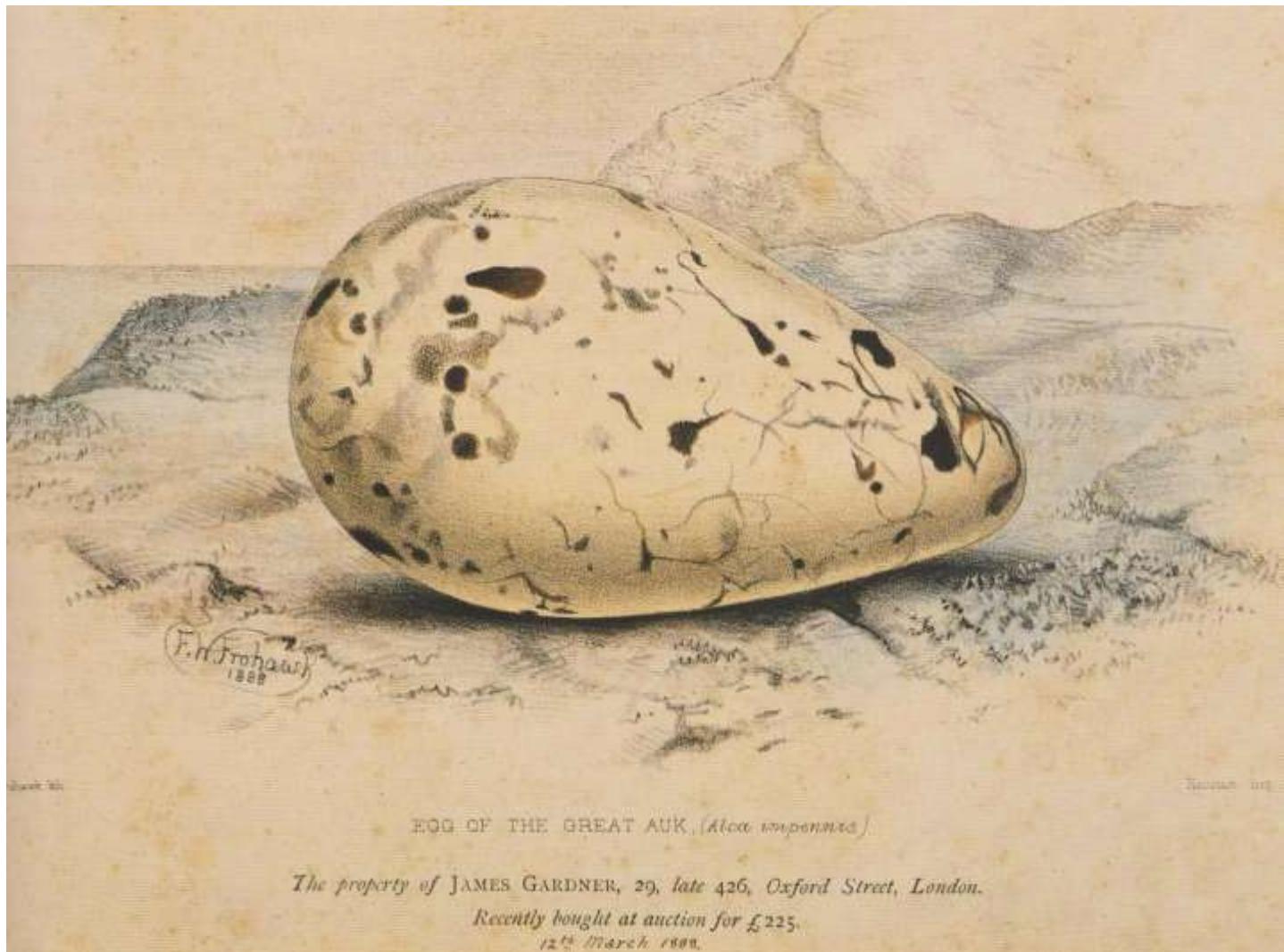


NINTH CRANIAL NERVE LESIONS



"Egg of the Great Auk, *Alca impennis*", Hand coloured lithograph by F.W Frohawk,
1888

*It was an undeniable fact that eggs of the Great Auk became prized trophies in Victorian Britain. There were just enough of them to sustain a fairly constant interest but never too many to make them anything other than rare. They were also tantalisingly vulnerable. Their emergence as symbols of power and wealth went hand in hand with the rise of egg collecting as a nationally approved pastime and a realization that *Alca impennis* was actually extinct. Egg list after egg list was compiled, each attempting to supersede in completeness its immediate predecessor; names of owners were recorded and the whereabouts of examples disclosed. Often an estimation of fast rising value was included.*

Like the similarly high prized stuffed specimens, each egg has a history attached to it - often one redolent with intrigue, greed and what might simply be termed, "human interest."

Their heyday as objects of national interest and spectacular financial value passed long ago, however. Were an egg to be offered today it would doubtless fetch a good deal more than the 300 pounds it might have brought around the year 1900. But £300 was a colossal sum at the time and it is extremely unlikely that any figure realised now would approach it in true value. When Captain Vivian Hewitt (the most formidable of all Great Auk egg collectors) died in the mid 1960's he left no fewer than thirteen examples, all of which were offered for sale. Five found new-owners fairly quickly but it took almost 30 years to affect the sale of the remaining eight.

Where once the collecting of wild bird's eggs rivaled football or fishing in popularity, it has now all but vanished. Today the fuss over bird's eggs is long since over and the schoolboy passion that developed in so many men into a full-blown mania is largely a thing of the past. Despite ridiculous claims to the contrary, there is no lucrative black market in bird's eggs (apart, perhaps from those taken to supply the aviaries of falconers) and the legions of active egg collectors feared by some bird protectionists are just a myth. Certainly, a few individuals still indulge themselves in this rather unendearing persuasion but these are isolated and secretive characters quite unlike the swaggering, self-assured "egggers" of a century ago. The taking of eggs for collections is an activity that - in any meaningful sense - no longer exists.

Partly this is because egg collecting is now illegal. Probably more telling is the fact that it is now entirely unfashionable. Perhaps another factor is equally significant. The deliberate finding and taking of eggs is - notwithstanding - its unpleasant overtones - something requiring enormous patience and skill, plus a remarkable degree of knowledge about the birds themselves. Few of today's ornithologists - priding themselves on their scientific approach - could match the knowledge of the old time egg collectors when it comes to understanding the ways of birds. Yet all the frantic activity of these men was, perhaps, to no real point. Alfred Newton, who inherited John Wolley's fabled egg collection and cherished it for much of his life, believed that little of scientific value could be gleaned from the study of a collection. Once assembled, such collections were - he thought - simply of aesthetic beauty.

The few Great Auk eggs that remain must be considered in the same way. What knowledge is to be drawn from them has - very likely - already been taken. Ornithologists may fuss over what they consider to be significant 'scientific data', but none of this really matters. Whether a particular egg came from Newfoundland, Iceland or the Orkneys or anywhere else within the species' known range, is surely as irrelevant as whether it cost 50 pounds or 90 pounds. To regard such information as being in some way significant is an affectation. The living bird is gone and the eggs simply testify to the fact that it once lived. As the very symbol of life itself, these eggs are objects that carry a terrible irony and great wonder. Perhaps, also, they really are things of beauty. Ultimately, however, they represent a life that never was. When a pair of hitherto unknown eggs were discovered in Edinburgh during 1880, the find caused much excitement among interested parties. A well known ornithologist tried to explain the significance (and

outline the enormous financial value) to two perplexed citizens - a popular Edinburgh minister and a newspaper reporter. At the end of the short lecture these gentlemen gave their would-be teacher a look of profound pity and together- uttered the same words:

...But the eggs are of no use; they will never hatch.

Errol Fuller, "The Great Auk", Harry N. Abrams, 1999

On the 3rd of June 1844, a small fishing boat emerged from the freezing morning mists and made landfall on the remote Icelandic island of Eldey. Three men, Jón Brandsson, Sigurður Ísleifsson and Ketil Ketilsson struggled ashore and clambered over the rocks. A great flock of seabirds arose at their approach, leaving only two large flightless birds behind. One of the men moves towards the birds through the biting cold mists and brutally bludgeons one of the birds to the ground. As it flaps helplessly, he picks it up and strangles it in his bare hands. Another of the men then chases the second bird in its panicked flight - catches it and breaks its neck. The birds were a pair who were guarding their solitary egg. The third man strolls over to the egg and puts it into his pocket, to take back to Iceland. This event records the last reliable sighting of the Great Auk, a majestic penguin-like flightless bird, that became extinct at the hands of humanity.

Paleontologists have established that in deep geological time the Earth has witnessed five great extinction events - at the end of the Ordovician (440 million years ago), the late Devonian (365 million years ago), the end Permian (225 million years ago), the end Triassic (210 million years ago) and most famously of all, the end Cretaceous (65 million years ago). Each of these mass extinction events saw at least 65% of all living species on the planet perish in a geological instant. Paleontologists have long debated the cause of these events. It has been established that the most recent, which saw the demise of the mighty dinosaurs, was due to a cosmic disaster in the form of an asteroid the size of Mount Everest striking the Earth in what is present day Mexico. The most serious of all these events, the end Permian, saw the extinction of around 95 % of all species on the planet. At this time life on Earth nearly "went to the wall" and - poignantly - the current best guess for this event was the runaway greenhouse effect of massive and unprecedented volcanic activity and the resulting climate change that this brought about. Causes of the other three great extinction events are currently unclear. Many biologists today are alarmed at the extinction rate of the Earth's species. Over the course of the Nineteenth and Twentieth centuries in particular an alarming loss of the Earth's biodiversity has occurred. Although most are blissfully unaware of the extent of the loss over the last 200 years, there are some now who are speaking out. The famous paleontologists Richard Leakey and Roger Lewin have in fact pointed out that as this loss of biodiversity continues into the 21st century, we are directly witnessing the "Sixth Great Extinction" event - and there is no doubt whatsoever about this event's cause - it is a direct result of the unthinking and uncaring actions of humanity. If we continue to destroy life on Earth at the current rate, our descendants will live in a greatly impoverished world, a world in which the planet teams with humans and insects, and a few types of farm animals, but precious little else. The vast majority of the beautiful, exotic, majestic and truly wondrous creations of billions of years of evolution are rapidly heading towards extinction - or at the very least extremely rarity - about as common as Auk eggs - or isolated lesions of the glossopharyngeal nerve!

NINTH CRANIAL NERVE LESIONS

Introduction

Cranial nerve IX is also known as the **Glossopharyngeal nerve**

The glossopharyngeal nerve as its name suggests primarily supplies the tongue (as both somatic sensory and special sensory) and the pharynx (predominantly sensory with a minor motor component).

It also has mediates two very important reflexes:

- The gag reflex
- The baroreceptor reflex

Isolated lesions of the glossopharyngeal nerve are very rare.

Lesions are usually seen in combination with lesions of other lower cranial nerves

Anatomy

Course of the Glossopharyngeal nerve:

Preganglionic parasympathetic nerve fibers that supply the salivary gland arise in the inferior salivary nucleus in the pons.

Somatic efferent fibers of the glossopharyngeal nerve (as well as those of the 10th and 11th cranial nerves) arise in the nucleus ambiguus within the lateral medulla oblongata.

The nucleus solitarius within the lateral medulla oblongata, contain sensory relay nuclei for the glossopharyngeal nerve, (as well as the 7th and 10th cranial nerves).

The nerve roots of the Glossopharyngeal nerve exit the posterior olfactory nucleus of the medulla oblongata (with the 10th cranial nerve and the cranial roof the 11th cranial nerve) and pass out of the posterior fossa of the skull through the jugular foramen (together with CN 10 and 11 as well as the internal jugular vein and the inferior petrosal sinus), to enter the neck.

A tympanic branch passes through the floor of the tympanic cavity and forms the tympanic plexus around the promontory. This plexus supplies the lining of the tympanic cavity (i.e. the middle ear) and gives off the lesser petrosal nerve. This nerve leaves the skull through the foramen ovale to join the otic ganglion, which then conveys parasympathetic nerves to the parotid gland.

Within the jugular foramen, the nerve contains superior and inferior sensory ganglia.

The nerve descends in the neck within the carotid sheath, to eventually wind around the Stylopharyngeus muscle, which it supplies and then passes forward between the superior and inferior pharyngeal constrictor muscles, after which it divides into multiple branches.

The lingual branch of the glossopharyngeal nerve supplies general sensory and taste sensation to the posterior third of the tongue.

Glossopharyngeal nerve innervations:

The major branches of the glossopharyngeal nerve include:

1. Somatic Motor:

- Stylopharyngeus muscle, (all other pharyngeal muscles have their motor function supplied by the vagus nerve).

2. Somatic sensory:

- Sensation posterior one-third tongue
- Internal surface of tympanic membrane.
- Pharynx and soft palate

3. Special sensory:

- Taste, to posterior one third of the tongue.

4. Parasympathetic autonomic secreto-motor:

- Parotid gland.

5. Autonomic sensory, (nerve of Hering):

- Carotid body and carotid sinus.

Pathology

Isolated lesions are rare . Lesions of the Glossopharyngeal nerve are more commonly seen in association with other lower cranial nerve lesions.

Causes include:²

1. Central:

- Vascular:

- ♥ Including lateral medullary infarction, (or variants) due to vertebral or posterior inferior cerebellar artery disease.
 - Tumour
 - Syringobulbia
2. Peripheral (posterior fossa lesions):
- Aneurysm
 - Tumour
 - Trauma to the region of the posterior fossa.

Clinical Assessment

1. Testing the gag reflex:
 - Gently touch the left and the right sides of the back of the pharynx with a spatula

The glossopharyngeal nerve mediates the sensory component and the vagus nerve mediates the motor component of the gag reflex.

Ask the patient if they feel the touch of the spatula for each side.

If contraction of the soft palate is absent and sensation is intact, this suggests a lesion of the vagus nerve. If there is a lack of sensation (and consequent lack of a gag reflex as well), this suggests a lesion of the glossopharyngeal nerve.
2. Taste sensation of the posterior third of the tongue is lost in glossopharyngeal nerve lesions, however this is rarely formally tested.
3. Pseudobulbar and bulbar palsies:
 - The combination of bilateral upper motor neurone lesions involving the 9th, 10th and 12th cranial nerves is known as a pseudobulbar palsy.

Bilateral lower motor neurone lesions of these nerves are known as bulbar palsies.

Blood tests

According to the index of clinical suspicion for any given condition, consider:

- FBE

- U&Es/ glucose
- CRP
- ESR

Others as clinically indicated, such as blood lead levels.

CT Scan

For delineation of mass lesions causing a compression of the Glossopharyngeal nerve

MRI

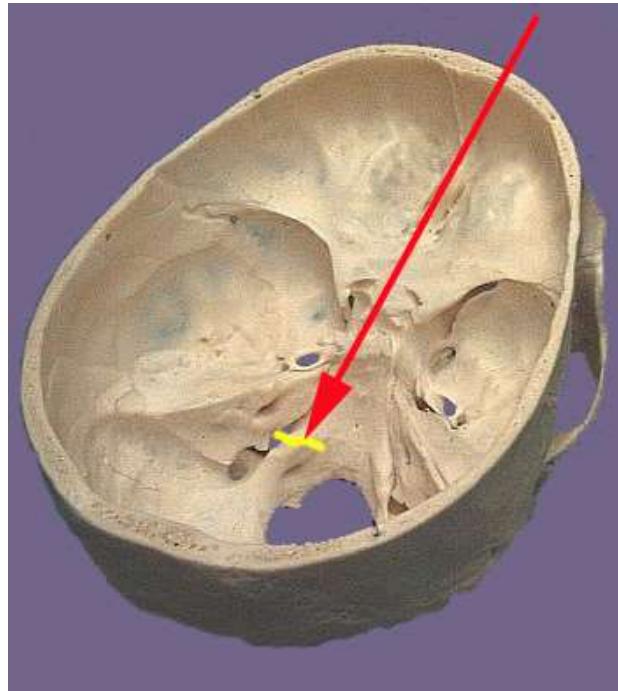
Again this may be useful for delineation of mass lesions.

It may also be used to visualize the nerve itself.

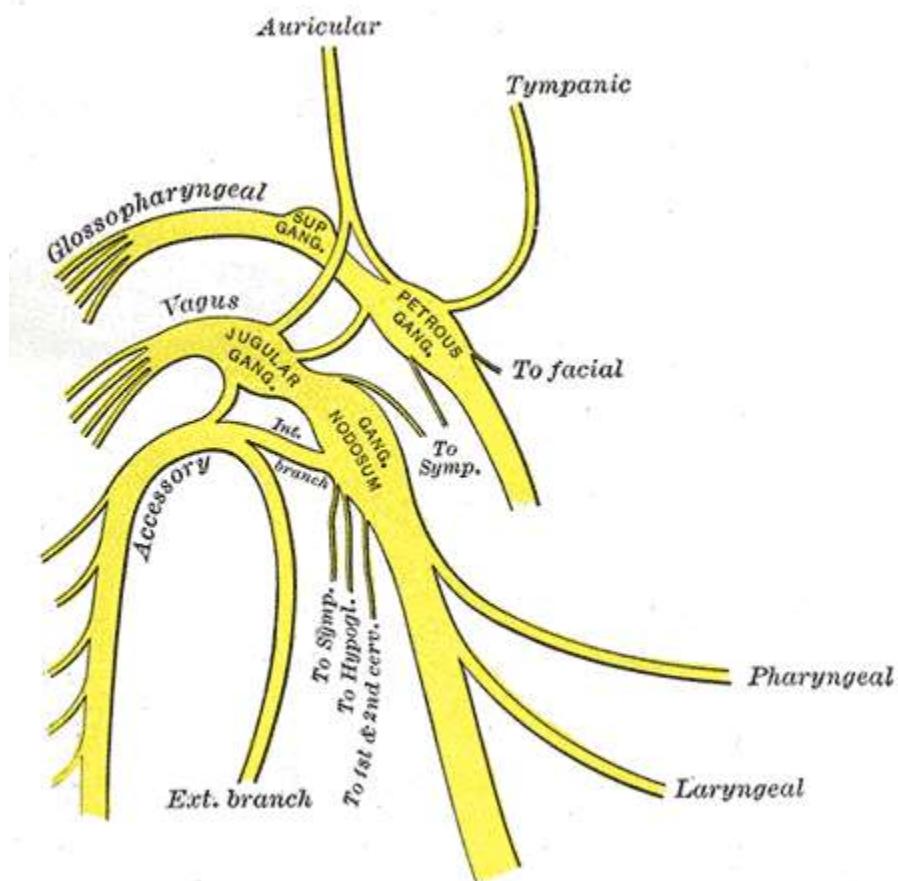
Management

Management depends on the underlying cause of the lesion.

Appendix 1



Intracranial course of the Glossopharyngeal Nerve.



*Plan of upper portions
of glossopharyngeal,
vagus, and accessory
nerves, (Gray's
Anatomy 1918).*



"The Great Auk", lithographic print, John Gould's Birds of Great Britain, 1862-73. When John Gould published his beautiful lithograph of the Great Auk, he knew it was a rare bird - what he did not know was that it had actually been extinct for over two decades!

References

1. Snell R. Clinical Anatomy for Medical Students, 5th ed 1995.
2. Talley NJ, O'Conner S: Medicine, the examination series 6th ed 2010, p.377-78.

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15 December 2011