MALIGNANT TUMOURS OF THE SALIVARY GLANDS

Essay

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SUBMITTED IN PARTIAL FULFILLMENT

OF THE MASTER DEGREE IN

Oto-Rhino-Laryngology

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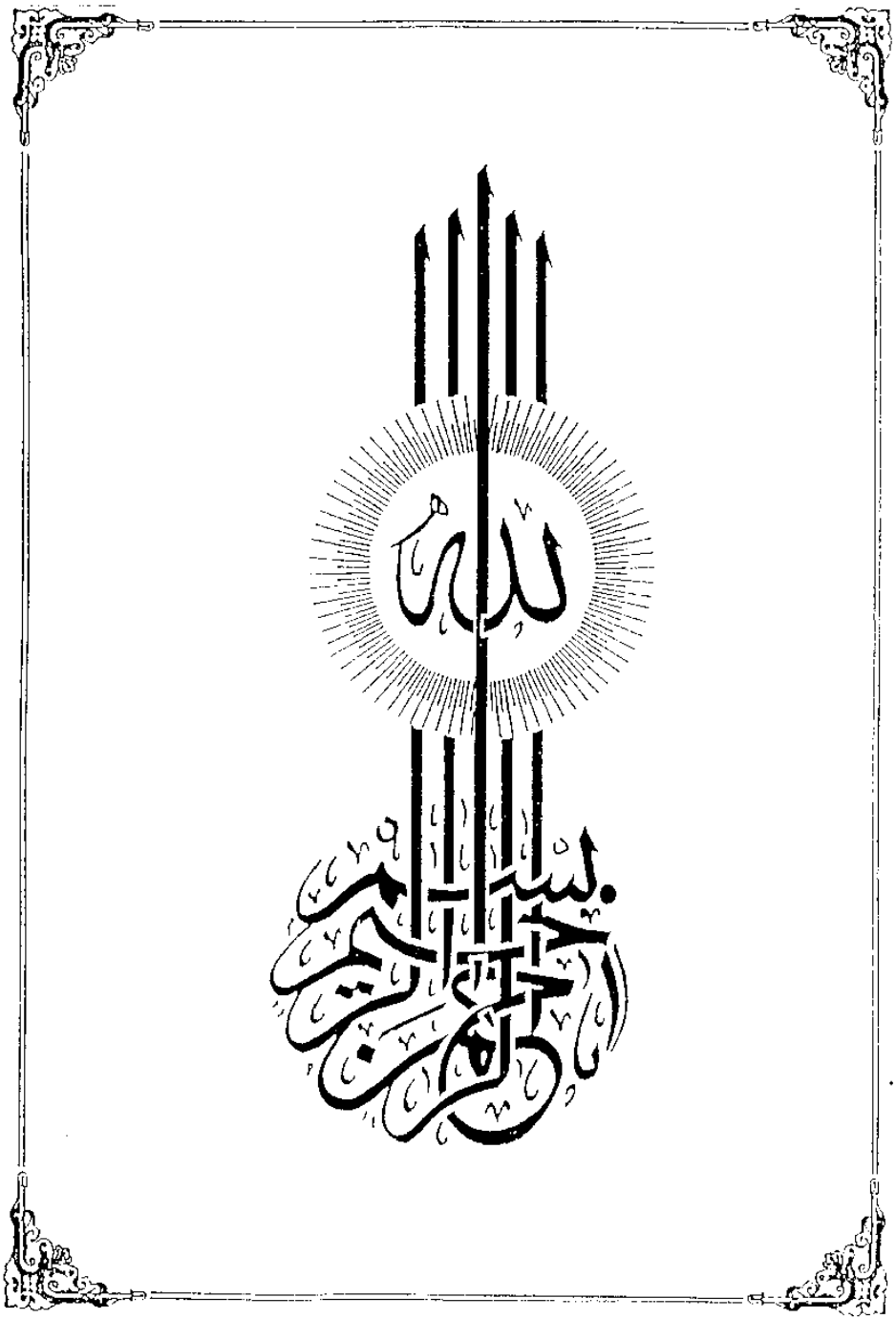
1984

ACKNOWLEDGEMENT

I want to take this opportunity to express my sincere appreciation and gratitude to Dr. ADEL YOUSSEF, Assistant Professor of Oto-Rhino-Laryngology, who honoured me by supervising this work and supplied me with continuous help, guidance and encouragement.



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INTRODUCTION

Although the salivary gland tumours comprise less than 3 percent of all neoplasms of the head and neck region, they are of unusual interest and challenge to the surgeon because of their complex and varying histologic types and their regional anatomic relationships.

The salivary gland that is the most frequent site of tumours is the parotid gland. The submandibular and sublingual glands are afflicted less commonly. Tumours may also arise in the minor salivary glands widely dispersed in the mucosa of the upper respiratory and upper digestive tracts.

This work is aiming at providing a helpful guide to the diagnosis, investigation and management of the malignant tumours of the salivary glands on an anatomical, pathological, and clinical basis.

ANATOMY OF THE SALIVARY GLANDS

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The salivary glands are customarily devided into two main groups, the major and the minor. The parotid, the submandibular and the sublingual glands are grouped in the major category. The glands of the minor category are scattered widely throughout the pharyngeal and oral mucosa including the lips. It is worth noting that similar glands with comparable secretions are found in the nose, sinuses, post-nasal space, larynx, trachea and bronchi.

Developmental anatomy:

The human major and minor salivary glands begin their development as solid buds from the oral epithelium. As the epithelial buds proliferate solid cords appear that hollow out to form a double layer of cuboidal progenitor cells.

The progenitor cells apparently under the influence of the surrounding mesenchyme differentiate into the various ducts, acini and myoepithelia. This process begins about the sixth week in utero for the major salivary glands and around the ninth week for the minor salivary glands.

Salivary gland function begins several weeks after the initial development of the gland with mature morphology

appearing many weeks later at the time of birth (Joseph et al., 1977).

The parotid gland is the first salivary gland to develop. In the sixth week old embryo (13-15 mm embryo) there is the beinning of an invagination of the inner surface of the epithelium of the cheek. This invagination occurs close to the area of oral commisure. By the eighth embryonic week (19-25 mm embryo) this invagination has extended to the underlying mesenchyme and fused to form a tube or duct which grows posteriorly until it reaches the level of the ascending ramus of the mandible, where the duct branches into secondary and terminal divisions that will become the terminal alveoli. This branching and the organization of these terminal divisions will constitute the ductal system and alveoli of the perotid gland.

Although the original invagination occurs close to the oral commisure, it migrates posteriorly in the cheek to a higher and somewhat more central position in the buccal mucosa.

The submandibular salivary gland ordinarily begins to show late in the sixth week embryo as a paired primordial cellular cords. Each cord presenting the main duct of the

gland on that side arising near the midline under the tongue. The duct grows back along the floor of the mouth and near the angle of the mandible turns ventrally It then grows toward the surface pushing outside the border of the myelohyoid muscle before it begins to branch freely.

The sublingual glands arise slightly later than the parotid and submandibular. Their primordia are usually recognizable by the end of the seventh week embryo. (Conley, 1975).

SURGICAL ANATOMY OF THE PAROTID GLAND

The parotid gland is paired and is situated immediately inferior and anterior to the lower part of the ear ("Parotid" is derived from two Greek words meaning" near the ear"). Its superior limit is at the zygoma; its inferior limit is below the angle of the mandible. It extends anteriorly to a variable extent over the masseter muscle; posteriorly, it is bordered by the external auditory meatus, the mastoid and the styloid processes, and the sternocleidomastoid and the posterior digastric muscles. The deep portion of the gland extends in along the bony external auditory meatus behind the ascending ramus towards the base of the skull.

The parotid (Stensen's) duct is approximately 6cm long and opens into the mouth by a small orifice opposite the upper second molar. The direction of the duct corresponds to a line drawn across the face from the lower part of the concha to midway between the free margins of the upper lip and nasal ala, about one finger's breadth below the zygoma. The fascia of the gland is attached to the zygomatic arch above and to the fascia of the masseter and sternocleidomastoid muscles below. In different regions about the parotid this fascia varies in thickness and fixation as it comes in contact with various muscles, bone, cartilage, blood vessels and nerves.

The larger superficial segment of the gland, which comprises 70 to 80 percent of the entire gland lies lateral to the facial nerve branches, and the smaller deep portion lies medial to these branches. The portion of the gland embraced near the origin of the two major nerve divisions is called the isthmus. From the surgical point of view, the lobes appear more or less fused, yet are separable with careful surgical technique. In addition, the deep lobe has a retromandibular portion of variable size that hooks around the posterior portion of the mandiable and extends medially into the loose areolar tissues of

the upper lateral pharyngeal area in close relation to the internal jugular vein. Tumours arising in the retromandibular portion of the parotid gland have the potential to expand into the parapharyngeal space and base of the skull and to reach massive size prior to clinical presentation.

The facial nerve emerges from the skull through the stylomastoid foramen and passes 0.5 to 1.5 cm inferiorly with a slight anterolateral inclication to enter the parotid gland. The facial nerve branches are given off after it has entered the gland, with the exception of the muscular rami to the occipital, auricular, posterior digastric, and stylohyoid muscles. In this short passage from the foramen to the gland, the nerve passes anterior to the posterior belly of the digastric muscle and lateral to the styloid process, external carotid artery, and posterior facial vein. Shortly after entering the gland and at a point posterior and slightly medial to the ramus of the mandible, the nerve splits into two main divisions, the temporofacial and the cervicofacial portions. These two divisions then sub-branch to form five main branches. The facial nerve emerges from beneath the superficial parotid lobe in five branches: the temporal, zygomatic, buccal,

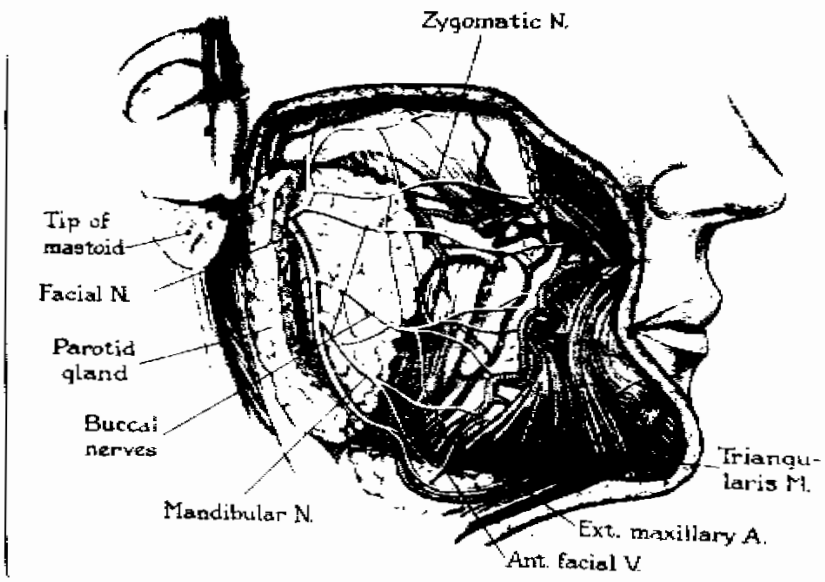

Fig.(1): Relation of facial nerve to Parotid gland and facial muscles and Blood vessels (After Conley, 1975).

mandibular, and cervical. The terminal nerve branching (the so called " pes anserinus" meaning goose's foot") and possible anastomotic connections are complex, but several important facts emerge :

1. In 13 percent of cases there are anastomotic connections between the terminal branches.
2. In 70 percent of cases, anastomotic connections between the two major divisions exist.
3. Anastomoses between terminal branches of the three temporofacial divisions are frequent, anastomoses between the two branches of the cervicofacial division are infrequent. Hence, injury of the temporofacial division is less likely to result in permanent paralysis than is injury to the cervicofacial division.
4. Where nerve anastomoses between the temporofacial division do exist, they are often closely related to the parotid duct and are readily injured when the duct is divided during surgery. (Conley and Baker, 1981).

A number of structures traverse the parotid gland or are closely applied to it and have relationships of considerable surgical significance. They are considered regarding their depth from the surface :

.. The greater auricular nerve arises from the second and third cervical nerves and curves around the posterior border of the steronomastoid muscle near its centre, pierces the deep fascia and ascends across that muscle running with the external jugular vein deep to the platysma muscle. It reaches the postero-inferior portion of the parotid gland and then runs upwards on the capsule or in the most superficial part of the gland before dividing into an anterior branch which supplies the skin over the angle of the jaw and a posterior branch which supplies sensation to the lobe of the ear.

The facial nerve traverses the gland in a postero-anterior, direction deep to the great auricular nerve and immediately superficial to the veins.

Immediately deep to the facial nerve lies a plexus of veins draining into the posterior facial vein running from above downwards in the same plane. This vein originates by the union of the supeficial temporal and maxillary veins and at the lower part of the parotid it devides into an anterior division which joins the anterior facial vein to form the common facial vein, and a posterior division which becomes the external jugular vein after being joined by the posterior auricular vein. Very occasionally the posterior

facial vein runs between the lower branches of facial nerve lying immediately superficial, instead of deep, to the lower one or two branches of the nerve.

Just above the posterior belly of the digastric muscle the external carotid artery enters the deep aspect of the parotid gland and at this point is separated from the veins by a moderate amount of gland tissue. As the artery travels upwards it becomes more and more superficial until at the upper pole the arteries and veins lie together. In the parotid gland the external carotid artery divides into maxillary and superficial temporal arteries.

The auriculotemporal nerve arising from the mandibular division of the trigiminal nerve passes backwards on the surface of the tensor palati muscle deep to the lateral pterygoid muscle and then between the neck of the mandible and sphenomandibular ligament just above the maxillary artery. The nerve then runs laterally to the deep aspect of the upper part of the parotid gland behind the neck of the mandible. Passing around the upper pole of the parotid gland the auriculotemporal nerve emerges just behind the superficial temporal vessels at the condyle of the mandible. It then runs upwards with the vessels to