

Morphological and Structural variations in Parotid gland: A cadaveric study and its clinical implications

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Abstract

Introduction: An accessory parotid gland is defined as “the salivary tissue present in close association to the Stenson’s duct lying on the masseter but away from the parotid gland”. Very often the accessory salivary gland tissue is located in front of the parotid gland. The accessory parotid tissue is found in more than 21% of adults. Any disease process which affects salivary glands may affect accessory parotid gland.

Objectives: present study was conducted to study the morphology of parotid gland, structural variation including accessory parotid glands in Indian population.

Materials and Method: study was conducted by studying 50 dissections of parotid glands. The Weight of the gland was measured in gms, cranio-caudal and ventro-dorsal dimension was measured in cms. Mean and standard deviation was calculated. Accessory parotid gland was explored and examined.

Results: overall incidence of accessory parotid gland was noted in 5 (10%) of cases. Bilateral accessory gland was noted in 2 (4%) of cases. Unilateral accessory parotid gland was noted in 3 (6%) of cases.

Conclusion: Accessory parotid gland is a prominent morphological variation in Indian population.

Keywords: Morphological variations, Structural variation, Parotid gland, Ectopic salivary tissue

Introduction

The parotid glands are a pair of serous salivary glands. These glands are located below and in front of each ear canal. The secretions of these glands are drained into the vestibule of the mouth through the parotid duct.⁽¹⁾ Each gland lies behind the mandibular ramus and in front of the mastoid process of the temporal bone. The gland can be felt on either side, by feeling in front of each ear, along the cheek, and below the angle of the mandible.⁽²⁾ The gland is roughly wedge-shaped when seen from the surface.^(1,2)

Humans have three pairs of salivary glands a "parotid, sub-mandibular and sublingual. The parotid is the largest and is situated in front of the ear. It weighs about 15 gms and contributes about 25 per cent of our total salivary secretion. It releases saliva through the Stenson’s duct, which opens opposite the upper second molar tooth. Saliva contains an enzyme called "ptyalin" or salivary alpha-amylase, which helps in digestion by breaking down starch into maltose.⁽¹⁻³⁾

The parotid duct, a long excretory duct, emerges from the front of each gland, superficial to the masseter muscle. The duct pierces the buccinator muscle, then opens into the mouth on the inner surface of the cheek, usually opposite the maxillary second molar. The parotid papilla is a small elevation of tissue that marks the opening of the parotid duct on the inner surface of the cheek.⁽³⁾

The gland has four surfaces, superficial or lateral, superior, anteromedial, and posteromedial. The gland has three borders, anterior, medial, and posterior. The

parotid gland has two ends, superior end in the form of small superior surface and an inferior end (apex).⁽⁴⁻⁶⁾

The parotid salivary glands appear early in the sixth week of prenatal development and are the first major salivary glands formed.^(7,8) The epithelial buds of these glands are located on the inner part of the cheek, near the labial commissures of the primitive mouth (from ectodermal lining near angles of the stomodeum in the 1st/2nd pharyngeal arches; the stomodeum itself is created from the rupturing of the oropharyngeal membrane at about 26 days).^(9,10) These buds grow posteriorly toward the otic placodes of the ears and branch to form solid cords with rounded terminal ends near the developing facial nerve. Later, at around 10 weeks of prenatal development, these cords are canalized and form ducts, with the largest becoming the parotid duct for the parotid gland. The rounded terminal ends of the cords form the acini of the glands. Secretion by the parotid glands via the parotid duct begins at about 18 weeks of gestation. Again, the supporting connective tissue of the gland develops from the surrounding mesenchyme.⁽⁹⁻¹¹⁾

An accessory parotid gland is the salivary tissue present in close association to the Stenson’s duct lying on the masseter but away from the parotid gland.⁽¹²⁾ The most common location of accessory salivary gland tissue is an extra major salivary gland in front of the parotid gland. It is typically about 3 cm or less in size, and drains into the parotid duct via a single tributary.⁽¹³⁾ Accessory parotid tissue is found in 21-56% of adults.⁽¹⁴⁾ Any disease process which affects

salivary glands may affect accessory parotid gland, but the tumours of accessory parotid gland are rare.⁽¹²⁻¹⁴⁾

Objectives

Present study was conducted with following specific objectives,

1. To study the morphology of parotid gland in Indian population
2. To study the structural variations in parotid glands in Indian population

Materials and Method

The present study was conducted in anatomy department of Dr D Y Patil Medical College, Navi Mumbai. A total of 50 cadaveric dissections of parotid glands were studied. The formalin fixed parotid glands were used for pro-section during the dissection classes of 1st MBBS students of Dr D Y Patil Medical College, Nerul, Navi Mumbai. Weight was measured in gms, cranio-caudal and ventro-dorsal dimension was measured in cms (Fig. 1). Average and standard deviation was calculated. Accessory parotid gland was explored and examined.

Result

A total of 50 cadaveric dissections of parotid glands were studied. This included 50 left and 50 right parotid glands. Average weight of left parotid gland was 16.32 gms with standard deviation of 1.2 gms while range was 14.00 gms to 18.5gms. Average weight of right parotid gland was 15.78 gms with standard deviation of 1.6 gms while range was 14.00gms to 18.00gms (Table 1).

Average cranio-caudal dimension of left parotid gland measured 5.6 cms with standard deviation of 0.8 cms while range was 4.00 cms to 07.5 cms. Average cranio-caudal dimension of right parotid gland was 5.2 cms with standard deviation of 0.6 cms while range was 4.00 cms to 7.8 cms (Table 1).

Average ventro-dorsal dimension of left parotid gland measured 3.2 cms with standard deviation of 0.6 cms while range was 2.00 cms to 04.8 cms. Average ventro-dorsal dimension of right parotid gland was 3.4 cms with standard deviation of 0.7 cms while range was 2.00 cms to 5.00 cms (Table 1).

Table 1: Morphology of Parotid gland in Indian population (N=50)

Morphological Character	Left Gland (Mean ± SD)	Right Gland (Mean ± SD)
Weight in gms	16.32 ± 1.2	15.78 ± 1.6
Cranio-caudal dimension in cms	5.6 ± 0.8	5.2 ± 0.6
Ventro-dorsal dimension in cms	3.2 ± 0.6	3.4 ± 0.7



Fig. 1: Dimensions of Parotid Gland

Out of 50 dissections overall incidence of accessory parotid gland was noted in 5 (10%) of cases. Bilateral accessory gland was noted in 2 (4%) of cases. Unilateral accessory parotid gland was noted in 3 (6%) of cases.

Discussion

Average weight of parotid gland was ranging from 14 to 18 gms. It was found to be slightly higher as compare to various studies reported in western population 14.8 gms, as reported by Francis B et al.⁽¹⁵⁾ Cranio-caudal and ventro-dorsal dimensions were same as reported in other studies.⁽¹³⁻¹⁵⁾ The accessory parotid gland is defined as a salivary tissue which is separated from the main parotid gland and lying on masseter muscle in front of stenson's duct. Frommer has described anatomical features of accessory salivary gland in detail.⁽³⁾ There are two types of anterior extension of gland one is "facial process" which is attached directly to the main gland. The other is "detached glandular mass" or "accessory parotid gland which is completely separated from the main gland. The average distance of the separated accessory parotid gland from the anterior edge of main gland is 6 mm. the accessory parotid gland exists in 20—61% individuals according to various autopsy studies.⁽⁸⁻¹⁰⁾ In the present study incidence of accessory parotid gland was noted in 5 cases that is total incidence was 10%. However bilateral accessory gland was noted in 2 cases that is incidence of 4%. Unilateral accessory parotid gland was noted in 3 cases that is 6% cases. So the incidence was less as compared to previous studies.

Tumours arising from the accessory parotid glands are usually found above the midpoint of an imaginary line extending from the tragus to a mid way between the ala of nose and the vermillion border of upper lip which corresponds to the accessory parotid tissue.^(5,6) Failure to remove a distantly separated accessory gland during parotidectomy could be a cause of tumor recurrence.

Conclusion

Accessory parotid gland is a prominent morphological variation in Indian population. In present study, the incidence of morphological variations in

parotid gland was found to be less as compared to previous studies.

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