STUDIES ON THE LYMPHATIC SYSTEM IN RELATION TO THE UPPER AERODIGESTIVE TRACT

ESSAY

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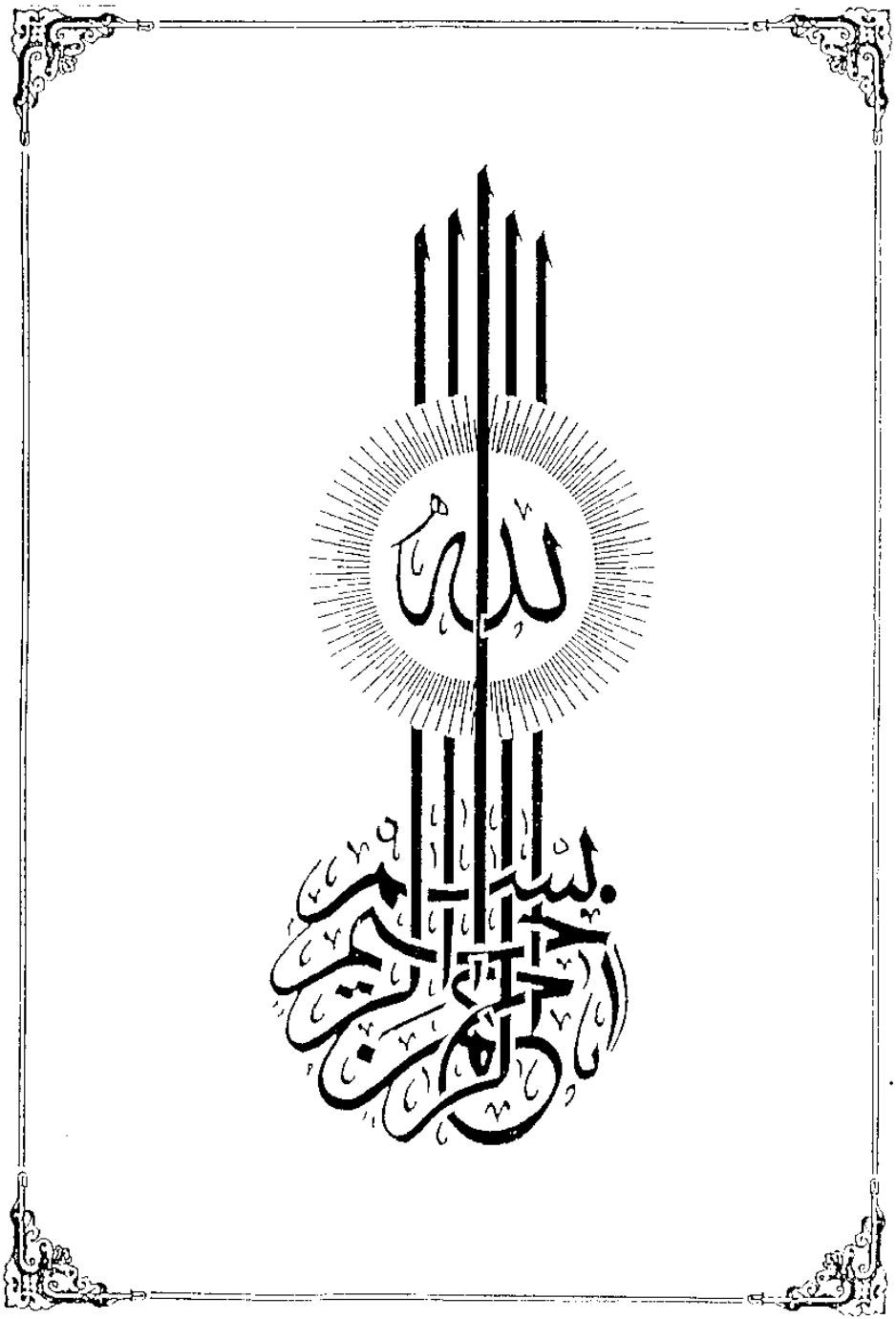

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INTRODUCTION

AIM OF THE WORK

STUDIES ON THE LYMPHATIC SYSTEM IN RELATION TO THE UPPER AERODIGESTIVE TRACT

Introduction :-

The pharyngeal lymphoid tissue-the so called Waldeyer's ring-consists of collections of lymphoid tissue situated subepithelially. This ring consists of the palatine tonsils, lingual tonsils, nasopharyngeal tonsil (Adenoids), tubal tonsils, lateral pharyngeal bands and other discrete nodules which occur in the subepithelial layer of posterior pharyngeal wall. (Ballantyne et al., 1978).

The pharyngeal lymphoid tissue differs from other members of the lymphatic system in that it is located subepithelially and so, it has no afferent lymphatics. In this point it is similar to the Peyer's patches of the small intestine, lymphoid tissue of the appendix and the small solitary nodules of the colon. (Ballantyne & Groves, 1979).

The function of the pharyngeal lymphoid system is thought to be the same as the general function of other body lymphoid tissue i.e. lymphocyte and

antibody synthesis, however the function of filtration of lymph is not performed due to the absence of afferent lymphatics.

This work is ment to be a trial to study the exact immunologic function of the pharyngeal lymphatic tissue.

Aim of the work :-

The aim of this essay is to review the literatures dealing with the function of the pharyngeal lymphoid tissue in order to get a better understanding of its function especially the role played in the general immunological aspect.

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EMBRYOLOGY OF THE PHARYNGEAL LYMPHOID TISSUE

Within the first three weeks of intrauterine life, the embryonic disc becomes thicker. Increased growth forms the proximal head fold, while surface invagination of ectoderm forms the primitive oral pit or stomatodaeum. (Hamilton et al., 1972; Arey, 1974). Towards the end of first month (23-25 days), the foregut comes to lie dorsal to the developing heart tube and to the developing septum transversum (developing diaphragm). Its anterior end at this stage is closed by the buccopharyngeal membrane which separates it from the stomatodaeum. At about 26-27 days, the bucco-pharyngeal membrane ruptures and the stomatodaeum becomes continuous with the foregut, thus the oral and pharyngeal cavities become continuous (Hamilton et al., 1972; Ballantyne & Groves, 1979). This occurs with the formation of five ectodermal grooves which lie caudal to the stomatodaeum and lateral to the pharynx. These grooves are separated by surface elevations which become the branchial or visceral arches. These arches extend ventrally to merge with the arches of the opposite side. At the level of each groove, pouches of the endoderm evaginate from the developing pharynx and contribute to the forming ear, parathyroid and thymus gland. (Langman, 1969; Arey, 1974).

EMBRYOLOGY OF THE PHARYNGEAL LYMPHOID TISSUE

The second pharyngeal pouch becomes largely absorped into the pharyngeal wall (Langman, 1969), however,dorsal remnants of the pouch persist to become the epithelium of the palatine tonsil. (Schaeffer, 1953; Arey, 1974). The palatine tonsils are developed from the part of the second pharyngeal pouches which lie between the tongue and soft palate. The endoderm lining these pouches grows into the surrounding mesenchyme in the form of number of solid buds. These buds are excavated by the degeneration and shedding of their central cells, thus the tonsillar crypts and fistulae are formed (Warwick & Williams, 1973). The crypts branch, degenerate and reform even after birth. Lymphocytes appear near the epithelium during the third month and become organised as nodular structures after the sixth month. By the fifth month of development, mesenchyme contagious to the tonsil forms the tonsillar capsule as well as the internal connective tissue framework of the tonsil. (Arey, 1974). A slit-like intratonsillar cleft extends into the upper part of the tonsil and is a remnant of the second pharyngeal pouch. (Warwick & Williams, 1973; Ballantyne & Groves, 1979). The tonsillar pillars are formed from the second and third branchial arches through dorsal extension of the mesenchyme into the forming soft palate.(Arey, 1974).

The lingual tonsil represents lymphoid infiltration into the base of the tongue concomitant with the development of the palatine tonsils. Formation may also involve epithelial ingrowth into the connective tissue which has already condensed at this site. Peritonsillar mucous glands also form, with excretory ducts around which lymphocytes may also form. These ducts commonly open into saccular crypts. (Arey, 1974).

In the embryo the notochord lies a short distance inferior to the base of the skull in the region of the developing basilar part of the occipital bone. Here it is attached to the endoderm forming the roof of the primitive pharynx and with subsequent growth of this region the notochordal attachement draws out an angled recess of endoderm (the pouch of Luschka) which forms the pharyngeal bursa. (Warwick & Williams, 1973). Later on it becomes invaded by lymphocytes resulting in the formation of the pharyngeal tonsil or adenoid, during the fourth to sixth month of development. These lymphocyte either arise in situ or are derived from the blood stream. (Arey, 1974; Ballantyne & Groves, 1979).

ANATOMY

ANATOMY OF THE PHARYNGEAL LYMPHOID TISSUE

The pharyngeal lymphoid tissue-the so - called Waldeyer's ring-consists of:

1- The palatine tonsils.

2- The nasopharyngeal tonsil or adenoids.

3- The lingual tonsils.

4- The lateral pharyngeal bands.

5- Some discrete nodules lying in the subepithelial layer of the posterior pharyngeal wall. (Last,1978; Ballantyne et al., 1978; Wong & Ogra, 1980).

THE PALATINE TONSILS

These are two masses of lymphoid tissue, situated in the lateral walls of the oral part of the pharynx. Each tonsil is placed in the triangular recess (tonsillar sinus) between the diverging palatoglossal and palato-pharyngeal arches (Warwick & Williams, 1973). Although each tonsil may be variable in size, measurements in young adults have demonestrated an approximate length to be 20-25 mm, width to be 15-20 mm, and thickness to be 12 mm. An average weight of adult tonsil is 1.5 gm. (Schaefer, 1953).

The medial surface is free and forms a conspicuous projection into the pharynx during childhood, but the size of this projection is not a true indication of the size of the organ. (Warwick & Williams, 1973). It is covered by mucous membrane composed of stratified squamous epithelium which is variably pitten with the openings of the tonsillar crypts (Parkinson, 1959) which are twelve to fifteen in number. They penetrate nearly the whole tickness of the tonsil and from which numerous follicles branch out into the tonsillar substance. The upper part of the tonsil contains a deep intratonsillar