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Research Article

## RETICULAR EPITHELIUM AND UNDERLYING HIGH ENDOTHELIAL VENULES OF HUMAN NASOPHARYNGEAL AND PALATINE TONSILS: A COMPARATIVE HISTOLOGICAL STUDY

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**Abstract:**

**Background:** The tonsils are a significant structure for immunological capacities and are made out of nasopharyngeal and palatine tonsils. They bear a shifting level of antigenic affront.

**Objective:** To look at the reticular epithelium and basic high endothelial venules of human nasopharyngeal and palatine tonsils.

**Material and Methods:** This was relative cross-sectional research, led in Mayo Hospital, Lahore from February 2018 to January 2019. Thirty examples every one of human nasopharyngeal, right palatine and left palatine tonsils were gathered by accommodation examining system. Haematoxylin and eosin recoloured paraffin areas were inspected for patches of the reticular epithelium. The separation between the patches was estimated and high endothelial venules in the subepithelial compartments were determined.

**Results:** The reticular epithelium had the same structure in the two tonsils. The separation between two patches was  $(181.18 \pm 17.83)$   $\mu\text{m}$  in nasopharyngeal and  $(726.01 \pm 48.89)$   $\mu\text{m}$  in palatine tonsils. The research yielded noteworthy factual contrast ( $P=0.000$ ). The mean includes of high endothelial venules in lymphoid compartments underneath these patches of nasopharyngeal and palatine tonsils were  $(2.19 \pm 0.1)$  and  $(1.85 \pm 0.12)$  separately with no significant factual contrast ( $P=0.075$ ).

**Conclusion:** The comes about suggested that regardless of the way that the level of reactivity of reticular epithelium in the two sorts of tonsils could be equivalent, however, the nasopharyngeal tonsil may react to antigenic lift all the more rapidly when contrasted with palatine tonsil by morals of more visit reticulation of epithelium on mucosal surface of past contrasted with a short time later.

**Key Words:** Tonsils, Structure, Immunological, Nasopharyngeal, Palatine, Antigenic, Anatomy, Reticular, Patches and Significant.

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## INTRODUCTION:

The tonsils are masterminded as a ring known as Waldeyer's ring [1]. The nasopharyngeal tonsil is a mass of lymphoid tissue in the posterosuperior mass of nasopharynx while a couple of palatine tonsils is situated on the right and left dividers of the oropharynx [2]. They take an interest in an assortment of immunological capacities going from intrinsic to cell and humoral invulnerability both at neighbourhood and fundamental dimensions. One of these significant immunological capacities is the persistent reconnaissance for remote antigens at the entryway of section into gastrointestinal and respiratory tracts [3]. The regions in charge of this capacity of antigen testing incorporate reticular epithelium which is portrayed by disturbances in the cellar film's congruity, desquamation of the surface cell layers and penetration of epithelium by non-epithelial lymphoid cells which can reach to a degree of loss of clear division among epithelium and lymphoid tissue [4, 5]. By ethicalness of overwhelming invasion by lymphocytes, these regions have even been named as lymphoepithelium [6]. Presence of such lymphoepithelium had likewise been accounted for in nasopharyngeal tonsils [7]. The reticular epithelium is viewed as a utilitarian compartment of the tonsils. The proposed capacities incorporate an arrangement of a positive domain for the contact between the effector cells of resistant reactions, direct transport of antigens, a persistent combination of secretary part and keeping a pool of immunoglobulins [5]. All these capacities need a steady enlistment of immunocompetent cells, entry for transendothelial movement, which is given by high endothelial venules (HEVs) [8]. The recurrence of these venules is in this manner considered a relative pointer of the dimension of reactivity [9]. The nasopharynx is a piece of aviation route thus its structure accommodates perpetual patency when contrasted with oropharynx which closes discontinuously [10]. Nasopharyngeal tonsil is in this manner moderately more presented to antigenic incitement than palatine tonsil. This changing level of antigenic affront recommends simultaneous contrasts in structure and relative conveyance of reticular epithelia and basic HEVs in the two tonsils. Such similar histological investigation is deficient in the writing. With this foundation, the present Research was intended to study and think about the reticular epithelium and HEVs of human nasopharyngeal and palatine tonsils.

## MATERIAL AND METHODS:

This was a relative cross-sectional Research, led in Mayo Hospital, Lahore from February 2018 to January

2019. Thirty examples every one of right palatine left palatine and nasopharyngeal tonsils were gathered by comfort inspecting procedure for this near cross-sectional Research at the season of tonsillectomy with earlier authorization from Ethical Committee of Institute. Tests were gathered from the patients in whom the sign was either ceaseless tonsillitis or non-fieri nasal check after educated assent. The examples from patients with ongoing scenes of intense tonsillitis, anti-toxin treatment inside a month of usable method and neoplastic developments of the tonsils were barred from the Research. Exacting recognition of these determination criteria guaranteed that examples gathered had prevalence over the ones from post-mortem Research. The chose tests were free of any aggravation or anti-microbial treatment for in any event one month, rendering them as near ordinary as could be expected under the circumstances. In the event that the examples were generally gathered from dissection of people kicking the bucket of different reasons, it would have been unseemly to think of them as ordinary in light of the way that tonsillitis is a typical condition, and an exact history of the present status of tonsils is normally not accessible in these cases.<sup>11,12</sup> After fixing in formalin, 5 1. t,m thick paraffin installed areas from mucosal surfaces of nasopharyngeal and palatine tonsils (counting the grave if there should arise an occurrence of later) were recoloured with haematoxylin and eosin for minute Research. The graves of Palatine and mucosal surfaces of nasopharyngeal tonsils were seen in histological segments for patches of reticular epithelium and their morphology was inspected and recorded. So as to discover the number of such fixes per unit length, which by implication demonstrated their recurrence per unit zone, the separation between two neighbouring patches was estimated. It was done either by the visual micrometre (when the line was moderately straight) or with the assistance of PC programming, picture J (if there should be an occurrence of a bent line of interceding epithelium) [13]. Means and standard deviation were determined. The field underneath each fix was contemplated for HEVs. Their number was checked per field and means and standard deviation were determined. The methods for the two parameters were then contrasted by free example test and the assistance of SPSS. A p-value of 0.05 or less was considered measurably critical.

## RESULTS:

The patches of reticular epithelium on nasopharyngeal tonsils were observed to be fundamentally nearer ( $181.1 \pm 17 \text{ um}$ ) than those of palatine tonsils ( $726 + 48\text{um}$ ), on factual Research by autonomous example

test ( $p=0.000$ ). Though the check of HEVs underneath epithelial patches of both had no huge contrast when analyzed measurably, where a number of HEVs in

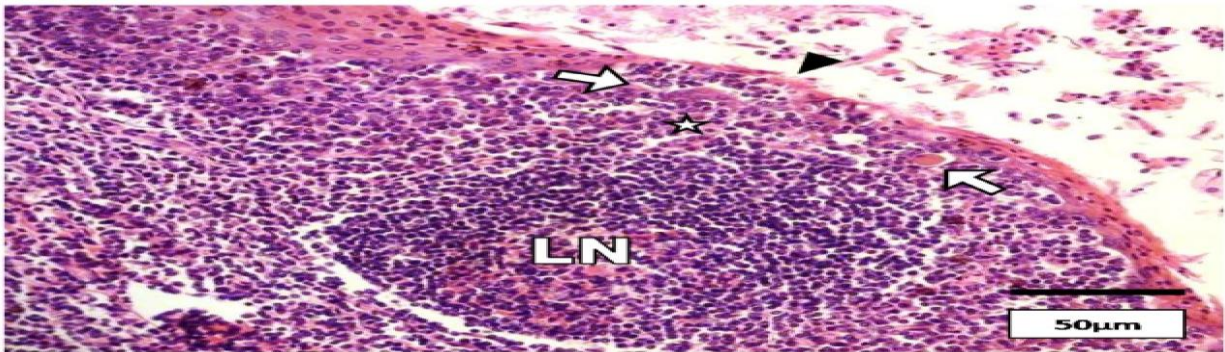
palatine tonsils was  $(1.85 \pm 0.12)$  and in nasopharyngeal tonsils was  $(2.19 \pm 0.1)$  ( $p=0.07$ ).

**Table:** Mean, Standard Deviation and statistical significance between the reticular epithelium of Palatine and nasopharyngeal tonsils

Parameter	Palatine tonsil Mean + SD (60)	Nasopharyngeal tonsil Mean + SD (30)	P- value
Distance between two patches of reticular epithelium (Um)	726.01 + 48.89	181.18 + 17.83	0.000
No. of HEVs beneath patch of reticular epithelium	1.85 + 0.12	2.19 + 0.1	0.075

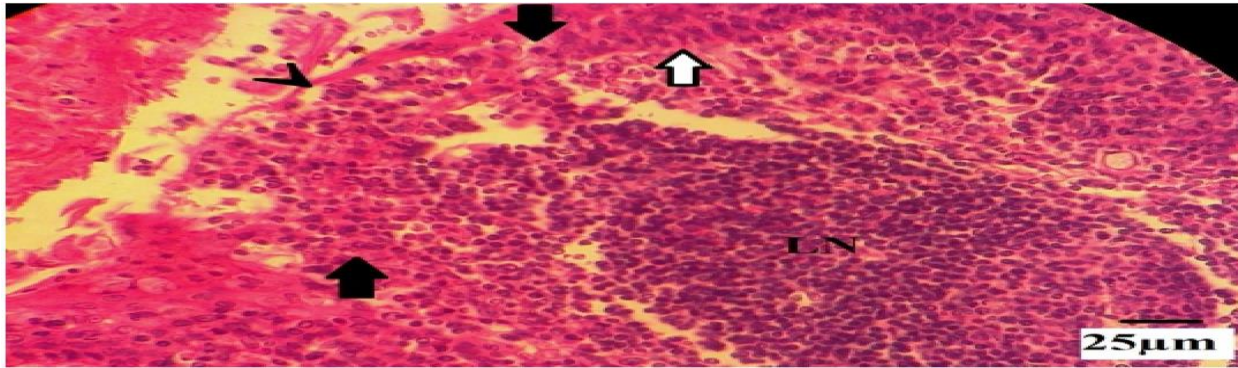
All samples had patches of the reticular epithelium. They were usually located on the apices of nodules (Figure – I)

**Figure – I:** Section of the palatine tonsil, showing a patch of reticular crypt epithelium (white arrows) overlying a lymph nodule (LN). Some characteristic features of reticular epithelium-like loss of demarcation between epithelium and underlying lymphoid tissue (asterisk) and surface disruption (arrowhead) are visible. (Haematoxylin and eosin. Photomicrograph. Bar approximately 500 um)



If there should arise an occurrence of nasopharyngeal tonsil they prevailed in the epithelium of folds, while in palatine tonsil, were seen in graves. The sepulchres of palatine tonsils demonstrated these patches scattered with flawless stratified squamous epithelium and the limit between these two epithelia was set apart by the loss of boundary among epithelium and subepithelial lymphoid tissue (Fig: II)

**Figure – II:** Section of the palatine tonsil, showing a patch of reticular crypt epithelium (black arrows) with heavy infiltration by non-epithelial cells overlying a lymph nodule (LN). The demarcation between epithelium and subepithelial lymphoid tissue (white arrow) is apparent in the adjacent intact stratified epithelium. Very thinned out epithelial cells (arrowhead) is still present above a portion of reticular epithelium. (Haematoxylin and eosin. Photomicrograph. Bar approximately 25um).



In the two sorts of tonsils, the patches of reticular epithelium indicated comparable morphological qualities. They were described by the substantial invasion of the epithelium by non-epithelial cells which brought about bending of, and detachment between epithelial cells. The limit between the epithelium and fundamental lymphoid tissue was not particular. (Fig: I, II) The negligible measure of subepithelial connective tissue was found now and

again. A few HEVs were seen underneath the epithelial patches. (Fig: III)

**Figure – III:** Section of the nasopharyngeal tonsil, showing a High Endothelial Venule (HEV) running beneath a patch of the reticulated epithelium. Endothelial cells with bulging nuclei (arrowheads) can be seen bulging into the lumen filled by blood cells. (Haematoxylin and eosin. Photomicrograph. Bar approximately 20µm).



At destinations of most extreme invasion by non-epithelial cells, the epithelial cells seemed like star-formed reticulum cells with a few cytoplasmic procedures comprising a perplexing system. Reticular epithelium turned out to be exceedingly slender in spots. The outside of the reticular epithelium was disturbed at locales (Fig: I) and non-epithelial cells were seen at these interruptions which most likely go into the lumen through these holes. Thinned out epithelial cells with cytoplasmic augmentations, where every so often observed on the surface. (Fig: II) At destinations of over the top penetration, the reticular epithelium rather gave the presence of lymphoid tissue. A few little veins and

vessels notwithstanding the HEVs were additionally found in the locale of the reticular epithelium.

#### DISCUSSION:

Exact recognition of consideration criteria guaranteed that one lot of tests (counting one nasopharyngeal, right palatine and left palatine tonsil each) originated from one patient in this manner had a similar dimension of antigenic presentation and uniform inner condition. This safety measure upgraded the legitimacy of the outcomes. The palatine tonsils and adenoids structure an unmistakable part of the mucosa-related lymph reticular tissues appearing of both foundational and mucosal compartments [14]. Tonsils do not just go

about as the first line of guard against outside antigenic affront yet additionally as a course of section and a site for replication for some pathogens [15]. The epithelium of palatine tonsil may even go about as a potential site for oral transmission for HIV [16]. Thus a superior comprehension of auxiliary attributes of the tonsillar epithelium may help in explaining the pathogenesis of numerous sicknesses. The tombs of palatine tonsils and the mucosal surfaces of nasopharyngeal tonsils in all cases demonstrated epithelial patches with attributes of the reticular epithelium in concurrence with past investigations, straightforwardly overlying the lymphatic knobs as per archived literature [5, 17, 18]. By excellence of this nearby affiliation, these patches can be contrasted with those referenced as "Follicle related epithelium" and subsequently may go about as practical compartments of tonsils allied with the subepithelial lymphoid tissue [7, 19, 20]. The reticulation of the epithelium may have come about because of more grounded antigenic incitement while the zones which have held stratified squamous epithelium may have been presented to this affront at a lesser degree [6]. The close association between reticular epithelium and non-epithelial lymphoid cells invading through it gives a premise to alleged lymphoepithelial symbiosis [21]. It was seen that at destinations of substantial invasion, the reticular epithelium took up the presence of lymphoid tissue. This concurs with the way that it additionally gains the job of the lymphoid compartment. The palatine and nasopharyngeal tonsils are the locales of hypersensitive refinement as they are both situated at the gateway of passage to respiratory and stomach related tracts yet possess various pieces of pharynx [22]. The nasopharyngeal tonsil lies in that part which is kept continually patent because of the inflexible pharyngobasilar sash, while oropharynx which gives a seat to palatine tonsils is liable to conclusion discontinuously [10]. This distinction in the area may prompt contrast in the level of antigenic incitement which could clarify essentially more fixes of reticular epithelium per unit length of nasopharyngeal when contrasted with palatine tonsil saw in this investigation. This finding supports the documentation of various and every now and again happening edema because of antigenic incitement if there should be an occurrence of nasopharyngeal when contrasted with palatine tonsil and altogether higher expansion of lymphocytes in previous when contrasted with later when animated by P6 external film protein of non-typeable H flu prompting the determination that nasopharyngeal is a progressively responsive tonsil [23, 24]. The tonsils are considered as auxiliary lymphoid organs, and for completing

their resistant capacities they rely on a consistent enlistment of lymphocytes. The incitement of the utilitarian compartments of tonsils and consequent invulnerable responses is a dynamic procedure and improvement of HEVs is a pre imperative for that [25, 26]. Thus, the overall bounty of HEVs in useful compartments of tonsils could be connected with their dimension of reactivity in direct extent. Despite the fact that the patches of reticular epithelium were observed to be firmly set in nasopharyngeal than in palatine tonsils, the unimportant contrast in number of HEVs underneath these patches recommend no distinction in mode or level of capacity of individual fix in either case and the recently examined and reported high reactivity of nasopharyngeal tonsils could be ascribed to all the more much of the time found reticular epithelium on them when contrasted with palatine tonsils. The usefulness of tonsils relies on a few variables including immunocompetent cells, reticular epithelium and cytokines [4, 5, 27]. However, in light of its auxiliary attributes and area where it goes about as the primary line of experience with antigens, the significance of reticular epithelium in such manner can't be over looked.

#### CONCLUSION:

The outcomes propose that in spite of the fact that the level of reactivity of reticular epithelium in the two kinds of tonsils may be comparative, yet the nasopharyngeal tonsil may respond to antigenic boost all the more quickly when contrasted with palatine tonsil by ethicalness of increasingly visiting reticulation of epithelium on mucosal surface of previous contrasted with later.

#### REFERENCES:

1. Modrzytiski M, Mazurek H, Zawisza E. Unfavorably susceptible tonsillitis: fantasy or reality. *Postepy Hig Med Dosw (Online)*. 2005. Sep; 13; 59:450-6.
2. Drake RL, Vogl W, Mitchell AWM. *Dark's Anatomy for understudies*. Philadelphia: Churchill Livingstone; 2004.943-45.
3. Horter DC, Yoon KJ, Zimmerman JJ. An audit of porcine tonsils in resistance and ailment. *Anim Health Res Rev*. 2003 Dec; 4(2):143-55.
4. Clark MA, Wilson C, Sama A, Wilson JA, Hirst BH. Differential cytokeratin and glycoconjugate articulation by the surface and sepulchre epithelia of human palatine tonsils. *Histochem Cell Biol*. 2000; 114(4):311-21
5. Perry ME. The particular structure of tomb epithelium in the human palatine tonsil and its utilitarian hugeness. *Janet*. 1994; 185 (Pt 1):111-27.

6. Kumar P, Timoney JF. Histology, immunohistochemistry and ultrastructure of the equine palatine tonsil. *Anat Histol Embryol*. 2005. Jun; 34(3):192-8.
7. Kumar P, Timoney JF. Light and electron magnifying lens think about on the nasopharynx and nasopharyngeal tonsil of the pony. *Anat Histol Embryol*. 2001; 30(2):77-84.
8. Akkus M, Yuruker S, Dagdeviren An, Asan E. Basic and immunophenotypic portrayal of high endothelial venules in rodent and human tissue. *Saudi Med J*. 2004. Apr; 25(4):434-41.
9. Hafeez A, Khan MY, Minhas LA. A relative histological investigation of the surface epithelium and high endothelial venules in the subepithelial compartments of human nasopharyngeal and palatine tonsils. *J Coll Physicians Surg Pak*. 2009. Jun; 19(6):333-7.
10. Sinnatamby CS. *Last's Anatomy local and connected*. Tenth ed. Edinburgh: Churchill Livingstone; 1999.
11. Yamanaka N. Moving towards another period in the exploration of tonsils and mucosal boundaries. *Adv Otorhinolaryngol*, 2011.72:6-19.
12. Berner R. Otitis media and tonsillitis-2 of the most incessant pediatric determinations. *Ther Umsch*. 1998; 55(1):13-7.
13. Rasband WS. Picture J, U. S. National Institutes of Health, Bethesda, Maryland, USA. 1997-2005. Accessible from: <http://rsb.info.nih.gov/ij>.
14. Boyaka PN, Wright PF, Marinaro M, Kiyono H, Johnson JE, Gonzales RA et al. Human nasopharyngeal-associated lymphoreticular tissues. Useful Research of subepithelial and intraepithelial B and T cells from adenoids and tonsils. *Am J Pathol*. 2000; 157(6):2023-35.
15. Zidan M, Pabst R. The microanatomy of the palatine tonsils of the one-humped camel (*Camelus dromedarius*). *Anat Rec (Hoboken)*. 2009; 292(8): 1192-7.
16. Moutsopoulos NM, Nares S, Nikitakis N, Rangel Z, Wen J, Munson P et al. Tonsil epithelial elements may impact oropharyngeal human immunodeficiency infection transmission. *Am J Pathol*. 2007; 171(2):571-9.
17. Hafeez A, Khan MY, Minhas LA. The overall circulation of high endothelial venules in the subepithelial lymphoid compartments of human palatine tonsil. *Ann Pak Inst Med Sci*. 2008; 4(4):223-226.
18. Palmer MV, Stasko J, Waters WR, Thacker TC. Research of the reticular epithelium of the cow-like pharyngeal tonsil. *Anat Rec (Hoboken)*. 2011; Nov; 294(11):1939-50.
19. Kraehenbuhl JP, Neutra MR. Epithelial M cells: separation and capacity. *Annu Rev Cell Dev Biol*. 2000; 16:301-32.
20. Kumar P, Timoney JF, Sheoran AS. M cells and related lymphoid tissue of the equine nasopharyngeal tonsil. *EquineVet J*. 2001; 33(3):224-30.
21. Bykova VP, Satdykova GP. Morphofunctional association of lymph epithelial organs of the human pharynx. *Izv Akad Nauk Ser Biol*. 2002 Jul-Aug ;(4):463-71.
22. Modrzyriski M, Grochowski P, Zawisza E, Lipiec A. Histopathological and immunological investigation of hyperplastic palatine tonsils and adenoids in kids with coinciding atopic dermatitis. *Przegl Lek*. 2003; 60(5):317-21.
23. Endo LH, Altemani A, Chone C, Idagawa E, Sakano E. Histopathological Research among tonsil and adenoid reactions to hypersensitivity. *Acta Otolaryngol Suppl*. 1996; 523:17-9.
24. Kodama H, Faden H, Harabuchi Y, Kataura A, Bernstein JM, Brodsky L. Cell insusceptible reaction of adenoidal and tonsillar lymphocytes to the P6 external layer protein of non-type able *Haemophilus influenza* and its connection to otitis media. *Acta Otolaryngol*. 1999; 119(3):377-83.
25. Ruddle NH, Akirav EM. Optional lymphoid organs: reacting to hereditary and natural signals in ontogeny and the insusceptible reaction. *J Immunol*, 2009. Aug. 15; 183(4):2205-12.
26. Ruskell GL. Association and cytology of lymphoid tissue in the cynomolgus monkey conjunctiva. *Anat Rec* 1995.Oct; 243(2):153-64.
27. Brandtzaeg P. Immunology of tonsils and adenoids: everything the ENT specialist has to know. *Int J Pediatr Otorhinolaryngol*. 2003; 67 Suppl 1: S69-76.