

Original Research Article

COMPARATIVE HISTOPATHOLOGY OF PALATINE TONSILS IN EARLY CLINICAL LEARNING FOR PHASE 1 MBBS STUDENTS

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ABSTRACT

Background: The Human Palatine tonsils are part of a protective annulus of lymphoid tissue and a common site of pathology, their histopathological interpretation forms an important part of the foundational curriculum for 1stMBBS students. This study aims at describing a simplified, descriptive comparison of normal with common tonsillar pathologies for strengthening early histopathological diagnosis.

Materials and Methods: 60 formalin-fixed, paraffin-embedded specimens, comprising normal tonsillar tissue& tonsillectomy specimens were procured, processed and descriptive cross-sectional study was done. Predefined histological parameters (surface epithelium, germinal centres, crypt changes and inflammatory infiltrate) were recorded and compared descriptively.

Results: The control normal tonsillar tissue were differentiated with absent abscess, absent crypt hyperplasia and absent subepithelial inflammatory infiltration whereas chronic tonsillitis showed 95% crypt micro-abscess, 80% non- epithelial cell infiltration, 95% surface epithelial ulceration when compared with Hypertrophied tonsillar tissues.

Conclusion: From this study it was also concluded that the chronic tonsillitis specimen show's ulceration, crypt micro abscess & lymphocytic, neutrophilic infiltration in surface epithelium, whereas lymphoid hyperplasia & hypertrophy of lymphoid follicles are predominant features of hypertrophied tonsils. Distinct histological criteria reliably help to differentiate normal from diseased tonsils and definitive features can meaningfully strengthen early histopathology learning, particularly for first MBBS students.

Keywords: Human Palatine tonsils, Chronic tonsillitis, Tonsillar hypertrophy.

INTRODUCTION

The normal Palatine tonsils consist of lymphoid tissue arranged in follicles, covered by no keratinized stratified squamous epithelium which extends to deep crypts lined by crypt epithelium that penetrate each tonsil.^[1] MBBS Students often encounter pathology of palatine tonsils during their clinical postings and also students entering medical college often have limited prior exposure to microscopy and histo-pathology laboratories, making it difficult for them to differentiate normal tonsillar architecture from inflammatory and hypertrophied tonsils. A simplified, descriptive

comparison of these three entities can strengthen early histopathological reasoning.

Aim: To describe and compare the histopathological features of normal palatine tonsil, chronic tonsillitis, hypertrophied tonsils and to translate these findings into an easily distinguishable diagnostic framework for first MBBS students.

MATERIALS AND METHODS

Study Design: A Descriptive, cross-sectional and observational study.

Study setting: Data collection from Institute of Anatomy, Madras Medical college in collaboration with Institute of Pathology, Madras Medical

College. Design of work, drafting, data interpretation and analysis of result at Government Medical college, Kallakurichi.

Study population: A total of 60 tonsillectomy specimens were included and categorised into three groups: (i) grossly and microscopically normal tonsillar tissue (studied as control tissue among the tonsillar specimens collected), (ii) tonsillectomy specimens with a clinical indication of chronic tonsillitis (n=42), and (iii) tonsillectomy specimens with a clinical indication of tonsillar hypertrophy (n= 18).

Inclusion criteria

Normal tonsillar tissues collected from young cadavers during routine dissection from Government Medical college, Kallakurichi has been compared as control tissues. 60 Tonsillectomy specimens collected through randomisation from the Institute of Pathology, Madras Medical College with clinical details, fulfilling the clinical criteria for chronic tonsillitis and tonsillar hypertrophy.

Exclusion criteria

Specimens with suspected or confirmed tumour/malignancy, adenoidectomy, peritonsillar abscess, autoimmune/granulomatous disease and incompletely processed or autolysed specimens.

Tissue processing: Specimens were fixed in 10% neutral buffered formalin, grossed, and processed by the standard paraffin-embedding technique. Sections of 4-5 micron thickness were cut and stained with haematoxylin and eosin (H&E).

Staining procedure: The slides were kept in hematoxylin trough for 20 minutes and washed in distilled water, then they were dipped in 1% alcohol for differentiation. Then washed again in water and kept in running tap water for bluing. The slides were then dipped in eosin for 2 seconds, washed again

with water and air dried. Then dipped in Xylene, isopropyl alcohol, again air dried and mounted using DPX mount. Distinct histological features were studied using Binocular light microscope under 4X, 10X, 40X and 100x magnifications, analyzed and photographed.

Parameters assessed: Surface epithelium (ulceration, hyperplasia), lymphoid follicles and germinal centre activity, crypt epithelium, presence of crypt micro-abscesses, sub epithelial infiltration of lymphocytes and neutrophils, increased vascularity (Capillaries and High endothelial venules).

Ethical considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee (ECReg.No: ECR/270/Inst./TN/2013- No.16082018). In accordance with institutional policy, patient identifiers were not recorded, only clinical diagnostic details were considered.

RESULTS

In the total of 60 human Palatine tonsils of different age groups, Normal tonsillar specimens were among the 70% (42 out of 60) of chronic tonsillitis and 30% (18 out of 60) of hypertrophied tonsils. Normal tonsillar tissue described Non keratinised stratified squamous epithelium with absent abscess, absent crypt hyperplasia and absent subepithelial lymphocytic, neutrophilic infiltration whereas Chronic tonsillitis specimens showed 95% crypt micro-abscesses, 95% non-epithelial cell infiltration, and 95% epithelial ulceration in surface epithelium when compared with Hypertrophied tonsillar tissues.

Table 1: Comparative Histopathological Features

S. No	Comparative Histological Criteria	Normal Palatine Tonsils	Chronic Tonsillitis	Hypertrophied Tonsils
1.	Surface epithelium	Non keratinised stratified squamous epithelium - Intact	Ulceration / disrupted epithelium often by abscess and non epithelial cell infiltrates	Intact, epithelial hyperplasia is seen
2.	Lymphoid follicles	Few, small, primary follicles with few/absent germinal centres	Shows increased secondary follicles but relatively less	Numerous, large secondary follicles with prominent germinal centres
3.	Germinal centre activity	Minimal	Mildly increased	Markedly increased (reactive hyperplasia)
4.	Crypts	Regular, narrow, lined by intact epithelium	Infiltrated with neutrophils & lymphocytes	Lymphocytic infiltration seen but comparatively less
5.	Crypt micro-abscess	Absent	Frequently present	Absent / rare
6.	Inflammatory infiltrates	Absent	Dense neutrophilic and lymphocytic infiltrate present	Predominantly lymphocytic infiltration seen
7.	Capillaries & High endothelial venules	Normal	Increased	Mildly increased

DISCUSSION

On comparison, Chronic tonsillitis specimens showed a significantly higher frequency (95%) of crypt micro-abscesses, ulceration in surface epithelium when compared with both normal tonsil

and hypertrophied tonsil. Hypertrophied tonsils showed significantly greater germinal centre size and number (90%), consistent with reactive lymphoid hyperplasia, whereas in chronic tonsillitis there is increased neutrophilic and lymphocytic infiltration (95%). Normal tonsillar tissue showed,

the least follicular activity with absent or few germinal centres and a normal crypt architecture. The presence of abscess, diffuse lymphocyte& neutrophil infiltration leading to the defect in the surface epithelium and crypt hyperplasia is usually absent in normal human palatine tonsils. Therefore, combination of these three findings are fairly diagnostic for chronic tonsillitis. These findings are present in 95% and 93% in chronic tonsillitis, respectively and it correlates with Serdar Ugras et al,^[6] study in which he coined a term called “Ugras Abscess” (Abscess that consists of small or large intraepithelial groups of often tightly aggregated lymphocytes located within a vacuole) and Taban K Rasheed et al,^[7] study on ‘Histological study of human palatine tonsils in patient with Recurrent Bacterial Tonsillitis’ in which they found statistical significance in thickness of surface epithelium. R.K.Mal et al⁴ quoted from the studies done by A.Jacobi: that “A surface lesion must always be supposed to exist when a living germ or toxin is to find access”. And they found discontinuity in surface epithelium in 70.6% of Chronic tonsillitis patients and 35.3% of hypertrophied tonsil patients. Dahshe adnan et al,^[18] reported characteristic ulceration of surface epithelium and presence of

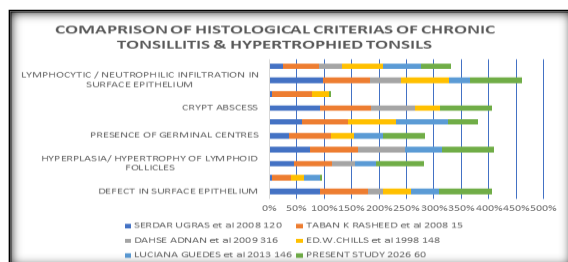
leucoplakia in 94 cases out of 316 specimens studied.^[18]

The healthy palatine tonsils are sites of continuous stimulation of lymphoid cells,^[17] up to now only few systematic studies exist, comparing chronically inflamed tonsils with “normal” ones.^[18] In our study, Hyperplasia/hypertrophy of lymphoid follicles is predominantly seen in tonsillectomy specimens, a common finding encountered in 95% cases of hypertrophied tonsils than in chronic tonsillitis that correlates with Alfredo R et al,^[13] study that observed follicular lymphatic hyperplasia in 205 specimens (82%) out of 250 in hypertrophied tonsil specimens.^[13]

Serdar Ugras et al,^[6] also reported the presence of lymphoid hyperplasia in 45% of Chronic tonsillitis specimens out of 120 and in 75% of hypertrophied tonsil specimens out of 120 specimens examined.^[6] Yet another study by Dahshe Adnan et al,^[18] ‘Contributions to the clinical, histological and microbiological study of chronic tonsillitis’ in 316 tonsillectomy specimens reported the presence of hypertrophy of lymphoid follicles with germinal centres in 134 cases(42%)18and 217 cases(86%) in hypertrophied group.

Table 2: Master Chart

Comparison of Histological Criterias of Chronic Tonsillitis & Hypertrophied Tonsils													
S.No	Name of the Study	Year of Study	No of Specime nstudied	Defect in Surface Epithelium		Hyperplasia/ Hypertrophy of Lymphoid Follicles		Presence of Germinal Centres		Crypt Abscess		Lymphocytic / Neutrophilic Infiltration In Surface Epithelium	
				Ct	Ht	Ct	Ht	Ct	Ht	Ct	Ht	Ct	Ht
1	Serdar Ugras Et Al	2008	120	93%	5%	45%	75%	36%	60%	93%	5%	97%	25%
2	Taban K Rasheed Et Al	2008	15	86%	35%	70%	86%	76%	84%	92%	72%	86%	66%
3	Dahse Adnan Et Al	2009	316	29%	0	42%	86%	0	0	80%	0%	57%	42%
4	Ed.W. Chillset Al	1998	148	51%	24%	0	0	42%	86%	46%	31%	88%	75%
5	Luciana Guedes Et Al	2013	146	51%	28%	37%	68%	54%	95%	0	0	37%	68%
6	Present Study	2026	60	95%	4%	88%	95%	66%	95%	95%	4%	95%	55%



Comaprison of Histological Criterias of Chronic Tonsillitis & Hypertrophied Tonsils

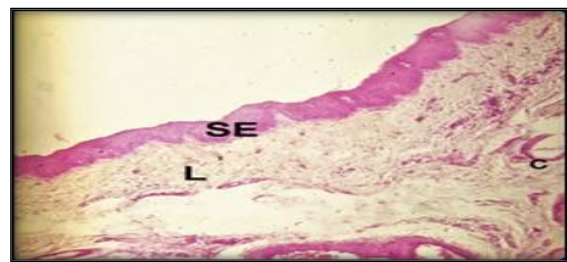


Photo 1: Surface Epithelium of Normal Palatine tonsil Hematoxylin and Eosin-100 Magnification

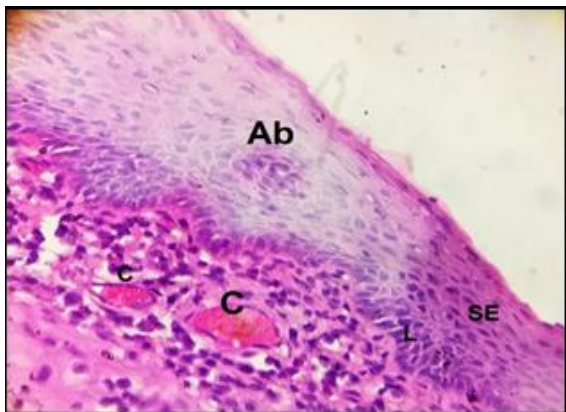


Photo 2: Diffuse Lymphocytic infiltration in Surface epithelium & Abscess causing defect in Surface epithelium in chronic tonsillitis- Hematoxylin and Eosin-100 Magnification

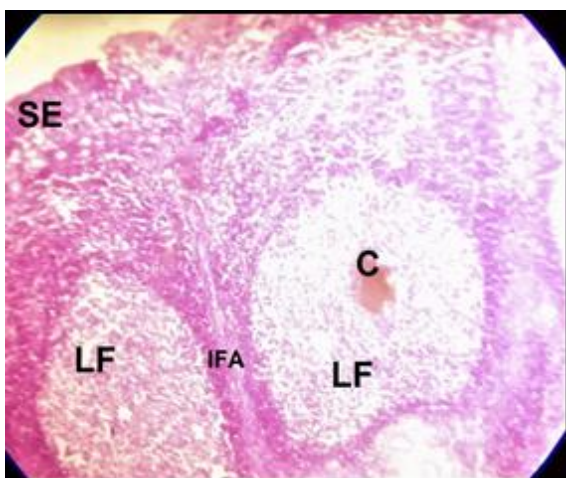


Photo 3: Lymphoid hyperplasia in tonsillar hypertrophy specimens - Hematoxylin and Eosin-100 Magnification

Abbreviations: CT- Chronic tonsillitis, HT- Hypertrophied tonsils, C- Capillaries, LF- Lymphoid follicle, SE- Surface Epithelium, IFA- Interfollicular area, L- Lymphocytes.

We think lymphoid hyperplasia is a nonspecific finding, which may be seen in tonsillar hypertrophy and chronic tonsillitis. Therefore these findings alone should not be used as a criteria to diagnose chronic tonsillitis. Because lymphoid hyperplasia is enlargement of lymphoid organs as a consequence of hyperplasia of some or all of the cellular components, reflecting stimulation of the lymphoid cells by a variety of antigens or allergens⁶

Secondary follicles with germinal centres in tonsillectomy specimens is predominantly a common finding in Hypertrophied tonsils. The Present study correlates with Luciana guedes et al⁸ whose study analysed the Germinal centres in light microscopy under 100X magnification in five fields, where they divided Germinal centres into 2 groups- less than six per field and more than six per field. They reported increase in Germinal centres in 95% of hypertrophied group compared with 54% of Recurrent tonsillitis group⁸.

Normal Palatine tonsil slides were compared as control showed absent non epithelial cell infiltration in surface epithelium whereas neutrophilic & lymphocytic infiltration was present in 57 specimens (95%) of chronic tonsillitis and 3 specimens (4%) of hypertrophied tonsils of total 60 post tonsillectomy specimens studied.

The study on human palatine tonsils in 15 tonsillectomy specimens by Taban K Rasheed et al⁷ reported significant difference in lymphocytic infiltration in surface epithelium of tonsils harbouring *S.aureus* or *S.pyogenes* or mixed bacteria⁷.

Dahsheadnan¹⁸ in his research study in 2009 revealed presence of lymphocytic infiltrate in the surface epithelium and found statistically significant.

CONCLUSION

Despite the prevalence of chronic tonsillitis, tonsillar hypertrophy and tonsillectomy, relatively few studies have investigated the impact of the histopathologic diagnosis. Unfortunately these studies were confined to the lymphoid follicle, germinal centre and crypts, but the entire tonsil area including surface epithelium has not examined in these studies⁶.

In Conclusion systematically presenting the histological features of Normal human Palatine tonsils vs chronic tonsillitis vs hypertrophied tonsils (as described in table 1) in a comparative, tabular format can meaningfully support the early histopathological learning by first MBBS students during early clinical exposure and also helps students of all phases of MBBS in medical curriculum to acquire a clear knowledge about diagnostic criteria of palatine tonsils.

Limitations

- Descriptive, single-centre study; findings may not be generalisable to all populations.
- Immunohistochemical analysis was not performed which can be added as tool in future studies.
- Histological grading of inflammatory and hyperplastic change carries a degree of observer subjectivity and may increase the bias.
- Normal tonsillar tissue used as a comparison group may itself show variable reactive changes depending on the patient's age and inflammation if any.
- The educational impact of the proposed teaching framework was not formally assessed with a pre-/post-test in this study and would require a separate interventional design.

Recommendations

- Incorporate a simplified comparative histopathology chart (as in Table 2) into

first-year MBBS practical histology and pathology teaching.

- Supplement conventional microscopy sessions with digital slide scanning/virtual microscopy for students with limited prior laboratory exposure, including many students from rural backgrounds.
- Consider a follow-up interventional study assessing pre- and post-teaching comprehension scores using this comparative framework.

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