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Comparative Analysis of Mast Cell Count in Oral Lichen Planus Andnormal Oral Mucosa

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Abstract: *Oral lichen planus (OLP) is a common mucocutaneous disease of unknown etiology .It was first described by Wilson in 1869 and is thought to affect0.5–1% of the world's population.It appear clinicallyas a persistent red, white or a mixed lesion. Though the precise pathogenesis is unidentified,evidences available at present strongly suggest that cell mediated immunity plays a major rolein the initiation and evolution of this disease. The mast cell, the major immuno effector cellof the connective tissue is thought to be mediating this synchronized cellular orchestra, the symphony of which results in the various clinical manifestations of oral lichen planus.*

Aim:*To evaluate mast cell density in oral lichen planus and to compare itwith normal mucosa.*

Materials & Methods: 60 cases of oral lichen planus and 20 normal oral mucosa were studied for mast cells using toluidine blue stain. Two sample T test was used to compare the mean values of the density of cells in the lesional area to that of control. The mean of the type and distribution of mast cells were compared using F test-One way ANOVA.

Result: *An increase in mast cell density was noted in lichen planus when compared to normalbuccal mucosa. There is a marked Distribution of mast cells was seen below the inflammatory band and mast cell degranulation was prominent.*

Conclusion: *Markedincreased density of mast cells and their distribution suggest there is a definiterole in different phases of evolution of Oral Lichen Planus.*

KeyWords: *Mast cells, Oral lichen planus, Pathogenesis*.

Photomicrogram:

Photo-1: mast cell with large eosinophilic cytoplasm andcentrally placed nucleus seen in close associationwith a blood vessel.(H & E, 20x)

Photo-2: Spreading mast cells. Note the granules dispersed inthe adjacent connective tissue(Toluidine Blue,40 x)

Photo-3: Intact mast cells packed with granules. (ToluidineBlue,10x)

Photo-4-Degranulated mast cells with pale pink cytoplasmand well defined blue nucleus.(Toluidine Blue, 20x).

Photo-5: Spreading mast cells. Granular cells with indistinctcell border seen immediately below the inflammatoryband.(Toluidine Blue,10 x)

I. Introduction

The data available suggests that oral lichen planusis a T-cell-mediated[1,2]autoimmune disease in which cytotoxicCD8+ T-cells trigger the apoptosis of oral epithelial cells.with an unknownetiology[3]. and is thought to affect 0.5–1% of the world's population. Though various clinical subtypes have been described by WHO4, the subepithelial band of chronic inflammatory infiltrate is a consistent microscopicfinding in all the cases. The inflammatory cellular components and its complimentary essentials which make up the sub epithelial band in oral lichen planus acts against a self antigen, presentin the epithelium as a self motivated synchronized orchestra. While there is sizeable literature on the T cell population[1,2] in the oral lichen planus, other immunocompetant cells have attracted less attention. Hence a histochemical study using toluidine blue stain was conducted to assess the density, morphological characteristics and distribution of mast cells, the major immunoeffector cells of the connectivetissue, in 60 cases of oral lichen planus

II. Material And Methods

The material used for this studyconsisted of Diseasedgroup and controlgroup. The diseased group comprised of60 cases of oral lichen planus reportedto the out patient department of Jodhpur Dentalcollege , Jodhpur, and the controlgroup consisted of 20 specimens takenfrom normal buccal mucosa forcomparative analysis with the diseasedtissue. Specimens from these cases weresubjected for histopathological studyunder H&E, to read the histologicalchanges and toluidine blue stain to analyzethe mast cells.The working solution of toluidine bluewas prepared as given below[5].

Stock solution: Toluidine Blue O – 1.0 gm
70% Alcohol - 100ml
1% Sodium Chloride
Sodium chloride -0.5gms
Distilled water -50ml
Working solution:
Toluidine Blue, stock-50ml
1%Sodium Chloride- 45ml

III. Results

Toluidineblue stain revealed more number of mastcells and distinct features of mast cellscould be well appreciated using toluidineblue stain.Our observations based on 60 cases studied, showed that there is definiteincrease in mast cell density in OLP whencompared to the normal control group.In H & E sections mast cells werenoticed in all cases of Lichen planusand they appeared as large eosinophilic cellswith well-defined cell borders and acentrally placed nucleus (Fig.1).

Out of 60 cases, 19 cases showedsevere increase, 19 cases showedmoderate increase and 22 cases showedmild increase in mast cell density.When distribution of mast cells wasstudied, more concentration of mast cellswas found immediately below theinflammatory infiltrate. 18 casesshowed intense density of mast cellsbelow the infiltrate whereas 34cases showed moderate distribution and8 cases showed mild distribution.Differences were noticed in thecolour and morphology of mast cellsdistributed within the infiltrate and in thedeeper connective tissue and three typesof mast cells could be identified. The cellsin the deeper connective tissue (exceptthose seen in relation to the blood vessels)were found to be round/oval in shape anddark purple in colour. The cell borderswere well defined and nucleus was notvisible. These fully granulated cells withgranules masking the nucleus were namedas intact cells(Fig.2). In the superficialconnective tissue, immediately below theinfiltrate and near the blood vessels, themast cells appeared flattened or irregularand cytoplasm appeared granular. Manycells showed spreading granules and insome cases granules were found dispersedin the connective tissue. The cell borderswere not defined and the nucleus was onlypartially appreciable. They formed thespreading cells(Fig.3 & Fig.4). Inaddition to the types mentioned above, athird type named as degranulated cells(Fig 5) was found within the infiltrate.These cells appeared paler as the stainninghad changed from metachromatic violetto light pink; the nucleus was blue incolour and well defined. When the meanvalue of the cell types were statisticallyanalysed it was found that spreading cellswere significantly increased in numberwhen compared to other cell types.

IV. Discussion

Our research reveals that only 20 out of the 60 casesexamined, showed lining up of mast cellsnear the basement membrane. In these 20 cases only few cells (<10 cells) wereseen in relation to the basementmembrane. Though consistency regardingthe increase in mast cell density wasnoticed no conformity seems to existregarding their distribution. Abbey et al[6]noted the distribution of mast cellsthrough out the sub epithelialinflammatory infiltrate whereas Heyden G et al [7]reported the distribution of mastcells in the non inflammatory part oflamina propria. Similar distribution ofmast cells was noticed in our study also. Jontell M[8] et al found an increaseddistribution of granulated mast cells belowthe infiltrate and noticed that those cellswithin the infiltrate lost theirmetachromatic property and appearedpale pink suggesting degranulation of thecells.

Increased density of mast cellsfound in our study was consistent with theprevious studies reported. Walter B Hall [9] et al found a significant increase in thenumber of mast cells in oral lichen planus and he noted that the mast cells lined upalong the basement membrane. In our study we noted an increasedaccumulation of degranulating/spreadingmast cells immediately below theinflammatory band, though thesignificance of infiltrate below theinfiltrate is not known. The mast cellaccumulation in the connective tissuealong the borders of inflammatoryinfiltrate especially at the inflammatoryinfiltrate - connective tissue interface wasnoticed in recurrent aphthous ulcer byNatah S S et al[10] and they suggested thatmast cell degranulation at these interfacemay contribute to localized extra cellulardegradation by mast cell proteinases,which is an essential step

forinflammatory cell movement andmigration through extra cellular tissue. Kabashima et al [11] found close association of substance Pimmunoreactive nerve and mast cells in periapical granuloma and suggested that the synthesis of TNF α from mast cells is stimulated by substance P released by noxious stimulants. Similar non immunogenic mast cell degranulation could also occur in OLP. Tryptase can facilitates recruitment of T lymphocytes whereas Chymase, can cause the degradation of basement membrane either directly or indirectly via the activation of T-cell secreted MMP-9 thereby paving way for the CD8+ lymphocytes to enter the epithelium. Zhao etal[12] found increased number of mast cell in close apposition to the nerve fibers especially in the superficial layer and they suggested that mast cellnervous system axis may contribute to thepathogenesis of OLP.Mast cell degranulation releases arange of pro-inflammatory mediators suchas Histamines, TNF α, Chymase andTryptase, and each of these mediatorshave specific function in OLP. Histaminecauses vasodilatation and increases thevascular permeability whereas TNF mayup regulate endothelial cell adhesionmolecule expression that is required forlymphocyte adhesion to the luminalsurfaces of blood vessels and subsequentextravasation. The distribution of mast cells atdifferent levels may suggest the role ofmast cells at different phases of oral lichenplanus.The initial phase may be involvingthe blood vessel to dilate and extravasatethe lymphocytes. Subsequently theselymphocytes are attracted towards the subepithelial zone. The mast cells may alsorelease some cytokines that causes thedestruction of extracellular matrix andattract the targeting lymphocytes towardsthe basement membrane.

V. Conclusion

Our study reveals that the mast cellshas definite definite role in thepathogenesis of oral lichen planus. Hencedue importance should be given forfurther study to understand the diseaseprocess as well as to evolve a successfultreatment.

References

[1]. Dockrell H M, Greenspan .J.S:Histochemical identification of T cells in orallichen planus. Oral surgb.48, 42-46, 1979.
[2]. Walker DM: The inflammatory infiltrate inlichen planus lesions. An auto radiographicand ultra structural study. J Oral Pathol-5:277-286, 1976.
[3]. Sugerman et al. The pathogenesis of orallichen planus. Critical Reviews in OralBiology & Medicine, Vol. 13 (4) 350-365(2002).
[4]. WHO Collaborating Centre for OralPrecancerous Lesions. Definition ofLeukoplakia and related Lesions an aid tostudies on Oral Precancer. Oral surg oralMed oral Pathol.1978; 46:518-39.
[5]. Lab Procedures:http:www.bris.ac.ul/Depts/Path andMicro/CPL/abs
[6]. Abbey,Shklar G.A Histochemical study oforal lichen planus.Oral Surg.1971;31:226
[7]. Heyden G, Arwill T, GisslenH.Histochemical studies on LichenPlanus.Oral surgery 1974; 37:239.
[8]. Jontell M et al .Expression of class IItransplantation antigens by epithelial cells inoral candidosis, oral lichen planus andgingivitis.J. Oral Pathology, 1986:15; 484-488.
[9]. Walter B. Hall, Seattle, Wash: Mast cellsin desquamative gingivitis, lichen planus andpemphigoid: OralSurg, Oral Medicine, OralPathology, 1969; 28:646-659.
[10]. 9.
[11]. NatahS.S,Hayrinen-ImmonenR,HietanenJ et al:Quantitative assessment of mast cellsin recurrent aphthous ulcers(RAU).J.OralPathol Med.1998;27:124-9
[12]. Hiroaki Kabashima , Kengo Nagata et al :Involvement of substance P , mast cells,TNF α and ICAM-1 in the infiltration ofinflammatory cells in human periapicalgranulomas.J.OralPatholMed,2002;31:175-80.
[13]. Zhao ZZ, Savage NW, Z Pujic et al :Immunohistochemical localization of mastcells and mast cell-nerve interaction in orallichen planus.Oral Dis,1997;3:71-6.