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EVALUATION OF THE NUMBER OF MAST CELLS IN PERIAPICAL CYST AND PERIAPICAL GRANULOMA

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ABSTRACT
Mast cells are large granular cells that arise from a multipotent precursor in the bone marrow and play an important role in regulation of vascular permeability. The present study was, undertaken to identify as well as quantify mast cells in periapical cyst and periapical granuloma and compare it with the average count of mast cells in normal oral mucosa. Ten cases of normal oral mucosa and thirty four cases of periapical cysts and 29 cases of periapical granuloma for mast cell number using 1% toluidine blue. Data analyzed in SPSS soft ware using ANOVA and Tukey's test. P value at 0.05% was considered as significant level. A statistically significant increase was in the mean of average mast cell count per high power field in radicular cyst and periapical granuloma in comparison to normal oral mucosa. There was no statistically significant increase in the mean of average mast cell count in radicular cyst and periapical granuloma. The results of the present study show mast cells may play a role in radicular cysts.

KEYWORDS: Mast cell; Periapical granuloma; Radicular cyst.

INTRODUCTION
Mast cells are granulated cells that have immunoglobulin E receptors on their surface, and are the other source of vasoactive mediators in response to particular allergens.[1] Mast cells are seen in the all of body's connective tissues, particularly the mucosal surfaces of the lungs, gastrointestinal system, skin and capillary vessel.[1-3] When these cells are stimulated by antigen, inflammatory mediators in cytoplasmic granules are secreted into the extracellular tissue. These mediators are mucopolysacharide, serine protease, histamine and chemotactic mediators for neutrophils and eosinophils. Mast cells may be degranulated by factors such as cold, trauma and cationic proteins secreted by lysosome of neutrophils and platelets. Histamine increases vascular permeability and by connection with H1 receptors causes vasoconstriction and edema. Mast cells play an important role in regulation of vascular permeability.[1] Mast cells in immune disorder through releasing mediators such as leukotrienes, histamine, cytokine, chemokine, chymase and protease are able to regulate immune system.[4]

Ledesma-Montes et al (2004) showed that the number of mast cells in periapical inflammatory lesions in women was not associated with age and size. Therefore they suspected that mast cells have an active role in the pathogenesis of periapical inflammatory lesions.[5] Oliveria and colleagues (2004) showed that the number of mast cells in periapical cysts was significantly more than periapical granuloma and they believe that there is a functional relationship between lymphocytes and mast cells.[6] Drazic et al (2010) showed that the number of mast cells in cyst periapical was more than perriapical granuloma and they resulted that mast cells can regulate the mechanisms of cellular immunity in periapical lesions.[7] The studies have shown that mast cells are involved in the development of fibrous tissue of capsule in cystic lesions. The role of mast cells in collagen synthesis is due to the release of heparin, hyaluronic acid, proteoglycane and proteolytic enzymes and fibroblast growth factor.[7,8,9] Mast cells can be stimulated by non-allergic triggers such as neuropeptide and cytokines and may be able to conduct various biological processes through their ability to release proinflammatory mediators. These cells can stimulate immune responses or immune suppressant that this can lead to the development of inhibitors of release of specific mediators with novel therapeutic applications.[10]

The aim of this study was to investigate the number of mast cells in periapical cysts and granulomas.

MATERIAL AND METHODS

In this study, 34 previously diagnosed paraffin blocks of periapical cysts, 29 paraffin blocks of periapical granulomas and 10 blocks of normal tissue were selected from the archives of the Department of Pathology, School of Dentistry. 2 slides were prepared from each block, and one being hematoxylin - eosin stained slide and the other being toluidine blue stained slide.[11] The slides were evaluated under light microscope (Olympus BX-41, Japan) under 400 magnification. Results were expressed as the average number of mast cells per high power field. Both intact as well as degranulated mast cells were counted in five high power field of each section. An attempt was put not to overlap mast cell count. Cells were counted in each field and recorded as the means of the average mast cell count per high power field. Counting was performed by two individuals that were unaware than lesions. In case of disagreement, the calculation was done by a third person. People were matched with each other on calculation method.

Statistical analysis

We used SPSS software version 21. *The* means of the average mast cell count per high power field in normal oral mucosa and periapical lesions were compared by using distribution tables, analysis variance (ANOVA) and Tukey's test. Significance level of 5% is considered.
Figure 1
Figure 2

RESULTS AND DISSCUSIONS

Findings from this study were as follows:
In this study, 34.3% of lesions were in men and 65.7% in women. Mean age of participants was 37.6±16.9 years.

Correlation *between* the average mast cell count and age of subjects with kind of lesion are shown in Table 1.

Table 1 The average number of mast cells did not show a statistically significant difference relationship between periapical cysts and periapical granulomas(P= 0.8), but, the average number of mast cells in both lesions, was significantly higher than normal mucosa (Figure 1 & Figure 2). There was not a significant relationship between age and sex with the type of lesion (P=0.52, P= 0.96 respectively).

The present study was designed to investigate the number of mast cells in periapical cysts and granulomas. Mast cells are the main source of histamine, proteinase and other important chemical mediators. Trypase is an enzyme that is found exclusively in these cells and has been shown in a variety of biological activities including fibrinogenolysis, stimulation and proliferation of fibroblasts, smooth muscle cells and bronchial epithelial cell.[12-14] It is supossed that Trypase secreted from mast cells may stimulate collagen synthesis and is involved in angiogenesis.[14,15] The findings show that in all lesions, mast cells were significantly higher from normal mucosa.

In the present study the number of mast cells in two inflammatory lesions (periapical cysts and granulomas) was studied. There was a significant difference between the number of mast cells in these lesions with normal mucosa. Also the number of mast cells in periapical granuloma was more periapical cysts, that corresponded to results of studies Drazic et al (2010), Ledesma et al (2004) and Radin et al (2004).[5-7] Santos et al (2012) showed that the number of mast cells in areas of active inflammatory of periapical lesions was more. They also reported a greater number of mast cells in periapical cysts.[16] Although the current study showed a greater number of mast cells in the periapical cysts but the difference was not statistically significant. Lima et al (2011) showed that there was not a significant difference between the density of mast cells in periapical granulomas and periapical cysts[17], that is consistent with current research . Also Fonseca-Silva et al (2012) resulted that there was not a significant difference between the density of mast cells in periapical cysts and granulomas.[18] While the results of study of Marcal et al (2010) showed that the number of mast cells in periapical granuloma was significantly more than Periapical cyst.[19] These differences could be due to the method of staining(by Immunohistochemical staining mast cells show more colors), or due to the location of the mast cells count (mast cells are more at the areas with high vascularity). In this study, there was no statistically significant in the number of mast cells between age and sex, that is inconsistent with the study conducted by Ledesma et al.[5] This difference may be due to many people prefer to extract their teeth with periapical inflammatory lesion.

Table 1- Correlation of number of mast cells according to kind of lesions and age of subjects

lesions	Mean of masts cells	Standard deviation	P value
Radicular cyst	7.02	4.82	0.82
Periapical granuloma	4.79	1.81	
Normal mucosa	1.14	0.54	0.02
Age of subjects	Mean age	Standard deviation	P value
Radicular cyst	30.20	9.65	0.71
Periapical granuloma	30.43	13.68	

Figures legends

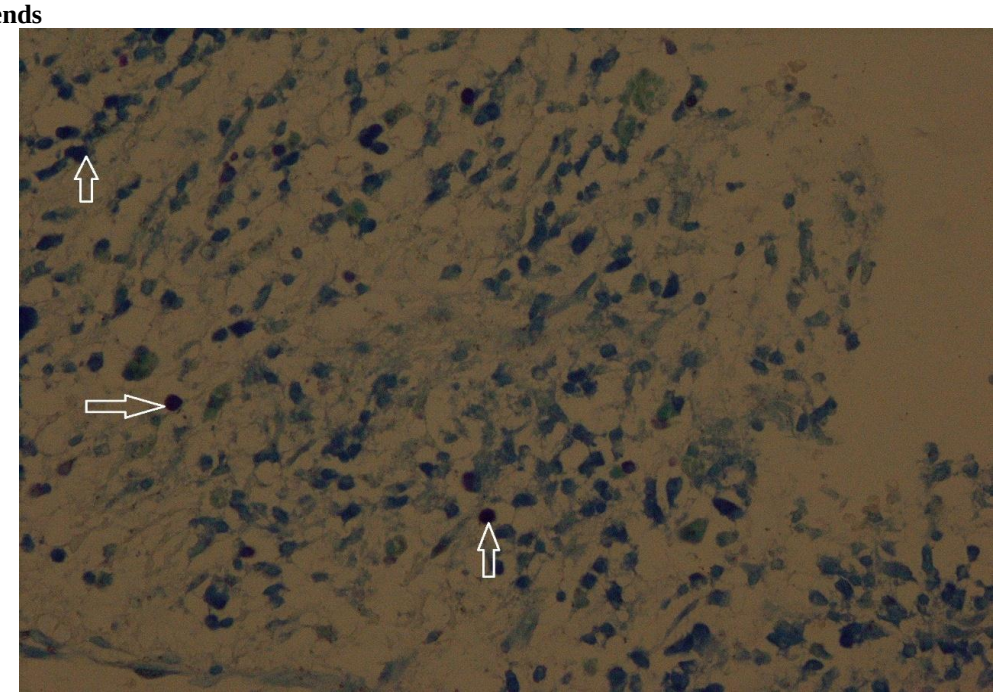

Figure1-Mast cells(arrows)in a case of radicular cyst.(Toluidineblue, *100)

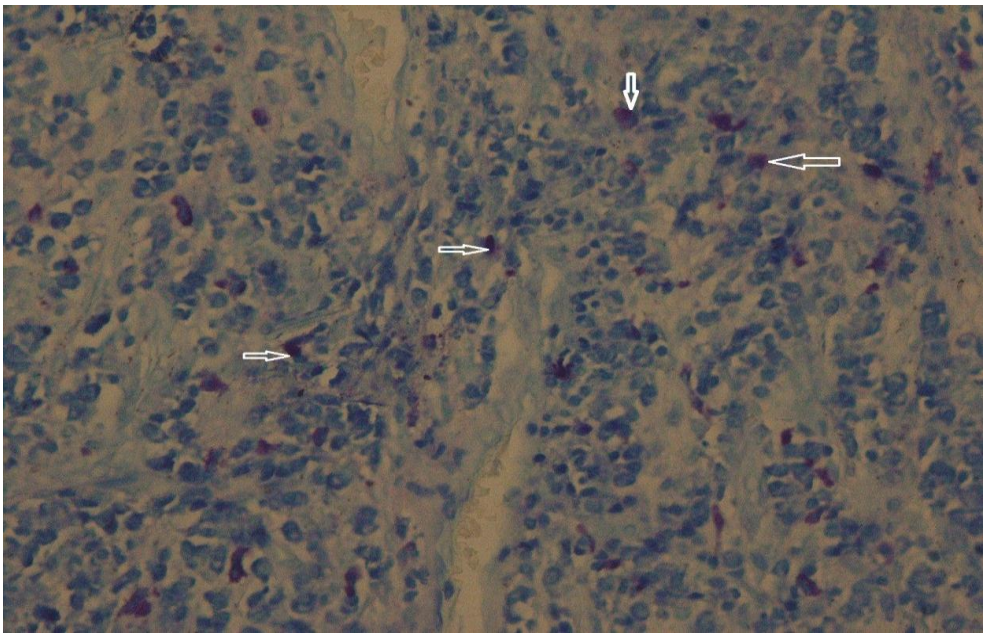

Figure2-Mast cells(arrows)in a case of periapical granuloma.(Toluidineblue, * 100)

CONCLUSION

This study, like other researches showed that the number of mast cells in periapical inflammatory lesions was higher compared to normal mucosa. Studies on larger samples is recommended.

REFERENCES

1. Rubin E, Gorstein F, Rubin R, Schwarting R, Strayer D. Rubins'pathology. 4th ed .Lippincott Williams & Wilkins 2005; chap3 pp. 62.
2. Lunderius-Andersson C, Enoksson M, Nilsson G. Front Immunol, 2012; 3: 82.
3. Theoharides TC, Kempuraj D, Tagen M, Conti P, Kalogeromitros D. Immunol Rev 2007; 219: 204.
4. Amin K. Respir Med 2012; 106(1): 9-14.
5. Ledesma-Montes C, Garcés-Ortíz M, Rosales-García G, Hernández-Guerrero JC. J Endod 2004; 30(12): 855-9.
6. de Oliveira Rodini C, Batista AC, Lara VS. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2004; 97(1): 59-63.
7. Drazić R, Sopta J, Minić AJ. J Oral Pathol Med, 2010; 39(3): 257-62.

8. Ahmed A, Powers MP, Youker KA, Rice L, Ewton A, Dunphy CH, Chang CC. Pathol Res Pract, 2009; 205: 634-8.
9. de Assis Caldas Pereira, Gurgel C AS, Vidal MTA, dos Santos JN. Tumor Biol, 2012; 33: 455-461.
10. Sismanopoulos N, Delivanis DA, Alysandratos KD, Angelidou A, Therianou A, Kalogeromitros D, et al. Curr Pharm Des, 2012; 18(16): 2261-77.
11. Kamal R, Dahiya P, Palaskar S, Shetty VP. J Clin Exp Dent, 2011; 3(1): e1-4.
12. Caughey GH. Immunol Rev, 2007; 217: 141–54.
13. Kondo S, Kagami S, Kido H, Strutz F, Mu¨ ller GA, Kuroda Y. J Am Soc Nephrol 2001; 12: 1668–76
14. Shimizu Y, Suga T, Maeno T, Tsukagoshi H, Kawata T, Narita T. Clin Exp Allergy 2004; 34: 1719–24.
15. Huttunen M, Harvima IT. Br J Dermatol 2005; 152: 1149–60.
16. de Noronha Santos Netto J1, Pires FR, da Fonseca EC, Silva LE, de Queiroz Chaves Lourenço S. J Oral Pathol Med 2012; 41(8): 630-6.
17. Lima SC, Rizo VH, Silva-Sousa YT, Almeida LY, Almeida OP, León JE, et al. Endod. 2011; 37(12): 1642-46.
18. Fonseca-Silva T, Santos CC, Alves LR, Dias LC, Brito M Jr, De Paula AM, Guimarães AL. Int Endod J. 2012 Sep; 45(9): 859-64.
19. Marcal JR, Samuel RO, Fernandes D, de Arauio MS, Napimoga MH, Pereira SA, et al. J Endod, 2010; 36(6): 995-9.