

Original Article

Histopathological Assessment of Chronic Inflammatory Periapical Lesions- An in vivo Study

Eesha¹, Gaurav Jain²

¹Assistant professor, Dept. of Oral Pathology, Vyas dental college & Hospital, Jodhpur, Rajasthan, India, ²Assistant professor, Dept. of Conservative and Endodontics, Saraswati Dental College and Hospital, Lucknow, UP, India

ABSTRACT:

Background: Periapical lesions are universally present and apical periodontitis, peri- apical granuloma, peri- apical abscess and peri- apical cysts are common one. The present study aimed at histological findings in chronic periapical lesions such as cysts, granuloma and abscess. **Materials & Methods:** The present study was conducted on 148 teeth having chronic inflammatory periapical lesions with or without non- surgical endodontic treatment. Endodontic surgery was performed by single endodontics. After surgical endodontic treatment, teeth were assessed histologically. Biopsy sections were sent to the department of Oral Pathology & Microbiology. All slides stained with hematoxylin/eosin and Gomoritrichrome for light microscopy assessment. **Results:** Out of 148 teeth, 41 had chronic inflammatory lesions, 34 had inflammatory cysts and 25 had indefinite lesions. Chronic inflammatory lesions assessed histologically found chronic apical periodontitis in 86 cases and inflammatory cysts in 62 cases. The difference was significant ($P < 0.05$). Out of 86 cases of chronic apical periodontitis confirmed clinical radiographically, 64% found positive while 36% were not histologically. Out of 62 cases of inflammatory cysts confirmed clinical radiographically, 78% found positive while 36% were not histologically. Out of 25 indefinite lesions, 56% found chronic inflammatory lesions while 44% found inflammatory cyst. **Conclusion:** There was significant disagreement in clinical radiographic as well as histological diagnosis. This shows the importance of histological examination as not all cases are confirmed clinically and even radiographic examination may be doubtful.

Key words: Clinical, Histological, Radiographic.

Received: 10 August 2018

Revised: 23 September 2018

Accepted: 25 September 2018

Corresponding author: Dr Gaurav Jain, Assistant professor, Dept. of Conservative and Endodontics, Saraswati Dental College and Hospital, Lucknow, UP, India

This article may be cited as: Eesha, Jain G. Histopathological Assessment of Chronic Inflammatory Periapical Lesions- An in vivo Study. J Adv Med Dent Scie Res 2018;6(10):42-45.

INTRODUCTION

Periapical lesions are universally present and apical periodontitis, peri- apical granuloma, peri- apical abscess and peri- apical cysts are common one. The most commonly involved site is maxillary anterior teeth. Patients encounter pain, discomfort or sensitivity to hot or cold beverages depending upon chronicity of the lesion. There is a cascade of pathologies one giving to another one.¹This usually represents sequelae of pulpitis. Reversible or irreversible pulpitis results in apical periodontitis. It usually proceeds to peri- apical abscess or granuloma formation depending upon host response. Peri- apical or radicular cyst arises from periapical granuloma.²

The diagnosis of the lesion is made by clinical and radiographical assessment. Histopathological findings support the diagnosis. Sometimes, due to structural and

evolutionary variations of a periapical lesions and radiographic findings may reveal different picture.³There is always disparity in opinion regarding appearance of specific lesion. Studies have shown variation in clinical, radiographical and histopathological outcomes. Basker⁴ demonstrated that there are chances of disagreement between clinical and histopathological diagnosis.

The causes of periapical lesions are different which involves immunological, idiopathic etc. Therefore all periapical lesions may act in specific form in the evolution of inflammation. Host factors such as oxygen, carbon dioxide tension and nutrition etc. may determine the progression of lesion.⁵Considering this, the present study aimed at comparing clinical, radiographical and histological findings in chronic periapical lesions such as cysts, granuloma and abscess.

MATERIALS & METHODS

The present study was conducted in the department of Endodontics & Oral Pathology & Microbiology. It consisted of 148 teeth having chronic inflammatory periapical lesions with or without non-surgical endodontic treatment. The study protocol was approved by the institutional ethical committee. After obtaining approval, teeth were assessed clinically as well as radiographically.

Endodontic surgery was performed by single endodontics. After surgical endodontic treatment, teeth were assessed histologically. Biopsy sections were sent to the department of Oral Pathology & Microbiology. All slides stained with hematoxylin/eosin and Gomoritricrome for light microscopy assessment.

The presence of connective tissue with variable collagen density, presence of macrophages, lymphocytes, groups of plasmocytes, polymorphonucleocytes and giant cells, and presence of variable fibro-angioblastic proliferation were indicative of periapical lesion. The lesions with variable diffuse inflammatory infiltrate and cavity formation limited by continuous or discontinuous stratified squamous epithelium were considered inflammatory cysts. The results thus obtained were subjected to statistical analysis using SPSS version 18.0. Chi-square test, Post Hoc test was applied and student's T test was used wherever required.

RESULTS

Table I shows that out of 148 teeth, 41 had chronic inflammatory lesions, 34 had inflammatory cysts and 25 had indefinite lesions. The difference was significant (P < 0.05). Table II shows that chronic inflammatory lesions assessed histologically found chronic apical periodontitis in 86 cases and inflammatory cysts in 62 cases. The difference was significant (P < 0.05). Graph I shows that out of 86 cases of chronic apical periodontitis confirmed clinical radiographically, 64% found positive while 36% were not histologically. Graph II shows that out of 62 cases of inflammatory cysts confirmed clinical radiographically, 78% found positive while 22% were not histologically. Graph III shows that out of 25 indefinite lesions, 56% found chronic inflammatory lesions while 44% found inflammatory cyst.

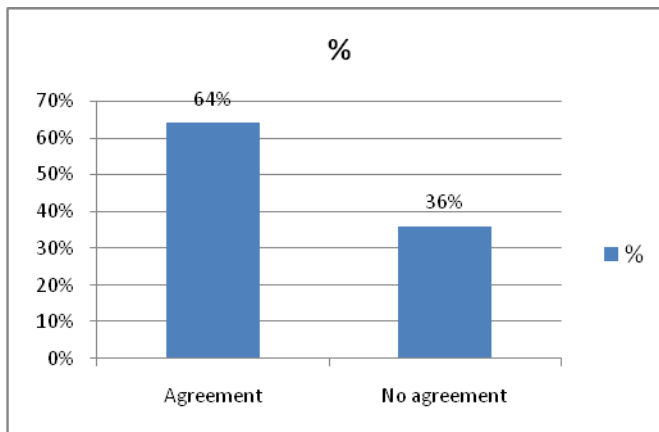
Table I Chronic periapical lesions assessed by clinical radiographic examination

| Total- 148 | | | |
|------------------------------|-------------------|------------|---------|
| Chronic inflammatory lesions | Inflammatory cyst | Indefinite | P value |
| 41 | 34 | 25 | 0.01 |

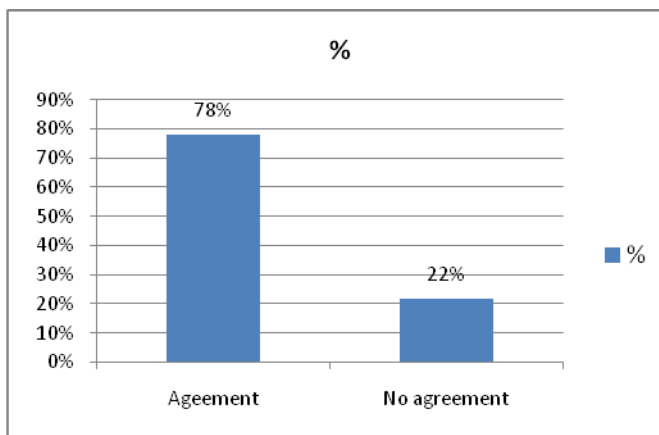
Table II Chronic inflammatory lesions assessed histologically

| Chronic apical periodontitis | Inflammatory cyst | P value |
|------------------------------|-------------------|---------|
| 86 | 62 | 0.01 |

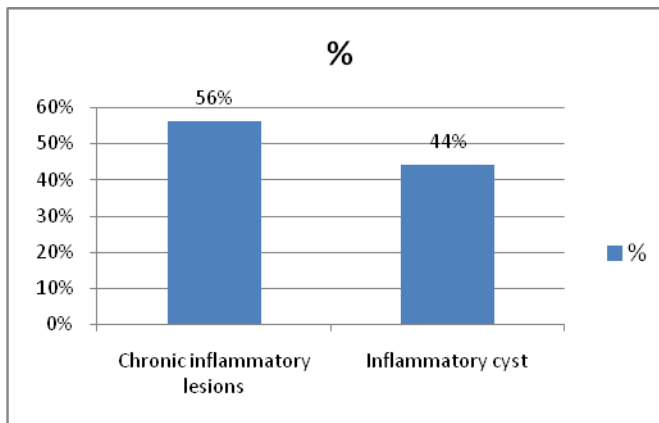
Graph I Diagnosis of chronic apical periodontitis after clinical radiographic versus histological assessment



Graph II Diagnosis of inflammatory cyst after clinical radiographic versus histological examinations



Graph III Percentage of chronic apical periodontitis and inflammatory cyst that were diagnosed only by the histological examination and not by clinical radiographic examination



DISCUSSION

The commonly seen inflammatory lesions are chronic apical periodontitis, periapical cyst and periapical granuloma. The origin of radicular cysts are from epithelial rests of Malassez⁷ involved during the evolution of periapical granulomas, characterized by an inflammatory process associated with the central cavity formation and limited by the stratified squamous epithelium, which may be discontinuous.⁶ The clinical appearance of periapical cyst is well defined swelling intraorally. Usually radicular cysts are painless until and unless they are infected. The expansion of buccal and lingual cortical plate may be evident in severe cases. There can be egg shell crackling. In most of the cases, the diagnosis of radicular cyst clinically may be confirmed by features such as carious teeth, non vital teeth or presence of fractured teeth. However, the radiographic diagnosis with intraoral periapical radiographs confirmed the diagnosis.⁷ In present study we tried to assess and compared chronic periapical lesions clinically, radiographically and histologically.

We included 148 teeth which had chronic inflammatory periapical lesions with or without non- surgical endodontic treatment. We assessed teeth clinically followed by radiographic as well as histologically. We observed that out of 148 teeth, chronic inflammatory periapical lesions were seen in 41 cases, inflammatory cyst in 34 cases and 25 cases found to be indefinite which were not designated as any of above lesions. All were diagnosed clinically as well as radiographically.

Studies has shown contradictory results for the incidence of chronic inflammatory periapical lesions such as chronic apical periodontitis, inflammatory cyst and granuloma when assessed lesions of extracted teeth with and without endodontic treatment and teeth with previous apicectomies and periapical curettage with previous root canal treatment.^{8,9}

It has been observed that the majority of these periapical granulomas and radicular cysts are occasionally found during routine examination. The commonest reason behind this is the absence of pain and tooth remains asymptomatic until and unless diagnosed accidentally. The smaller lesions are not discernible clinically and radiographically.¹⁰ The differentiating point in case of periapical granulomas and radicular cyst and periapical abscess is that in case of periapical granulomas there is well defined periapical radiolucency size less than 1.6 cm which is usually homogenous. There is thick sclerotic border around radiolucency. In case of radicular cyst, the size is bigger than 1.6 cm.¹¹ There is also well defined radiolucency around apex of non- vital teeth surrounded by radio-opaque sclerotic border. The border is relatively thin than granuloma. In all cases there is discontinuous or complete absence of lamina dura.

In present study, we observed that when lesions were examined histologically, chronic apical periodontitis was found in 86 cases and inflammatory cysts in 62 cases.

Comelliet al¹² in their teeth evaluated 164 teeth having periapical lesions. Chronic inflammatory periapical lesions were seen in 43.2%, periapical cysts in 35.9% and indefinite lesions in 20.7% cases. Authors also found inconsistent findings clinically, radiographically and histologically.

We observed that out of 86 cases of chronic apical periodontitis confirmed clinical radiographically, 64% found positive while 36% were not histologically. So there was difference in clinical radiographical and histological examination.

Similarly we found that out of 62 cases of inflammatory cysts confirmed clinical radiographically, 78% found positive while 36% were not histologically. There was significant lack of agreement in clinical radiographical and histological examination. Trope et al¹³ found a significant lack of agreement for 8 lesions diagnosed clinically and radiographically as 4 inflammatory cysts and 4 chronic apical periodontitis. Histologically, only one was diagnosed as a radicular cyst.

We observed that among the cases with previous non-surgical endodontic treatment, radicular cysts were more common. The persistence of periapical granuloma was also seen signifying incompetent endodontic treatment.¹⁴ The role of iatrogenic procedures and/or apical and periapical conditions, enhancing the likelihood of not removing the apical biofilm and the existence of endogenous or exogenous foreign bodies, inducing constant reaction variables that interfere with the post-treatment repair process may be considered.¹⁵

We observed that out of 25 indefinite lesions which were not diagnosed clinically and radiographically, 56% found chronic inflammatory lesions while 44% found inflammatory cyst. Literature has revealed that persistent periradicular biofilm induces non- specific and immunogenic reaction. The presence of gram negative bacteria may secrete lipid A and endotoxins resulting in uncontrolled auto destructive reactions.¹⁶

CONCLUSION

There was significant disagreement in clinical radiographic as well as histological diagnosis. This shows the importance of histological examination as not all cases are confirmed clinically and even radiographic examination may be doubtful.

REFERENCES

1. Patterson SS, Shafer WG, Healey HJ. Periapical lesions associated with endodontically treated teeth. J Am Dent Assoc 1964; 68:191-4.
2. Pulver WH, Taubman MA, Smith DJ. Immune components in human dental periapical lesions. Arch Oral Biol 1978;23:435-43.
3. Reitschel ET, Brade H. Bacterial endotoxins. Sci Am 1992;267:26-33.

4. Bhaskar SN. Periapical lesion: types, incidence, and clinical features. *Oral Surgery, Oral Medicine, and Oral Pathology* 1998; 21, 657–71.
5. Spatafore CM, Griffin JAJr, Keyes GG, Wearden S, Skidmore AE. Periapical biopsy report: an analysis of over a 10-year period. *J Endod* 1990; 16:239-41.
6. Stockdale CR, Chandler NP. The nature of periapical lesion: a review of 1108 cases. *J Dent* 1988; 16:123-9.
7. Trope M, Pettigrew J, Petras J, Barnett F, Tronstad L. Differentiation of radicular cysts and granulomas using computerized tomography. *Endod Dent Traumatol* 1989;5:69-72.
8. Zuolo ML, Toledo MS, Nogueira HE, Straus AH, Takahashi HK. Identification of GM3 as a marker of therapy-resistant periradicular lesions. *J Endon* 2001;27:107-9. 13-Patterson SS, Shafer 9. WG, Healey HJ. Periapical lesions associated with endodontically treated teeth. *J Am Dent Assoc* 1964;68:191-4.
9. Pulver WH, Taubman MA, Smith DJ. Immune components in human dental periapical lesions. *Arch Oral Biol* 1978;23:435-43.
10. Reitschel ET, Brade H. Bacterial endotoxins. *Sci Am* 1992;267:26-33.
11. Comelli, Simon JHS. Incidence of periapical cysts in relation to the root canal. *J Endod* 1980; 6:845-8.
12. Trope, Block RM, Bushell A, Rodrigues H, Langeland K. A histologic, histobacteriologic, and radiographic study of periapical endodontic surgical specimens. *Oral Surgery, Oral Medicine, and Oral Pathology* 1988; 656–78.
13. Molven O, Halse A, Grung B. Surgical management of endodontic failures: indications and treatment results. *International Endodontic Journal* 1991; 41: 33–42.
14. Molven O, Halse A, Grung B (1996) Incomplete healing (scar tissue) after periapical surgery, radiographic findings 8 to 12 years after treatment. *Journal of Endodontics* 1996; 22: 264–8.
15. Lin LM, Pascon EA, Skribner J et al. (1991) Clinical, radiographic, and histologic study of endodontic treatment failures. *Oral Surgery, Oral Medicine, and Oral Pathology* 1991; 71: 603–5.

Source of support: Nil

Conflict of interest: None declared

This work is licensed under CC BY: ***Creative Commons Attribution 3.0 License.***