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Orginal Article

FREQUENCY OF ENDODONTIC FLARE UP ACCORDING TO PULPAL AND PERIRADICULAR DIAGNOSIS AT REHMAT MEMORIAL HOSPITAL ABBOTTABAD

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ABSTRACT

Objectives: *To determine the frequency of endodontic flareup and its association with pulpal and peri radicular diagnosis in teeth receiving root canal therapy.*

Materials and Methods: *From June 10, 2021, to March 15, 2022, 101 patients aged 10 to 60 years were included in a descriptive case series.The sample size was determined using WHO software with a confidence level of 95%, an expected proportion of endodontic flare-up of 7%, and absolute precision of 5%. Non-probability consecutive Sampling technique was used for data collection. The study was conducted at the Restorative department of Rehmat memorial dental teaching hospital, Abbottabad, to determine the frequency of endodontic flare-ups based on pulpal and peri radicular diagnoses.*

Results: *The study participant's mean age was 33.62±11.57 years. Of the total 101 participants, 42 (41.58%) were females and 59 (58.42%) were males. Irreversible pulpitis, which affected 57 patients (56.44%), was the most frequent diagnosis of teeth requiring root canal therapy while pulp necrosis, which affected 14 patients (13.86%), was the least common diagnosis . Pulp necrosis (6.93%) was the most frequent diagnosis associated with endodontic flare-ups out of total 14 reported cases, followed by irreversible pulpitis (3.96%), and, least frequent diagnosis associated with flare up was peri-apical pathology (2.97%).*

Conclusion: *In our set-up, the frequency of endodontic flare-ups (13.86%) is significantly higher. Irreversible pulpitis, peri-apical pathology, and pulp necrosis are the major diagnoses associated with endodontic flare-ups.*

Key words: *Flare up, peri apical infection, irreversible pulpitis*

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INTRODUCTION

Endodontic flare-ups are considered to be one of the main unfavorable outcomes of endodontic therapy[1]. A flare-up is an acute inflammatory reaction that primarily results within 24 to 48 hours from manipulation in the peri-radicular tissue of the tooth, causing an unscheduled appointment due to severe pain and swelling[2,3]. Because of the variable clinical presentation of the condition and imprecise definition, patients presenting with the development of pain and or swelling a few hours or days after the root canal procedures having significant severity to require an unscheduled visit for emergency treatment is defined as endodontic flare up[4]. Among the causes of flare up, microorganisms (biologic) are the primary cause of flare-ups[5]. Over-instrumentation, the extrusion of debris or chemical irrigants, insuf-

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ficient debridement and retreatment are examples of mechanical factors[1,6]. Chemical causes include irrigant solution hypersensitivity or extrusion, as well as intracanal medication that may damage periradicular tissues[2].

One clinical investigation indicated that between 1.4 and 16 percent of endodontic cases reported a flare-up[7]. According to other studies, endodontic flare-ups occur 6–17% of the time[1-2]. Numerous clinical investigations have demonstrated a correlation between the pulpal and periradicular diagnosis of tooth and endodontic flare up indicating the teeth that have normal pulp will less commonly report with flare up[6,8]. The likelihood of a flare-up is higher in patients who have already started therapy or are going through retreatment[3]. Nair M et al[8] found out that 10% of all patients who report with an endodontic flare up had asymptomatic irreversible pulpitis, and 2.7% had necrosis with peri radicular disease while 2.1 % had necrosis without peri radicular disease. According to Onay EO, pulpal necrosis without peri-radicular pathosis (6%) was most commonly associated with flare up followed by pulpal necrosis with peri-radicular pathosis (5.2%)[3]. The purpose of this study is to determine the frequency of endodontic flare up and find an association between endodontic flare-up and pulpal and peri radicular diagnosis of teeth receiving root canal therapy. Endodontic flare up is a very unpleasant event and if properly recognized, the experience of the clinician along with the perioperative flare-up predictors can assist in improving patient post-operative care including management of the unscheduled patients accordingly.

MATERIALS AND METHODS

Patients aged 10 to 60 years, both males and females who reported to the OPD of Rehmat memorial dental hospital, Abbottabad needing endodontic therapy of a posterior tooth were recruited in the study. Patients who demanded single visit treatment were not included to conduct the study for multiple visit endodontics only for uniformity . Patients with history of trauma, severe systemic disease, periodontal disease, pregnancy or those not belonging to Abbottabad were excluded from the study. This descriptive study was carried out at the Operative dentistry department of Rehmat memorial dental teaching hospital, Abbottabad. A sample size of 101 was determined using WHO software with a confidence level of 95%, an expected proportion of endodontic flare-up of 7%, and absolute precision of 5%. Non-probability consecutive sampling technique was used for data collection. The study was conducted between June 11, 2021, and March 15, 2022.

Prior to the assessment, all subjects were provided written informed consent. The hospital granted permission for the trial (# RMPGDH/EC/4197). The clinical diagnosis of teeth requiring endodontic treatment was confirmed with the help of proper history, clinical examination (palpation, percussion and sensibility testing), and radiographic analysis. Affected tooth number and pulpal and periradicular diagnoses were recorded. All endodontic treatment was performed by single operator in two visits. In the first visit, teeth were anesthetized using 2 % lidocaine with 1:100,000 epinephrine (MedicaineR. Inj, HuonCo, Ltd, Korea), followed by rubber dam application. Biomechanical preparation of canals was done after establishment of working length with digital peri apical radiograph . A diamond bur was used to create the access cavity in a high-speed hand piece with abundant water spray. Canals were located and then cleaning and shaping of canals was done using manual files starting from # 20 followed by use of Gates Glidden bur size 1,2 to prepare the coronal portion of canal. A 3% sodium hypochlorite solution (Parcan RSol,Cadex Franc) was used as an irrigant between each instrument during the preparation of root canal. After the biomechanical preparation, the cavity was sealed with temporary restoration. Patients were advised not to bite from the treated area during root canal therapy since they could experience mild to moderate discomfort. The endodontic treatment was scheduled to be completed with a second visit in 5-7 days. An unplanned visit was deemed to be a "flare up" if the patient required one before the scheduled time because of pain or swelling or both. This was confirmed clinically (severe tenderness on palpation and percussion or severe pain without application of stimulus or redness or swelling either intra oral or extra oral). The diagnosis for flare up was made by the same operator (after taking history and clinical examination)who started the endodontic treatment. The patient's initial diagnosis was checked when flare up was reported by the patient in order to determine the association of frequency of flare up to

patient's initial pulpal and peri radicular diagnoses, Statistical analysis was done using Chi-square test. Data was analyzed using SPSS 22.0. The mean and standard deviation of age, a quantitative variable, were provided. In terms of frequencies and percentages, qualitative characteristics such as gender and the presence or absence of flare-ups were described. The Chi-square post-stratified test was applied at the 5% significance level. A null hypothesis was put up stating that the initial pulpal and periradicular state of the tooth is unrelated to the occurrence of endodontic flare-ups.

RESULT

The participants ranged in age from 15 to 55 years old, with a mean age of 33.62±11.57 years. There were 42 (41.58%) females and 59 (58.42%) males. The age group with the highest frequency of participation was 15–25 years old, with 31 (30.69%), followed by 36–45 years old, with 26 (25.74%) as shown in table 1. Irreversible pulpitis, which affected 57 patients (56.44%), was the most frequent cause of root canal therapy. Pulp necrosis, which affected 14 patients (13.86%), was the least common cause (n=14, 13.86%). (Table 2)

There were 14 (13.86%) cases of endodontic flare-up. Pulp necrosis (6.93%) was the most frequent cause of endodontic flare-ups, followed by irreversible pulpitis (3.96%) and, least frequently, peri-apical infection (2.97%). (Table 3)

The frequency of endodontic flare-up was higher in females (19.05%) compared to males (10.17%); however, the differences was not significant statistically (p = 0.3268). The remaining details are shown in Table 4. The age group 46–55 years old (25%) had the highest frequency of endodontic flare-ups, followed by the age group 36–45 years old (15.38%). Table 5 shows that these differences, however, were not statistically significant (p=0.257).

DISCUSSION

The objective of this study was to find out the frequency of endodontic flareup and its association with pulpal and peri radicular status of teeth undergoing root canal treatment. Endodontic flare up was found in 13.86% cases in our study. The most common diagnosis associated with endodontic flare up was found to be pulp necrosis (6.93%) followed by irreversible pulpitis (3.96%) and least by peri-apical infection (2.97%). No significant association of gender and age group with endodontic flare up was found which is in accordance with the

Table 1: Frequency of gender and age group

Variable	Characteristics	n (%)
Gender	Female	42 (41.58)
	Male	59 (58.42)
Age groups (years)	15-25	31 (30.69)
	26-35	24 (23.76)
	36-45	26 (25.74)
	46-55	20 (19.80)

Table 2: Frequency for causes of root canal treatment

Variable	Characteristic	n(%)
Cause of RCT	Irreversible pulpitis	57 (56.44)
	Peri-apical radiolucency	14 (13.86)
	Pulp necrosis	30 (29.70)

Table 3: Frequency of endodontic flare up and etiology of endodontic flare up

Variable	Characteristics	n (%)
Endodontic flare up	Absent 87 (86.14)	87 (86.14)
	Present 14 (13.86)	14 (13.86)
Causes of endodontic flare up	Nil	87 (86.14)
	irreversible pulpitis	4 (3.96)
	Peri-apical radiolucency	3 (2.97)
	Pulp necrosis	7 (6.93)

Table 4: Frequency of endodontic flare up stratified by gender

Endodontic flare up	Female, n= 421	male, n = 591	chi-square value	p-value
Absent	34 (80.95)	53 (89.83)	0.961	0.3268
present	8 (19.05)	6 (10.17)		

Table 5: Frequency of endodontic flare up among various age group

Endodontic flare up	15-25, n = 311	26-35, n = 241	36-45, n = 261	46-55, n = 201	chisquare value	P value 2
Absent	27, 87.10)	23, (95.83)	22, (84.62)	15, (75.00)	4.0418	0.257
Present	4 (12.90)	1 (4.17)	4 (15.38)	5 (25.00)		

1N (%) , 2 Fischer exact test

other studies[11,12].

The development of pain or swelling a few hours or days after the root canal procedures having significant severity to require an unscheduled visit for emergency treatment is defined as endodontic flare up[4]. Identification of risk factors is necessary as an institution may try to conduct a study, determine risk factors, and change protocols to get better outcomes. Endodontic flare up is a very unpleasant event and if an association of pulpal and periradicular diagnosis with flareup is well known, the clinicians can expect and take measures to prevent or lesson the expected symptoms of pain and swelling and manage the unscheduled patients accordingly[9]. Nair M et al found out that among all the patients who present with endodontic flare up, 10% is due to irreversible pulpitis, 7% is due to necrosis with peri radicular pathology which is in accordance with the results our study for % of necrosis cases associated with flare up[8]. In another study, the cause for endodontic flare up was reported to be pulpal necrosis without peri radicular pathosis as 6% and pulpal necrosis with peri radicular pathosis was reported to be 5.2% (p value < 0.01) which is in accordance with our study as in both studies necrosis is the most common diagnosis associated with flare up[3].

Gbadebo determined the incidence and risk factors associated with occurrence of flare up in a multi visit RCT on 106 root treated teeth. Flare up frequency reported was 8.5% which is a lesser than the results of our study (13.86%) and it may be due to the fact that there were lesser (47%) patients with pre operative pain included in his study as compared to our study which had 57% patients with diagnosis of irreversible pulpitis[11].

Chen et al[12] in a prospective survey assessed Taiwanese patients' endodontic flare-up incidence at Chang Gung Memorial Hospital (CGMH), Linkou, Taiwan. A flare-up was defined as an unforeseen phone call, an emergency room visit, or acute discomfort or swelling following endodontic therapy. Over the course of three months, 658 teeth received endodontic treatment. A relatively low (1.98%) frequency of flare up was documented. There was a significant correlation found between the incidence of flare-ups and the presenting symptoms of percussion pain (12%, p=0.000), spontaneous pain (5.48%, p=0.025), and root canal overfilling (7.89%, p=0.034). The occurrence of flare-ups, however, did not correlate with the patient's age, gender, tooth position[12]. Some of the findings of this study like no corelation of flare up with gender, age and tooth position is in accordance with our study but unlike their results we found significant association of flareup with pulpal and periradicular diagnosis which might be because of small sample size of our study. In the study by Chen et al type of therapy, or operator skills were not associated with the flare up, however we intentionally included only multiple visit endodontics cases and a single operator to keep uniformity in the type of therapy and operator skills which is a strength of our study.

The endodontics clinic of the São Paulo Dental Association (APCD), Jardim Paulista branch, São Paulo, Brazil, conducted a clinical study to assess the frequency of flare-ups (pain and/or swelling requiring endodontic inter appointment and emergency treatment) and to determine the risk factors associated with their occurrence in patients who received endodontic treatment between June 2006 and June 2007. Of the 408 teeth that had endodontic therapy, 1.71% experienced flare-ups which is lesser than our results and it might be due to the bigger sample size as compared to our study[1].

Thus the null hypothesis stating that the initial pulpal and periradicular state of the tooth is unrelated to the occurrence of endodontic flare-ups was not accepted.

LIMITATIONS

Some of the limitations of the study is its imprecise definition of a flare-up, which led to an approximated frequency estimation. Furthermore, it is difficult to compare the incidence of flare-ups among studies due to the lack of a gold standard and the different classifications. Also our study had a smaller sample size which if increased can give us better results. Another limitation is that we did not exclude the patients with pre operative pain which if was done, would include asymptomatic patients only. As pre operative pain is a strong predictor of post operative or inter appointment pain in endodontic treatment[13]. So it is recommended to conduct a well structured randomized controlled study in asymptomatic patients only with a bigger sample size. This will help the clinicians in improving post operative care and management of the patients.

CONCLUSION

Based on our study findings it can be concluded that the incidence of endodontic flare up is quite higher (13.86%) in our set up. The common causes of endodontic flare up found in the study are pulp necrosis, irreversible pulpitis and peri-apical infection. These diagnoses therefore can be considerd as predictors of endodontic flare up and give clinicians insight for better patient care and management. We had no commercial interest or research grants provided for the study.

REFERENCES

1. Alves Vanessa de Oliveira. Endodontic flare ups: a prospective study.Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontics, Volume 110, Issue 5
2. Sharma A, Mandli J, Varghese R. An Overview of Etiology of Endodontic Flare ups. Indian J ConservEndodont 2016;1(3):76 -80
3. Onay EO, Ungor M, Yazici AC. The evaluation of endodontic flare ups and their relationship to various risk factors. BMC Oral Health. 2015;15(1):142.
4. Kaur, Pushappreet. (2015). Endodontic flare ups: A proposal for etiopathogenesis and psychological management. International Journal of Health. 3. 42. 10.14419/ijh.v3i2.5145
5. Jayakodi H, Kailasam S, Kumaravadivel K, Thangavelu B, Mathew S. Clinical and pharmacological management of endodontic flare -up. J Pharm Bioallied Sci. 2012;4(Suppl 2):S294.
6. Ahmad AK. Effect of long acting anesthetic on post Op pain in teeth with Irreversible pulpitis; randomized clinical trial. Saudi Pharm J. 2014;22(1):39 -42.
7. Azim, A.A., Azim, K.A. & Abbott, P.V. Prevalence of inter-appointment endodontic flare-ups and host-related factors. Clin Oral Invest 21, 889–894 (2017)
8. Manuja Nair JR, Devadathan A, Mathew J. Incidence of endodontic flare-ups and its related factors: a retrospective study. J Int Soc Prev Community Dent. 2017;7(4):175
9. Alghazaly A, Al Habib L. Management of Endodontic Flare-Up in the Presence of Periapical Radiolucency: Case Report and Overview. Cureus. 2023 Nov
10. Iqbal M, Kurtz E, Kohli M. Incidence and factors related to flare ups in a graduate endodontic programme. Int Endod J. 2009;42:94 –104.
11. Gbadebo SO. Endodontic flare up: incidence and association of possible risk factors. Afric J Med Med Sci. 2016;45(2):207
12. Chen, Yi-Fen & Lin, Yu-Hen & Chen, Cheng-Chang & Chen, Hui-Ling. (2007). Endodontic flare-ups and associated factors in a Taiwanese hospital. Journal of dental sciences. 2. 39-44.
13. Rehman Khattak S, Sana, R, Khattak Y, Alam, F, & Khan M. Z. Factors Associated with Endodontic Flare-Ups. Journal of Gandhara Medical and Dental Science, 2016(2), 14–20

CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	MS, BI, BM, SFM
Acquisition, Analysis or Interpretation of Data:	MS, AS, BI
Manuscript Writing & Approval:	MS, BI, AS, BM, SFM

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.