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PERIAPICAL CYST IN DENTAL HOSPITAL FACULTY OF DENTISTRY UNIVERSITAS INDONESIA 2018-2019 PERIOD

(*KISTA PERIAPIKAL DI RUMAH SAKIT KHUSUS GIGI DAN MULUT UNIVERSITAS INDONESIA PERIODE TAHUN 2018-2019*)

Evy Eida Vitria[1*], Iwan Tofani[1], Maria Anneta Artha L. Malau[1]

[1]Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Indonesia
*Corresponding author
evy_eida@yahoo.com

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ABSTRACT

A periapical cyst is a lesion often found in dental practice. It is an odontogenic cyst of inflammatory origin with an epithelial wall originating from the epithelial rests of Malassez found in the periodontal ligament. Its high prevalence compared to other types of the odontogenic cyst and the absence of recent study of its distribution and frequency based on age, gender, tooth element, position, condition of the involved tooth, and its treatment render the need for further study. A retrospective descriptive study was done using the secondary data found in the patient's medical record. The study showed some patients with periapical cysts were at the Oral and Maxillofacial Surgery Department in the 2018-2019 period. The frequency and distribution of periapical cyst are primarily found in the third decade of life (39.1%). It found more in female patients (69.6%), more often involved maxillary lateral incisive (33.3%), mostly found at the apical of involved teeth (77.8%), involved teeth condition were more often pulp necrosis (63.0%), and endodontic treatment was the more chosen treatment (22.2%).

Keywords: distribution; frequency; periapical cyst

ABSTRAK

Kista periapikal merupakan lesi yang sering ditemukan pada praktik kedokteran gigi. Kista periapikal adalah kista odontogenik yang berasal dari inflamasi dengan dinding epitel yang berasal dari sisa epitel Malassez yang ditemukan pada ligamen periodontal. Prevalensinya yang tinggi dibandingkan dengan jenis kista odontogenik lainnya dan belum adanya penelitian terbaru mengenai distribusi dan frekuensinya berdasarkan usia, jenis kelamin, elemen gigi, posisi, kondisi gigi yang terlibat, dan perawatannya membuat perlunya penelitian lebih lanjut. Penelitian deskriptif retrospektif dilakukan dengan menggunakan data sekunder yang terdapat pada rekam medis pasien. Hasil dari penelitian ini didapatkan 23 pasien kista periapikal dari total 4.163 rekam medis pasien yang menjalani perawatan di Bagian Bedah Mulut dan Maksilofasial periode 2018-2019. Frekuensi dan distribusi kista periapikal paling banyak ditemukan pada dekade ketiga kehidupan (39,1%), lebih banyak ditemukan pada pasien wanita (69,6%), lebih sering mengenai insisivus lateral rahang atas (33,3%), paling banyak ditemukan pada apikal gigi yang terlibat. (77,8%), kondisi gigi yang terlibat lebih sering mengalami nekrosis pulpa (63,0%), dan perawatan endodontik lebih banyak dipilih (22,2%).

***Kata kunci**: distribusi; frekuensi; kista periapikal*

INTRODUCTION

A periapical cyst is an odontogenic cyst of inflammatory origin with an epithelial wall. It originates from the epithelial rests of Malassez found in the periodontal ligament. A periapical cyst develops from a periapical granuloma. It is a chronically inflamed granulation tissue at the apex of a nonvital tooth.[1] Pulpal death was either caused by physical, chemical, or bacterial injury.[2] Inflammatory stimulus reaches the periapical region and stimulates epithelial proliferation that separates the inflammatory stimulus from the

surrounding bone.[3] Cellular debris break down increases protein concentration, resulting in intraluminal fluid accumulation and cyst expansion as the bone resorps.[1] The incidence of periapical cyst cases varies between 6%-55% of the lesion findings. 75% of cases of periapical cysts occur in the maxilla, and 25% occur in the mandible.[4]

The previous study of the distribution and frequency of periapical cyst was in Rumah Sakit Khusus Gigi dan Mulut (RSKGM) Faculty of Dentistry Universitas Indonesia. It is involved tooth element, condition, site region, age, and gender. The research was in October 2007-September 2009. Forty-five patients with periapical cyst were found, with the most involved teeth were maxillary central incisive (37.78%), the problematic teeth condition were more often pulp necrosis (53.3%), more often affects the maxillary region (53.3%), found more in the fourth decade of life (31.11%), found more in female patients (62.22%). Endodontic treatment was the more chosen treatment (20.0%).[4]

Its high prevalence compared to other types of the odontogenic cyst and the absence of recent study of periapical cyst distribution and frequency based on age, gender, tooth element, position, condition of the involved tooth, and its treatment render the need for further study.

METHOD

A retrospective descriptive study was done using the secondary data found in the medical records of patients receiving treatments at the Oral and Maxillofacial Surgery Department at RSKGM Faculty of Dentistry Universitas Indonesia. The study includes patients with clinical diagnosis, radiographic (dental and panoramic), and histopathological examination results of periapical cysts in January 2018–December 2019.

A list of medical record numbers for oral surgery patients at RSKGM Faculty of Dentistry Universitas Indonesia 2018-2019 was obtained from the list of patients who did treatment at the Oral Surgery Clinic. Medical record numbers are grouped and then sorted based on the last two digits of the number using Microsoft Excel to simplify the data retrieval process.

Recording for each case finding periapical cyst by inputting data into Microsoft Excel software includes information about the medical record number, patient's name, gender, date of treatment, patient's age, dental elements involved, position, condition of the teeth involved, and their treatment

The data obtained were processed using SPSS 25 software to get the distribution and frequency of periapical cysts by age, gender, element of the tooth,

position, condition of the teeth involved, and treatment at RSKGM Faculty of Dentistry Universitas Indonesia for the period 2018-2019

RESULT

The retrospective descriptive study was conducted from June 2020 to August 2020 at RSKGM, Faculty of Dentistry, Universitas Indonesia, using secondary data from medical records of oral and maxillofacial surgery patients from January 2018 until December 2019. Study the distribution and frequency of periapical cysts based on age, gender, tooth element, and treatment.

A total of 23 patients with periapical cysts are found from the sum of 4,163 medical records. The study sample consists of 16 females (69.6%) and seven males (30.4%), with a mean age of 38.3 years and the age range of 20 – 74 years. The cysts more often occurred in the third decade of life or age group 21-30 years (39.1%) and at least found in the age group 11-20 years (4.3%). (Table 1).

Table 1. Frequency and distribution of patients based on admission year, age and gender

Admission year	**Frequency (n = 23)**
2018	15 (65.2%)
2019	8 (34.8%)
Gender	
Female	16 (69.6%)
Male	7 (30.4%)
Age (years)	
11-20	1 (4.3%)
21-30	9 (39.1%)
31-40	3 (13.0%)
41-50	5 (21.7%)
51-60	2 (8.7%)
>60	3 (13.0%)

The results are the distribution and frequency of periapical cyst on tooth element such as the position of involved teeth, 27 cases of periapical cysts, with the most commonly affected teeth being the left maxillary lateral incisive (18.5%), the right maxillary lateral incisive (14.8%). Most of the cysts were found at the apical of involved teeth (77.8%) (**Table 2**)

Table 2. Frequency and Distribution of Periapical Cyst based on Tooth element and position

Tooth element	Frequency (n = 27)
11	3 (7.4%)
12	4(14.8%)
21	2 (7.4%)
22	5 (18.5%)
25	1 (3.7%)
27	1 (3.7%)
34	1 (3.7%)
35	2 (7.4%)
36	1 (3.7%)
37	1 (3.7%)
45	2 (7.4%)
46	3 (11.1%)
47	2 (7.4%)
Position	
Apical	21 (77.8%)
Without radiograph	6 (22.2%)

Distribution and frequency of periapical cyst based on the condition of involved teeth, pulp necrosis, was more often (63.0%), followed by radix (14.8%). **(Table 3).**

Table 3. Frequency and Distribution of Periapical Cyst based on Involved tooth condition

Involved tooth condition	Frequency (n = 27)
Impacted	1 (3.7%)
Pulp necrosis	17 (63.0%)
Radix	4 (14.8%)
No information	5 (18.5%)

Distribution and frequency of periapical cyst based on the treatment of involved teeth, there were root canal treatment of involved teeth was the more chosen treatment (22.2%), followed by extraction and enucleation (14.8%) (**Table 4**).

Table 4. Frequency and Distribution of Periapical Cyst based on treatment

Treatment	Frequency (n = 27)
Root canal treatment of involved tooth	6 (22.2%)
Extraction of the involved tooth	2 (7.4%)
Cyst enucleation	2 (7.4%)
RCT and enucleation	2 (7.4%)
Extraction and enucleation	4 (14.8%)
RCT, apicoectomy, and enucleation	1 (3.7%)

Odontectomy	1 (3.7%)
No Information	9 (33.3%)

RCT = Root canal Treatment

DISCUSSION

Of the 23 patients, the study population comprised 16 female patients (69.6%) and seven male patients (30.4%). Similar results were found in the study by Chen et al. (2018), where periapical cysts were found more in female patients with a total of 133 cases (57.3%), compared to male patients with 99 cases (42.7%).[5] Studies conducted by Lin et al. (2010) also showed similar results, where periapical cysts were more common in female patients with a total of 67 cases (57.3%), compared to male patients with 50 cases (42.7%).[6] Research by de Souza et al. (2010) also showed that periapical cysts were more common in female patients with a male: female ratio of 0.61: 1.[7]

The age group with the most findings of the periapical cyst was the 21-30 year age group with nine patients (39.1%), and the least was the 11-20 year age group with one patient (4.3%). Compared with the study by Batista de Souza et al. (2010), there is a similarity where most findings of the periapical cyst were found in the 21-30 year age group. However, the age group with the least case number of periapical cysts in this study was 81-90 years.[7] Similarities are also found when compared with a retrospective study by Chen et al. (2018), where the most findings of periapical cyst cases were found in the 20-29 year age group and the 40-49 year age group with 57 cases (24.6%) each. In this study, the minor cases of periapical cysts were found in the 70-79 year age group, with a total of 13 cases (5.6%).[5] The age distribution of patients with periapical cysts is the highest in the third decade to the sixth decade. The more significant number of patients in this age group is due to the more substantial number of caries findings and nonvital teeth.[1] It is supported by the results of Riset Kesehatan Dasar (Riskesdas) regarding the prevalence of caries and root caries in Indonesia in 2018, with 87% and 70% in the 25-34 years age group, 92.2% and 75.6% in the 35-44 years age group, 94.5% and 73.5% in the 45-54 year age group.[8]

In this study, the left maxillary lateral incisives (18.5%) are the most commonly affected teeth, followed by the right maxillary lateral incisive (14.8%). A study by Açikgöz, et al. (2012) showed similar results where the most commonly involved teeth were anterior maxillary teeth with a total of 106 cases (42.2%).[9] Studies by Lin et al. (2010) also showed maxillary lateral intelligence as the most commonly affected teeth comprising 31 out of 117 periapical cyst findings (26.5%).[6] A similar

study by Chen et al. (2018) also showed similarities where maxillary lateral incisives were the most commonly affected teeth with a total of 105 cases (38.9%).[5] According to Ochsenius, et al. (2007), higher findings of periapical cyst involving maxillary lateral incisives were influenced by aesthetic factors, where patients tended to retain these teeth, so they were more susceptible to long-term chronic inflammatory processes when not treated.[10]

Based on their position, in this study, periapical cysts are often found at the apical with 21 cases (77,8%), with six other patients (22.2%) were not accompanied by radiographs. Another variation of the periapical cyst is the lateral radicular cyst. The cyst is found lateral to the tooth and is associated with lateral canals that connect them to the nonvital pulp. The radiograph shows a discontinuation of the lamina dura in the periapical cyst and radiopaque border of the bone surrounding the tooth root. The average size of most periapical cysts is 0.5–1.5 cm, although occasionally, the lesion may enlarge significantly, resulting in the partial destruction of the jawbone.[3,11–14]

Based on the teeth' condition, the most involved tooth conditions were pulp necrosis with 17 cases (63, 0%), followed by root gangrene with 4 cases (14.8%). Pulp necrosis and root gangrene conditions in the study are consistent with the etiology of periapical cysts. It is caused by necrosis or death of the pulp tissue.[1,2,5,15,16] According to Lin et al. (2010), most periapical lesions are due to pulpo-periapical disease. It is also in line with the number of pulp necrosis conditions found in this study.[6]

Pulp necrosis in periapical cyst findings in this study was due to a history of caries or trauma to the involved teeth. A history of extensive caries causes the condition of root gangrene due to untreated treatment. In the case of the finding of impacted teeth, there was no information available regarding the results of the pulp vitality examination of the involved teeth.

Periapical lesions are most often of caries origin and are associated with pulp infection[17]. Bacteria and their by-products can exit the root canal system through the apical foramen and cause an inflammatory response in the periapical tissues and resorption of the alveolar bone surrounding the root [18,19]. The necrotic pulp bacterial by-products can stimulate the proliferation of the Malasses epithelial remnants. It can lead to the formation of radicular cysts or periapical cysts [18,20]. Because periapical cysts occur as a result of pulp infection, root canal treatment is recommended Based on this study, the most chosen treatment was root canal treatment with 6 cases (22.2%). The minor treatment performed were root canal treatment. It combined with

apicoectomy and enucleation and odontectomy in case of the impacted teeth, each with 1 case (3.7%). Koju et al. (2019), there are various treatment options for periapical cysts, including non-surgical therapy with root canal treatment and surgical treatment including extraction of involved teeth, decompression, marsupialization, and enucleation in case of a large cyst. [21]The treatment plan depends on the size and location of the lesion, the integrity of the *epithelial lining*, the distance of the cyst from the surrounding vital teeth, and anatomical structures (such as the inferior alveolar canal, mental foramen, infraorbital foramen, maxillary sinus, nasal cavity, and infratemporal space). [21,22]

Bansal et al. (2013), the non-surgical management of periapical lesions demonstrated a high success rate. [23] Following the results of this study, Chen et al. (2018) states most endodontic treatment cases, was the first choice of treatment to remove inflammatory periapical lesions.[5] Endodontic treatment is primarily performed and is the treatment of choice when the involved tooth is preserved. Surgical treatment, such as cyst enucleation or curettage, may be performed when healing the apical area is not achieved. Enucleation could be performed from a post-extraction socket if extraction of the involved tooth was performed. In addition, enucleation can also be performed through a periapical surgical procedure. It is when the tooth is preserved and can still be restored or when the cyst is more significant than 2 cm in size.[21,24]

CONCLUSION

The periapical cyst frequency and distribution are primarily found in the third decade of life (39.1%), in female patients (69.6%), more often involved maxillary lateral incisive (33.3%), mostly found at the apical of involved teeth (77.8%), involved teeth condition were more often pulp necrosis (63.0%). Endodontic treatment was the more chosen treatment (22.2%).

CONFLICT OF INTEREST

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