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Oropharyngeal abscesses with repeated health care visits – the characteristics in patients with odontogenic and peritonsillar abscesses

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Abstract

Purpose Deep neck infection is a potentially life-threatening condition, and thus, early identification and treatment are essential. This study explored the diagnostic challenges and preceding treatment in patients with repeated healthcare contacts due to an odontogenic or a peritonsillar abscess.

Methods A retrospective study of oropharyngeal abscesses in hospitalized patients was conducted. Included were inpatients with an odontogenic or a peritonsillar abscess during 2019. Excluded were patients with other infection type and patients with an odontogenic abscess preceded by tooth removal. The main outcome variable was repeated healthcare visit(s) due to the current infection prior to hospitalization. The primary predictor variable was source of infection. Explanatory variables comprised age, sex, duration of symptoms (days), clinical findings, and referring unit. Additional analyses were conducted for patients with repeated healthcare visits. Study groups were compared using Fisher's exact test, Student's *t*-test, test where appropriate. A 2 × 2 risk analysis was performed.

Results Altogether 294 patients, 153 (52.0%) with an odontogenic abscess and 141 (48.0%) with a peritonsillar abscess, were included in the study. Source of infection was unidentified more often in patients with an odontogenic than a peritonsillar abscess ($P < .001$). In all, 106 patients (36.1%) had repeated healthcare visits prior to hospitalization, which was significantly associated with an odontogenic abscess ($P = .039$). Active intervention was conducted in only 34.0% of the patients with repeated healthcare visits.

Conclusions Clinicians have challenges in recognizing a developing odontogenic abscess, which remains essential for prompt and effective surgical intervention.

Keywords Odontogenic abscess, Peritonsillar abscess, Repeated healthcare visits, Abscess treatment

Introduction

Deep neck infection is a potentially life-threatening condition, the aetiology of which is most commonly (44.8%) an odontogenic infection. The second most common cause is a peritonsillar infection (37.5%) [21]. Differential diagnosis includes infectious mononucleosis, lymphadenitis, epiglottitis, and neoplasm [9, 13, 19, 21]. Differentiating the causes of deep neck infections can be difficult because the symptoms and findings of these infections partly overlap, yet the correct diagnosis is important since the treatments differ.

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The symptoms of a peritonsillar abscess are sore throat, fever, dysphagia, and trismus [1, 12, 18], which can also be found in odontogenic abscesses [22]. Typical signs of an odontogenic abscess are pain, swelling on the side of the affected jaw, trismus, and suppuration that is usually localized to the affected tooth [6, 16]. In peritonsillar abscesses, inspection of the oropharynx reveals tense swelling and erythema of the anterior tonsillar pillar and soft palate overlying the infected tonsil. The tonsil is generally displaced inferiorly and medially with contralateral deviation of the uvula [19]. In odontogenic abscesses, extraoral swelling and mouth restriction predominate [22].

There are also differences in patients' demografic factors. The highest incidence of a peritonsillar abscess occurs in teenagers and young adults [3, 4, 10], whereas odontogenic abscess patients are more often older [8, 20, 22]. In adults with a peritonsillar abscess, the male: female ratio is 1:1 [5, 14], but in odontogenic abscesses males predominate [3, 6, 20].

The diagnosis of deep neck infection, particularly an odontogenic infection, remains challenging even at specialized health care centers. Based on the literature, in half of the patients with progressive odontogenic infection referred for hospitalization, the focus was not detected despite repeated visits to health care [20]. In addition, in the study by Katoumas et al. [8], more than 80% of the patients did not receive any dental intervention for odontogenic infection. Thus, detection of an odontogenic infection and optimal early treatment seem to be challenging for clinicians. In both diagnoses, the treatment is a precise invasive procedure combined with antibiotics.

The aims of the present study were to explore the diagnostic challenges in patients with an odontogenic or a peritonsillar abscess and to clarify preceding treatments of these abscesses, focusing on patients with repeated visits due to the medical condition. We hypothesized that odontogenic abscesses would remain unidentified more often than peritonsillar abscesses.

Methods and materials

Study design

Data on all patients with an acute oropharyngeal infection diagnosed at the emergency units of Oral and Maxillofacial Surgery or Otorhinolaryngology at the Helsinki University Hospital, Helsinki, Finland, between 1 January and 31 December 2019 were included. These departments have a catchment area of approximately 1.6 million inhabitants.

Patient data were extracted from electronic patient records by infection diagnoses (ICD). Evaluated were patient data of hospitalized patients treated for acute bacterial odontogenic, other oropharyngeal, or sinus infection.

Inclusion and exclusion criteria

All visits in the ambulatory emergency department of the Oral and Maxillofacial Surgery and Otorhinolaryngology during the time period given above were evaluated. From this patient cohort, all patients with acute purulent odontogenic or peritonsillar abscess with hospital treatment were manually evaluated and included to this study. Excluded were patients with other bacterial infection aetiology and patients with odontogenic abscess and preceding tooth removal.

Study variables

The outcome variable was repeated health care visit(s) (yes or no) due to current abscess prior to hospitalization. For recurrent or persistent abscesses, only data from the first visit were evaluated.

The primary predictor variable was cause of abscess (odontogenic or peritonsillar).

Explanatory variables comprised age, sex, duration of symptoms (days), antibiotic treatment before

Table 1 Descriptive statistics and differences between infection source in 294 patients

	Odontogenic abscess		Peritonsillar abscess		*P*-value
	n	%	n	%	
All	153	52.0	141	48.0	
Age (years)					<0.001*
Min-max	12.9–89.9		3.9–89.3		
Mean	51.3		36.1		
Sex					0.151**
Male	88	48.6	93	51.4	
Female	65	57.5	48	42.5	
Duration of symptoms (days)					0.118*
Min-max	0–38		0–34		
Mean	4.9		4.7		
Extraoral swelling present					< 0.001**
Yes	130	92.9	10	7.1	
No	23	14.5	131	85.5	
Intraoral swelling present					< 0.001**
Yes	112	44.4	140	55.6	
No	41	95.7	1	4.3	
Swallowing difficulty					< 0.001**
Yes	28	19.4	116	80.6	
No	125	90.6	25	9.4	
Referring professional					< 0.001**
Medical doctor	48	27.1	132	73.3	
Dentist	80	100.0	0	0.0	
Without referral	25	67.6	9	26.5	

Abbreviations: *, Student-t-test; **, Fisher's exact test

Table 2 Explanatory variables and repeated healthcare visits in patients with an odontogenic or a peritonsillar abscess

	Repeated healthcare visits before hospitalization				*P*-value
	Yes		No		
	n	%	n	%	
All	106	36.1	188	63.9	
Age (years)					1.000*
Min-max	9.4–89.3		3.9–89.9		
Mean	44.3		44.3		
Sex					0.618**
Male	63	34.8	118	65.2	
Female	43	38.1	70	61.9	
Duration of symptoms (days)					0.404*
Min-max	0–23		0–38		
Mean	4.6		4.1		
Extraoral swelling present					0.672**
Yes	53	37.9	87	62.1	
No	53	34.4	101	65.6	
Intraoral swelling present					0.898**
Yes	90	35.7	162	64.3	
No	16	38.1	26	61.9	
Swallowing difficulty					0.403**
Yes	53	36.8	91	63.2	
No	53	35.3	97	64.7	
Referring professional					0.270**
Medical doctor	68	37.8	112	62.2	
Dentist	30	37.5	50	62.5	
Hospitalization without referral	8	23.5	26	76.5	

Abbreviations: *, Student-t-test; **, Fisher's exact test

hospitalization, clinical parameters (extraoral swelling, intraoral swelling, swallowing difficulty), and referring entity (medical doctor, dentist, or no referral, i.e. patient arrived without a referral to hospital).

Additional analyses were also conducted for patients with repeated health care visits.

Statistical analyses

Study groups were compared using Fisher's exact test, Student's *t*-test, test as appropriate. A 2×2 risk analysis was performed. Significance was set at $P<.05$. Statistical analysis was performed using SPSS Statistics 25 software (IBM).

Results

In total, 8964 emergency visits were evaluated. From this patient cohort, of the 415 patients with a bacterial oro-naso-pharyngeal infection, 121 were excluded: 86 patients with abscess preceded by tooth removal and 35 patients with other than odontogenic or peritonsillar abscess. Thus, 294 patients were included in the study: 153 patients with an odontogenic abscess and 141 patients with a peritonsillar abscess.

Patient-related and disease-related variables differed according to infection source. Patients with an odontogenic abscess were older than those with a peritonsillar abscess ($P<.001$). They had more often extraoral swelling ($P<.001$), and the referring professional was more often a dentist. In turn, swallowing difficulty ($P<.001$) was significantly associated with a peritonsillar abscess (Table 1).

In all, 106 patients (36.1%) had repeated health care visits prior to hospitalization (Table 2). Patients with an odontogenic abscess had significantly more often repeated health care visits than patients with a peritonsillar abscesses ($P=.039$). The primary source of abscess remained unidentified more often in patients with repeated health care visits before hospitalization (67.3% vs. 32.7%, $P<.001$). Salivary gland origin was the most common suspected site of infection leading to misdiagnosis (Table 3).

In all, patients received several types of active intervention before hospitalization (Fig. 1). In the odontogenic abscess group, 62.5% received antibiotic treatment, 32.8% endodontic treatment, and no one was surgically treated. Among patients with a peritonsillar abscess, 52.4% had received antibiotic treatment prior to referral to hospital,

Table 3 Difference between abscess source and repeated healthcare visits in 294 patients

	Repeated healthcare visits before hospitalization				*P*-value**
	Yes		No		
	n	%	n	%	
All	106	36.1	188	63.9	
Final source of abscess					0.039
Odontogenic	64	41.8	89	58.2	
Peritonsillar	42	29.8	99	70.2	
Source of abscess identified prior to final care					< 0.001
Yes	86	32.7	177	67,3	
No	20	64.5	11	35,5	
Suspected source of abscess*					< 0.001
Odontogenic	45	39.8	68	60.2	
Peritonsillar	34	29.3	83	70.9	
Salivary gland infection	10	90.9	1	9.1	
Mononucleosis	4	44.6	5	55.6	
Tonsillitis	2	40.0	3	60.0	
Paranasal sinus infection	1	100.0	0	0.0	
Tumor suspicion	1	100.0	0	0.0	
Other	9	24,3	28	75,7	

Abbreviations: *Primarily suspected infection source; **Fisher's exact test

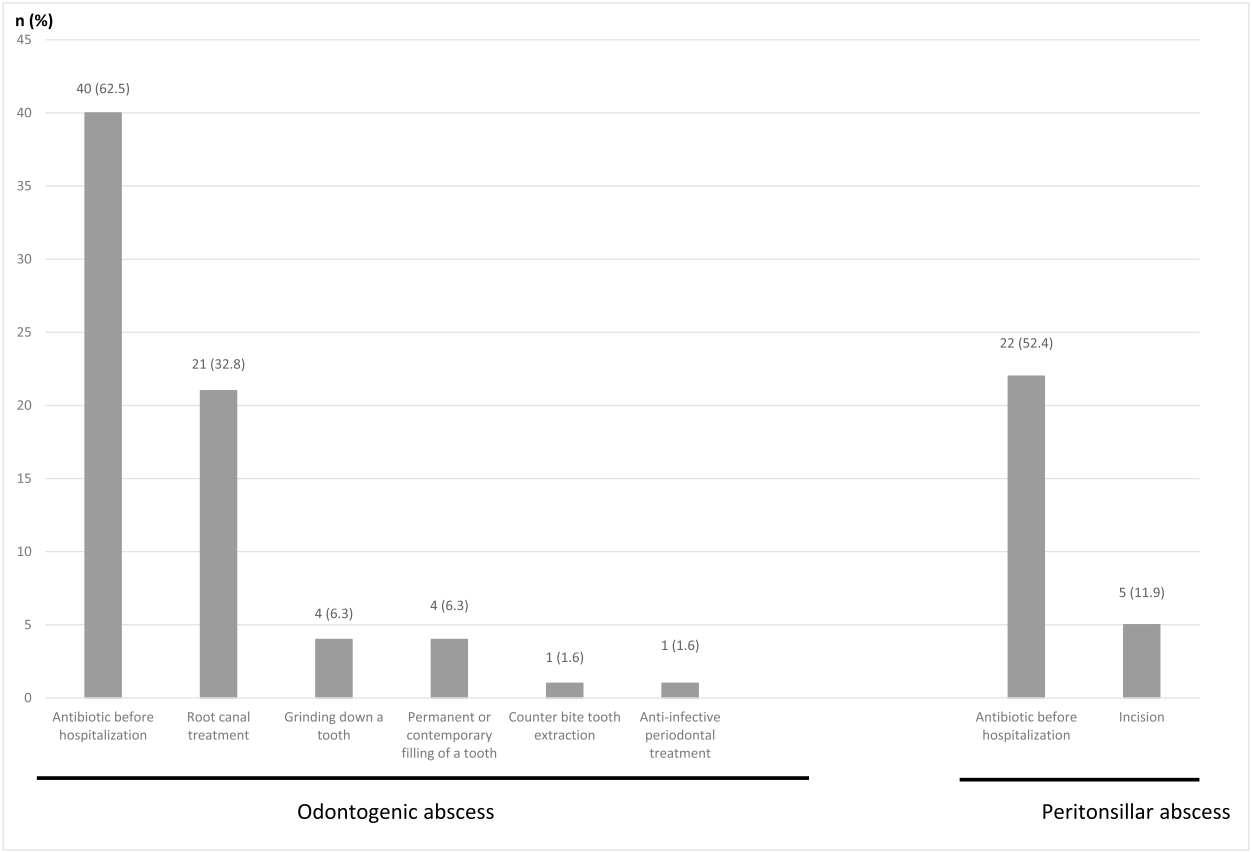

Fig. 1 Usage of antibiotics and active interventions done before hospitalization in patients with an odontogenic ($n=153$) or a peritonsillar ($n=141$) abscess

and 11.9% had been surgically drained elsewhere. The definitive information of recurrence in relation to peritonsillar abscess was not available.

Additional analyses for patients with repeated health care visit(s) showed wide variation between the two abscess types. The source of abscess was less often identified prior to final care in patients with an odontogenic abscess (25%) than in those with a peritonsillar abscess (90.5%) (Table 4). Number of visits was significantly higher among those with an odontogenic abscess ($P=.017$). Received antibiotic treatment before hospitalization and preceding active intervention were more common in patients with an odontogenic abscess ($P<.001$). Also, clinical symptoms differed significantly according to the site of abscess. Extraoral swelling associated significantly with an odontogenic abscess ($P<.001$). Intraoral swelling was absent significantly more often in patients with an odontogenic abscess ($P<.001$).

The 2×2 risk analysis of 106 patients with repeated health care visits showed significant differences between clinical symptoms and cause of abscess. Patients with extraoral swelling had a 20.4-fold risk for an odontogenic abscess ($P<.001$), whereas patients with swallowing difficulty had 2.4-fold risk for a peritonsillar abscess (Table 5).

Discussion

Comparative studies between specific sources of infection have shown characteristic features between different subgroups in the upper aero-digestive tract [21, 22]. We hypothesized that odontogenic abscesses may remain unidentified more often than peritonsillar ones. The aims of the present study were to explore diagnostic challenges in patients with an odontogenic or a peritonsillar abscess and to clarify the preceding treatment of these abscesses.

Our study revealed that odontogenic abscesses are clinically less well recognized than peritonsillar abscesses; the source of infection was unidentified for 75% of odontogenic abscess patients and they typically had repeated health care visits prior to final care. The most common misdiagnosis was related to salivary gland origin. Early surgical intervention(s) to manage these abscesses were often lacking, although nearly half of the patients with an odontogenic abscess received other active treatments. Also, the

Table 4 Confirmed abscess source and preceding treatment for 106 patients with repeated healthcare visits

	Odontogenic abscess		Peritonsillar abscess		*P*-value
	n	%	n	%	
	64		42		
Age (yrs)					< 0.001*
Min-max	12.9–87.8		9.4–89.3		
Mean	49.7		36.0		
Sex					0.427**
Male	36	57.1	27	42.9	
Female	28	65.1	15	34.9	
Repeated healthcare visits before hospitalization					0.017*
Min-max	1–4		1–3		
Mean	1.5		1.2		
Source of abscess identified prior to final care					0.073**
Yes	16	29.6	38	70.4	
No	48	92.3	4	7.7	
Suspected cause of abscess°					< 0.001**
Odontogenic	45	100.0	0	0.0	
Peritonsillar abscess or tonsillitis	1		35		
Salivary gland infection	10	100.0	0	0.0	
Tumor-suspicion	1	100.0	0	0.0	
Mononucleosis	0	0.0	4	0.0	
Paranasal sinus infection	1	100.0	0	0.0	
Other	6	66.7	3	33.3	
Antibiotic treatment before hospitalization					0.301
Yes	40	64.5	22	35.5	
No	24	54.6	20	45.4	
Active intervention before hospitalization					< 0.001**
Yes	31	86.1	5	13.9	
No	33	47.1	37	52.9	
Extraoral swelling present					< 0.001**
Yes	51	96.2	2	3.8	
No	12	23.1	40	76.9	
Intraoral swelling present					< 0.001**
Yes	48	53.3	42	46.7	
No	16	100.0	0	-	
Swallowing difficulty					< 0.001**
No	47	92.2	4	7.8	
Yes	17	30.9	38	69.1	

Abbreviations: *, Student-t-test; **, Fisher's exact test; °, including two patients without referral, both suspecting odontogenic infection etiology

consumption of antibiotics was higher in the odontogenic abscess group before hospitalization than in the peritonsillar abscess group. The causes leading to need for multiple health care visits and ineffective treatment vary, however, as reported recently, dentists routinely provide dental treatment without determining the initial cause of the discomfort in patients, suggesting the need for training to identify different ailments [15].

In addition, developing odontogenic abscesses are not recognized properly, as presented by Uittamo et al. [20], who previously showed that the focus of an odontogenic infection goes unidentified on every second occasion. Our study confirms the previous findings and emphasizes that both medical doctors and dentists need to be aware of and recognize the presenting (?) features of an odontogenic abscess. The severity of odontogenic and peritonsillar abscesses ranges from well-localized infections to life-threatening infections with such complications as respiratory obstruction, sepsis, descending mediastinitis, and endocarditis [11, 17]. The mortality rate reported in

Table 5 2x2 risk analysis of 106 patients with repeated healthcare visits before hospitalization for abscess

	Extraoral swelling present	Swallowing difficulty	Intraoral swelling present	Antibiotic treatment before hospitalization	Active intervention done before hospitalization
Odontogenic abscess	20.4 (5.2–80.0)	ref	ref	1.3 (0.8–2.0)	6.9 (2.4–19.9)
Peritonsillar abscess	ref	2.4 (1.6–3.6)	1.6 (0.7–4.0)	ref	ref
P-value *	< 0.001	< 0.001	< 0.001	0.312	< 0.001

Abbreviations: ref, reference; *, Fisher's exact test

reviews has been up to 10–40% in odontogenic and 10% in peritonsillar abscesses [2, 11]. A delay in diagnostics is potentially life-threatening in both conditions.

To avoid severe infections, abscesses should be identified at an early stage. Thorough medical history and clinical symptoms must be considered in the identification and differential diagnosis of odontogenic and peritonsillar abscesses. In this study, extraoral swelling strongly indicated the source for an odontogenic abscess, which is in line with earlier reports [6]. By contrast, swallowing difficulty was a significant predictor of a peritonsillar abscess.

In our study, for patients with repeated visits, antibiotics were administered before hospitalization in 62.5% of odontogenic and in 52.4% of peritonsillar abscess patients. Medical or dental intervention was provided before hospitalization for 11.9% of peritonsillar and 48.4% of odontogenic abscess patients. Most peritonsillar abscesses developed because of tonsillitis, which was treated first with antibiotics prior to hospitalization. It should also be noticed that the frequency of beta-hemolytic streptococcus A is clearly lower in recurrent peritonsillar abscess, which can explain the course of recurrent abscesses when compared to the un-recurrent ones [7]. Most of the repeated health care visits in the peritonsillar group were likely due to a slowly developing abscess. In the odontogenic abscess group, root canal treatment was the most common procedure provided (32.8%). A notable finding was that surgery was not performed in the odontogenic group before hospitalization. This finding is in concordance with a previous report revealing a lack of surgical treatment, i.e. incision of the abscess, in an early phase of the odontogenic infection [8], even though it is the main treatment for an odontogenic abscess.

The main limitation of this study is due to its retrospective nature, which might have influenced the reported symptoms and findings. Data of preceding treatment were based on the referral and patient-reported medical history; thus, gaps may have been present in the information. Possible previous oral and tonsillar infections were not recorded. In addition, with a larger number of patients more detailed findings, especially of preceding care, would have been available.

Conclusion

Although odontogenic and peritonsillar abscesses have similar signs and features, the patients' clinical background and symptoms differ. By thorough anamnesis and clinical inspection, the correct diagnosis is still achievable. Prompt treatment based on correctly defined cause of infection must be administered for both peritonsillar and odontogenic abscesses, the incision and drainage being the on-call treatment. Earlier surgical intervention by dentists is needed to manage an odontogenic abscess.

Authors' contributions

H-R.A: Raw data collection, study design, investigation, visualization, writing original draft and editing. S-T.V: Raw data collection, review, study design. J.U: Review and editing. A.M: Review and editing. J.S: Research design, methodology, project administration, supervision, validation, writing—review and editing. M.T: Statistical analysis, review and editing.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The study was approved by the Internal Review Board of the Head and Neck Center, Helsinki University Hospital, Helsinki, Finland (58/2020). The Internal Review Board of the Head and Neck Center waived the requirement of informed consent due to the retrospective nature of this study. The guidelines of the Declaration of Helsinki were followed in this study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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