Original Article / Özgün Araştırma

Analysis of Traumatic Bone Cyst of the Jaws: A Retrospective Study

Çenelerin Travmatik Kemik Kistlerinin Analizi: Geriye Dönük Bir Çalışma

Ahmet Emin Demirbaş[1], Halis Ali Çolpak[2], Nükhet Kütük[3], Zeynep Burçin Gönen[4], Alper Alkan[3]

[1]Erciyes University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Kayseri, Turkey
[2]Alanya Alaaddin Keykubat University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Alanya, Turkey
[3]Bezmialem University Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, İstanbul, Turkey
[4]Erciyes University, Genome and Stem Cell Centre, Kayseri, Turkey

Abstract

Objective: Traumatic bone cysts (TBC) are rare in the jaws, and may be characterized by the presence of a cavity in bone with no epithelial lining. Clinically, TBC is asymptomatic and often discovered incidentally on routine radiographic examination. The purpose of this study was to describe the clinical, surgical, and radiographic features of TBCs.

Materials and Methods: Records of patients with cystic lesions, who were treated in our clinic between 2006 and 2016, were examined. Twenty-two TBCs were detected among all odontogenic/nonodontogenic cysts. Clinical, radiographical, histopathological features of TBCs and follow-up information of the patients were analyzed retrospectively.

Results: The mean age of the patients was 18.5. The incidence of the TBC was found 1.05%. All lesions were found in the mandible, and were diagnosed incidentally during routine dental examinations except two cases have pain. Most cases showed a cavity without an epithelial lining, and were treated with curettage. No complications occurred during follow up period.

Conclusion: TBCs are rare seen in the jaws, and the mandible is generally affected site. Bone healing may be accomplished successfully with the curettage of the cyst cavity.

Keywords
Traumatic bone cyst, mandible, maxilla, incidence, jaw

Öz

Amaç: Travmatik kemik kistleri (TKK) çenelerde nadir görülür ve epitelsiz bir kemik kavitesi şeklinde karakterize edilebilir. Klinik olarak, TKK asemptomatiktir ve sıklıkla rutin radyografik incelemede rastlantısal olarak bulunur. Bu çalışmanın amacı, TKK'lerin klinik, cerrahi ve radyografik özelliklerini tanımlamaktır.

Gereç ve Yöntemler: Kliniğimizde 2006 ve 2016 yılları arasında kistik lezyonları olan hastaların kayıtları incelendi. Tüm odontojenik/nonodontojenik kistler arasında yirmi iki TKK tespit edildi. Hastaların klinik, radyografik, histopatolojik özellikleri ve takip bilgileri retrospektif olarak incelendi.

Bulgular: Hastaların yaş ortalaması 18,5 idi. TKK insidansı %1,05 olarak bulundu. Tüm lezyonlar mandibulada görüldü ve iki olgudaki ağrı bulgusu dışında rutin diş muayenelerinde rastlantısal olarak teşhis edildi. Olguların çoğu epitelsiz bir kemik kavitesi şeklindeydi ve küretaj ile tedavi edildi. Takip süresince olgularda herhangi bir komplikasyon görülmedi.

Sonuç: TKK'leri çenelerde nadir görülür ve mandibula genellikle etkilenen bölgedir. Kemik iyileşmesi kist boşluğunun kürete edilmesini takiben başarılı bir şekilde gerçekleştirilebilir.

Anahtar Kelimeler
Travmatik kemik kisti, mandibula, maksilla, insidans, çene

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Address for Correspondence/Yazışma Adresi:
Ahmet Emin Demirbaş DDS, PhD,
Erciyes University Faculty of Dentistry,
Department of Oral and Maxillofacial Surgery,
Kayseri, Turkey
Phone : +90 352 207 66 00
E-mail : aedemirbas@erciyes.edu.tr
ORCID ID: orcid.org/0000-0002-2602-6415

Introduction

Traumatic bone cyst (TBC) of the jaws was first described in 1929 (1). Later, TBC was more clearly defined by Rushton (2). TBC is not a true cyst because there is no epithelial lining (3,4). The other names of the TBC in the literature are solitary bone cyst (2), simple bone cyst, hemorrhagic bone cyst, progressive bone cyst, idiopathic bone cyst and unicameral bone cyst (2,5-9). Because the different names used to define the TBC, it is difficult to understanding of etiology and pathophysiology of this lesion. According to the World Health Organization the TBCs are included in the group of bone related lesion, together with the aneurysmal bone cyst, ossifying fibroma, fibrous dysplasia, osseous dysplasia, central giant cell granuloma and cherubism (10).

The lesion mostly occurs in the second and third decades of life with slight male predominance or with no gender differences (11). TBCs are usually seen in long bones, but rarely seen in the jaws (12). Most cases of TBC seen in maxillofacial region are clinically asymtomatic and diagnosed incidentally in routine radiographs (13-16). The TBCs of the jaws appear radiolucent with bony margins and frequently in mandible (16,17).

The treatment choice of TBCs is curettage and the healing is generally uneventful (12,14). The purpose of this retrospective study was to describe the clinical, surgical, radiographic features, and the incidence of TBC among other cyst of the jaws.

Materials and Methods

The study has been reviewed and approved by the local ethics committee of Erciyes University (Protocol number: 2017/ 10). A total of 2080 patients' records with cystic lesions, which were treated in Erciyes University, department of oral and maxillofacial surgery between 2006 and 2016, were examined. Twenty-two TBCs were detected among all jaw cysts. The patients who have operation notes, pathology report and follow-up radiographies were included the study. Clinical, radiographically, histopathological features of TBCs and follow-up information of the patients were analyzed retrospectively.

Statistical Analysis

SPSS 20.0 was used for statistical analysis. Number, percentage, average were calculated for descriptive statistics.

Results

According to the results of the study, incidence of TBC was found 1.05% (22 in all 2080 jaw cyst). Female and male distributions were found 12 and 10 respectively. Female and male ratio was found 54, 55% and 45, 45% respectively. Mean age was 18.5 ranges from 10 to 52. Mean follow up period of the patients was 3 to 24 month. Trauma history was found in one patient only. Multifocal TBC was found in 2 patients among all cases (Figure 1).

All TBCs treated with curettage and no recurrence was found throughout the follow up period. According to histopathological findings, empty (no epithelial lining), fluid, loose connective tissue and osseous like tissue were found in the cyst cavity. Distributions of the histopathological findings were demonstrated in Table 1.

All teeth that are related to cyst in radiograph were vital. Pain was observed in two patients only. Bone expansion was found towards buccal side in one patient. Diameter of the TBC measured on radiograph ranged from 1 to 4.6 cm. All TBCs were

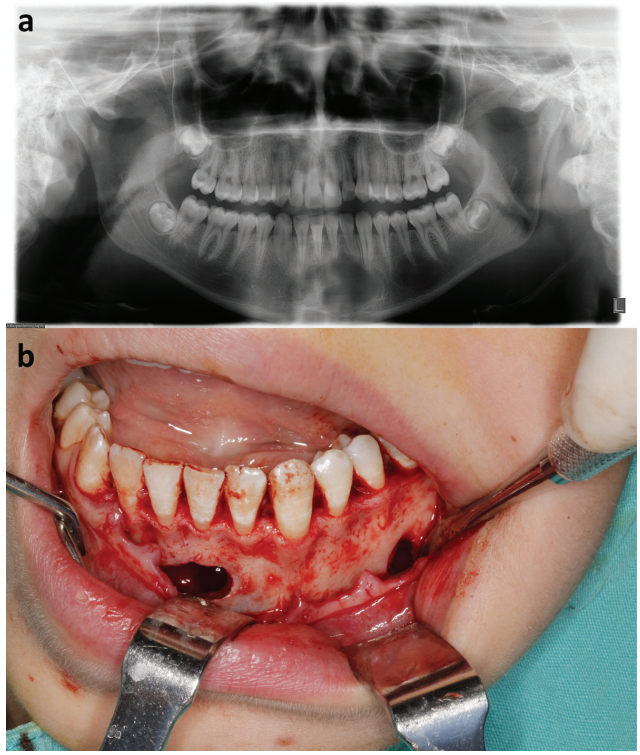

Figure 1. a) Radiographic view of the multifocal lesion at symphysis and left corpus regions; b) Intraoperative view of the TBCs

TBC: Traumatic bone cyst

found in mandible and distributions of the TBCs are demonstrated in Table 2.

All patients were operated under local anesthesia and the curettage of the bone cavity was made. All TBCs healed uneventfully and there was no recurrence of the TBCs in the follow-up period (Figure 2).

Discussion

The pathogenesis of TBC remains unclear and there are various proposed hypotheses in the literature. The commonly accepted theory is trauma that causes a medullary hemorrhage and a subsequent failure of the hematoma results in cavitation (10,18). Despite this theory, there is no trauma history in many patients (19,20). There was only one patient has a trauma history in our retrospective study. Other theories are bone tumor degeneration, altered calcium metabolism, low-grade infection, local alteration in bone growth, venous obstruction, increased osteolysis, local ischemia, the intraosseous incorporation of synovial tissue or a combination of these factors (21-23).

According to several authors, most cases of TBC present in young patient although they may detected any age (15,24). The lesion most commonly occurs in patients aged between 10 and 20 years, most frequently second decade of life (22). In this retrospective study, we found the mean age was 18.5 varying from 10 to 52. The sex distribution is reported to be equal or male affected slightly (1,18,25). But, in our study we found that females were more affected slightly.

The majority of lesion is asymptomatic and detected in routine radiographic examination (22,26). Pain is the most seeing symptom in 10-30% of patients (26). In this study, pain was observed in two patients (9.1%) only. Other symptoms are tooth sensitivity, paresthesia, fistula and pathologic fracture of the mandible. (21,26-29)

The TBCs are usually seen in mandible, especially in posterior area (29,30). A smaller percentage (3.4%) has been found in the maxilla (31). Very unusual locations reported include the condylar process and the zygomatic arch (32,33). In our study, all TBCs were found in mandible; 12 in corpus, 5 in ramus and 5 in symphysis. Rarely, multiple cysts have been found in the same patient reported in the literature (34-38). Multifocal TBC was found in 2 patients (9.1%) among all our cases. The size of the lesion varies from 1 cm to semi-mandible (39,40). Diameter of the TBC measured in our study ranged from 1 to 4.6 cm. Expansion of the cortical bone, usually the buccal cortex, has been

Table 1. Histopathological findings

Histopathological findings	Patient distribution
Loose connective tissue	3 (13.6%)
Empty	16 (61.5%)
Fluid	4 (18.1%)
Osseous like tissue	3 (13.6%)

Table 2. Distributions of traumatic bone cyst in the mandible

Location of TBC	Incidence of TBC (%)
Corpus	12 (54.7)
Ramus	5 (22.7)
Symphysis	5 (22.7)

TBC: Traumatic bone cyst

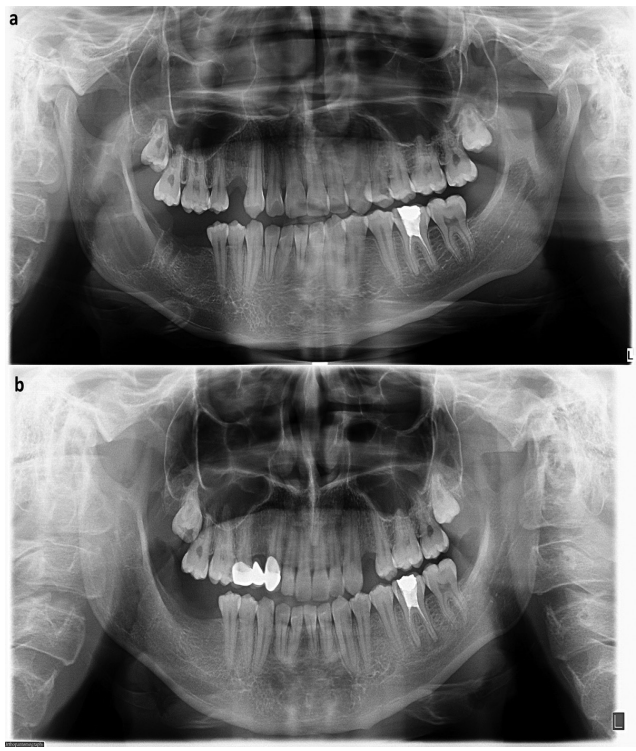

Figure 2. a) Preoperative radiographic view of the unilocular TBC in the right ramus region; b) Postoperative view at 18 month follow up with healing

TBC: Traumatic bone cyst

reported (26) like in our one case. Radiographically, the TBCs are seen as a radiolucent area with an irregular but usually well-defined scalloped borders (22). Most lesions are unilocular, but also multilocular cysts have been found (27,35,40,41) like in our two cases.

In a study of oral biopsy material, only 15 TBCs were found among 7427 cysts of the jaws (42). In this study, the incidence of TBCs was found 1.05% (22 in all 2080 jaw cyst). The histology of TBCs appears mostly an empty bone cavity or present a thin connective tissue membrane lining the pathologic cavity. Cholesterol crystals, hemorrhagic foci, and osteoclasts may be found (12,13,42,43). Thin connective tissue lining was found about 10% of lesions in the literature (22,26). In our study, cyst cavity was found empty in 16 patients (61.5%), fluid in 4 patients (15.3%), loose connective tissue in 3 patients (11.5%) and osseous like tissue in 3 patients (11.5%). The final diagnosis of TBCs is almost made at surgery and available material for histology is usually absent (16). Surgeons usually find an empty cavity, but rarely blood, serum or both (44).

Although spontaneous healing of TBCs has been reported in the literature, the first treatment choice is curettage of the bone walls (40,45). The curettage which generally results in short-term healing (45). In our study, all patients were treated with curettage and no recurrence was encountered throughout the follow up period.

Conclusion

TBCs are rare, and the mandible is generally affected site. Bone healing may be accomplished successfully with the curettage of the cyst cavity.

Ethics

Ethics Committee Approval: Retrospective study.

Informed Consent: Retrospective study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: A.E.D., H.A.Ç., N.K., Z.B.G., A.A., Concept: A.E.D., H.A.Ç., N.K., A.A., Design: A.E.D., H.A.Ç., N.K., A.A., Data Collection or Processing: A.E.D., H.A.Ç., Analysis or Interpretation: A.E.D., H.A.Ç., N.K., A.A., Literature Search: A.E.D., H.A.Ç., Writing: A.E.D., H.A.Ç., N.K.

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