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Maxilliary odontogenic cysts – case reports

Torbiele zębopochodne kości szczęk – opis przypadków

Maxillary and mandibular odontogenic cysts are among the most common pathological lesions within the facial region of the skull [2, 13, 16, 17, 20, 22]. The most common are true cysts, i.e. growths separated from the surrounding tissues by a multilayer capsule of connective tissue, called a cystic follicle. The follicle consists of three layers – the inner layer, formed by epithelial cells, the middle layer – built of basilemma and the outer layer formed by fibrous connective tissue. Epithelial cells of the inner layer secrete a fluid which increases the osmotic pressure within the cyst resulting in hyperplasia of the cyst with simultaneous atrophy of adjacent tissue (i.e. pressure atrophy). In general, cysts are developing as single lesions. Less common multiple growths appear as a single pathological symptom or they accompany such syndromes as Gorlin-Goltz syndrome, Albright syndrome, Grob syndrome, Klippel-Feil syndrome, Gardner syndrome, type VI mucopolysaccharidosis, cleidocranial dysplasia [17, 20]. Usually, both the inflammatory (radicular) and developmental (primordial, gingival, dentigerous and paradental) cysts are growing without any symptoms and sometimes they reach considerable sizes [2, 4, 11, 23].

Radicular and dentigerous cysts are among the most common cysts in the jaw bones. According to Pindborg and Kramer, radicular cysts are classified as epithelial inflammatory cysts, while dentigerous cysts are classified as epithelial developmental odontogenic bone cysts. Epithelial cell rests of Mallassez, which are residues of the enamel organ persistent in the periapical tissue and the inflammatory factor originating from the infected and decaying dental pulp presumably play a key role in the etiology of radicular cysts. A dentigerous cyst may also contain a partially or completely formed tooth or it may totally lack a tooth bud, depending on the phase of odontogenesis. The cysts develop from residuals of enamel epithelium of a growing tooth within the stellate cell layer. They are more commonly observed in the mandible, where they affect mainly the wisdom and second premolar teeth. In the upper jaw, they usually affect the cuspid or third molar teeth [2, 7, 9-11, 13, 18-20, 23]. Non-epithelial, blood (traumatic) and aneurysmal cysts, the etiology of which is not completely understood, are much less common. They should be distinguished from the true cysts [5, 8, 12, 21].

The growth of cysts is a slow process and usually in its initial phase there are no symptoms. Therefore, the lesions are most frequently detected by sheer chance on X-rays made in other indications. Upon growing in size, they cause atrophy and expansion of bone tissue. Other symptoms include: lack of bony resistance, translocation of teeth adjacent to the cyst, impaired sensation upon compressing the inferior alveolar or the sinfraorbital nerve.

Usually, diagnosis of a cyst does not give rise to any difficulties. It is based upon the analysis of X-rays; a puncture may be helpful. On X-rays, the lesion produces a regular, usually sharply limited depletion of the shadow that in most cases is ball-shaped in the upper jaw and oval-shaped in the mandible. Fluid drawn from a non-infected cyst is amber in color and shows opalescence specific for crystals of cholesterol. Ultimate confirmation of diagnosis always requires histopathological examination [2, 3, 11, 12, 22].

CASE REPORTS

Case 1

Male patient P.D. was admitted to Maxillofacial Surgery Department of MU of Lublin due to expansion of the body of the mandible associated with pain and inflammatory infiltration within the anterior segment. Radiological examination (pantomogram) revealed an extensive lesion located within the body of the mandible that was covering the area from tooth #33 to tooth #45. The lesion caused bone depletion with sharp borders and an irregular shape. Significant root resorption of teeth #32, #31, #41, #42, #43, and #44, affecting over ⅔ of root length was noted.

Fig. 1. Surgery under general anesthesia was performed in 2007. During the surgery, the lesion was concomitantly and completely enucleated and pathologically resorbed teeth stuck within the lesion were extracted. The material was sent for histopathological examination and a radicular cyst was diagnosed. The healing process after the surgical procedure was free of any complications

Case 2

Female patient A.D., age 33, came to Maxillofacial Surgery Department of MU at Lublin due to multiple cysts of the mandible. The lesion was decompressed in the first phase of the treatment and a six-hole metal plate was assembled on the body and branch of the mandible to prevent pathological fracture of the bone.

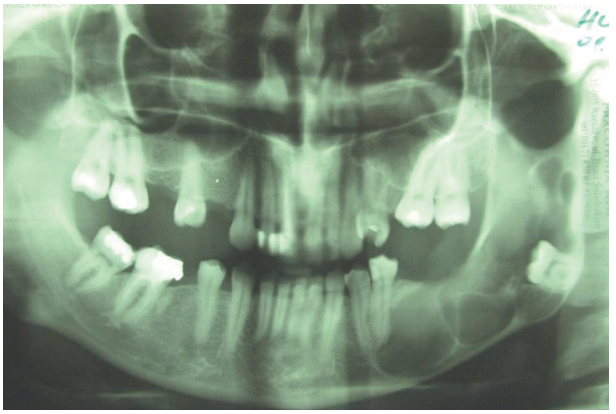

Fig. 2. Orthopantomogram, condition at the patient's admission to the facility

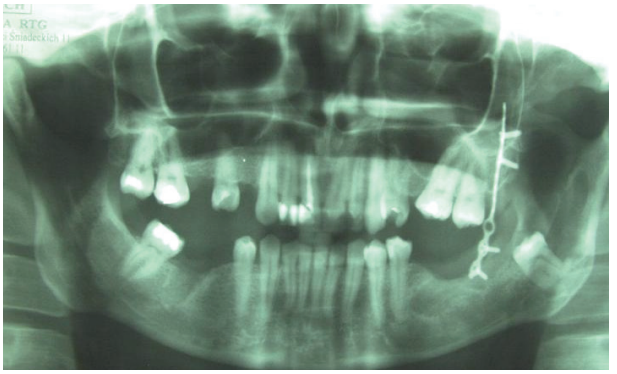

Fig. 3. Condition following the fixing a six-hole metal plate

Fig. 4. Computer tomography of the patient, a 3D reconstruction depicting the size of the lesion

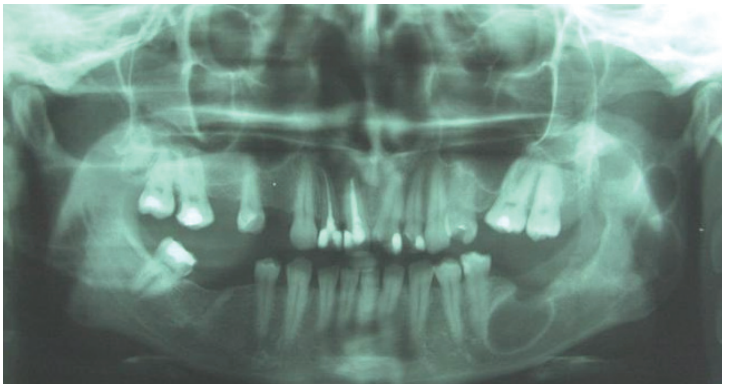

Fig. 5. Condition following extraction of the impacted tooth
and enucleation of the cyst; noticeable restoration of the bony tissue

Case 3

Male patient J.M., age 58, was admitted to Maxillofacial Surgery Department of MU in Lublin due to inflammatory infiltration affecting the left cheek and mandible. The inflammatory condition subsided after extraction of persistent molar teeth roots and a treatment with antibiotics. The patient was directed for volumetric examination of the facial part of the skull (a 3D pantomogram) for further diagnostics. The examination revealed two osteolytic lesions within the anterior segment of the mandible body: a smaller one, spherical, well separated, approx. 10 mm in diameter

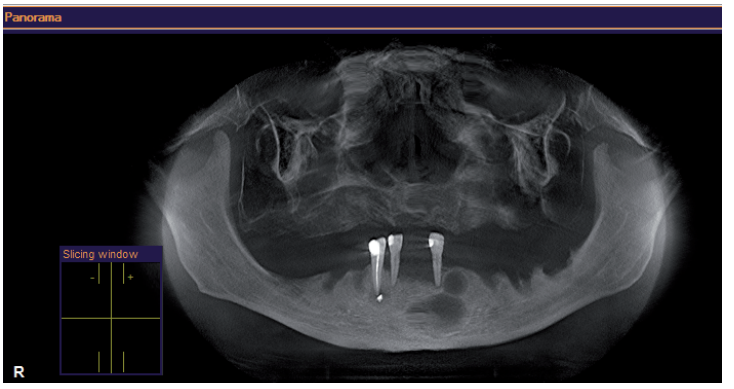

Fig. 6. 3D pantomogram, an osteolytic lesion within the mandible base

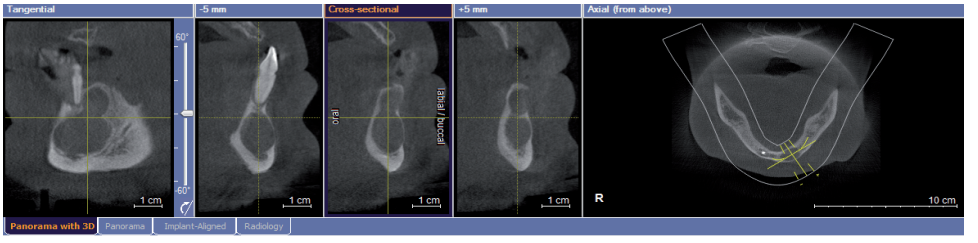

Fig. 7. Cross-section (3D pantomogram) through the mandible base illustrating the size of the lesion

and a larger one, oval, located in the basal part of the mandible, approx. 20×12×16 mm in size. Enucleation of both cysts with extraction of tooth #31 was performed under ambulatory conditions and under local anesthesia. Histopathological verification of the radicular cyst was positive.

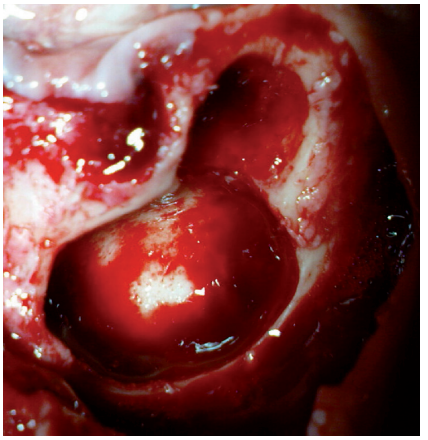

Fig. 8. Condition after enucleation of the radicular cyst

DISCUSSION

Unlike the treatment of periapical granuloma, conservative therapy of cystic lesions of the jaws rarely gives positive outcome [3, 14, 15]. In the majority of cases, the treatment involves complete, concomitant enucleation of the cystic follicle followed by microscopic examination of the specimen to confirm diagnosis and exclude other lesions. It is of the utmost importance to distinguish cyst-like tumors with benign, semi-malignant (in particular adamantoblastoma) and malignant neoplasms from inflammatory or vascular lesions and systemic diseases [2, 4, 9, 11-14, 16, 20, 22, 23]. At present, a two-step method that involves provisional transformation of the cystic cavity in an additional diverticulum of the oral cavity is less and less frequently used. A stepwise approach was supposed to ensure inhibition of the lesion growth prior to its complete enucleation and to reduce the scope of the second procedure. The approach has been frequently used for the treatment of large cysts. The drawbacks of this approach include the use of acrylic obturators in order to prevent obliteration of a decompressed cystic cavity and the risk of metaplastic lesions in the remaining cystic follicle. Cieślik et al. suggest an alternative concomitant osteoplastic method of treating large mandibular cysts involving an extraoral approach. The method involves excision of an external lamella over the cystic capsule and its restoration after enucleation of the lesion [4]. Definitive selection of the treatment method always depends on the type of the cyst, its location, size and age and general condition of the patient.

The approach to causal teeth has to be decided individually. In patients of adolescent age, efforts are usually undertaken to leave it in place in order to avoid facial-maxillary-occlusal disturbances. The teeth that were left after enucleation of a cyst frequently require an orthodontic treatment in order to insert them into the mandibular arch. A preserved tooth bud could also be helpful in replantation

within the cavity formed after removal of a cyst or in its vicinity, frequently with allogenic bone graft or insertion of a bone substitute material. Commonly, a radicular cyst enucleation procedure requires concomitant resection of the causal tooth's root apex and its prior endodontic treatment. In case of significant resorption of roots or if the lesion has affected more than 1\3 of their length, the teeth should be extracted since their maintaining in the oral cavity is no longer possible.

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SUMMARY

Bone odontogenic cysts are a very common surgical problem in maxillofacial area. A wide range of cystic lesions in maxillofacial bones require very careful surgical procedure to avoid or minimize complications associated with adjacent teeth, germs and other anatomical structures. Contemporary diagnostic such tools such as computed tomography and new volumetric tomography are very useful in preliminary diagnostics and treatment planning. Here we describe three different cases illustrating the diagnostic approach and complexity of treatment of odontogenic cysts.

STRESZCZENIE

Torbiele zębopochodne szczęki i żuchwy są często spotykanym problemem chirurgicznym w zakresie kości twarzoczaszki. Rozległe zmiany o charakterze torbieli wymagają ostrożnej techniki operacyjnej w celu uniknięcia lub zminimalizowania ryzyka powikłań ze strony sąsiadujących zębów, zawiązków zębów i innych struktur anatomicznych twarzoczaszki. Współczesne metody diagnostyki obrazowej, takie jak tomografia komputerowa i wolumetryczna są bardzo użytecznym narzędziem w diagnostyce przedzabiegowej. W pracy prezentowane są trzy przypadki rozległych torbieli zębopochodnych z uwzględnieniem diagnostyki przedoperacyjnej i postępowania leczniczego.