

Petia F. Pechalova¹, Angel G. Bakardjiev²

Ciste u čeljusti: kliničko ispitivanje 621 slučaja

Cysts of the Jaws: a Clinical Study of 621 Cases

¹ Zavod za maksilofacijalnu kirurgiju Stomatološkog fakulteta Medicinskog sveučilišta u Plovdivu, Bugarska
Department of Maxillo-Facial Surgery, Faculty of Dental Medicine, Medicine University, Plovdiv, Bulgaria

² Zavod za oralnu kirurgiju Stomatološkog fakulteta Medicinskog sveučilišta u Plovdivu, Bugarska
Department of Oral Surgery, Faculty of Dental Medicine, Medicine University, Plovdiv, Bulgaria

Sažetak

Svrha rada: Ciste u čeljusti mnogo su češće nego u drugim kostima zbog razvojnih, odontogenih, rezidualnih te epitelnih tkiva u tom području. Ovo je istraživanje imalo zadatak da klinički i epidemiološki analizira pacijente sa cističnim lezijama liječene na Maksilofacijalnoj klinici Sveučilišne bolnice u Plovdivu, u Bugarskoj. **Ispitanici i postupci:** Pregledana je 621 cista u jednoj čeljusti kod 594 pacijenta - odontogene ciste činile su 97,1%±0,67%. **Rezultati:** Radikularne ciste bile su najčešći oblik ciste u čeljusti (435 cista - 70,1%), a zatim su slijedile dentigerozne (146 cista - 23,5%) kao najčešće u prvom i drugom desetljeću života. Rezidualnih cista bilo je 112 (18%). Prosječna dob pacijenata bila je 35,3±0,73 godine. Ciste su bile češće u gornjoj negoli u donjoj čeljusti ($t = 2,33$; $P < 0,05$). Radikularne ciste uglavnom su zahvaćale alveolarni greben gornje čeljusti (204 ciste ili 46,9% svih radikularnih cista). **Zaključak:** Dentigerozne ciste razvijale su se češće u donjoj čeljusti (106 cista ili 72,6% svih dentigeroznih cista), posebice u tijelu mandibule (89 cista ili 61%).

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Adresa za dopisivanje

Dr. Petia F. Pechalova
Medicinsko sveučilište
Stomatološki fakultet
Zavod za maksilofacijalnu kirurgiju
Pestersko shose br. 66
Plovdiv, Bulgaria
Tel: 0359/ 898 468 498
pechalova@abv.bg

Ključne riječi

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Uvod

Ciste u čeljusti mnogo su češće nego u drugim kostima zbog razvojnih, odontogenih, rezidualnih te epitelnih tkiva u tom području (1,2). Cistične lezije snažno djeluju na destrukciju kostiju (3). Prema stajalištu Svjetske zdravstvene organizacije, dijele su na dvije velike skupine: s epitelom ili bez nje (4,5). Radikularne ciste podrijetlom su upalne, a dentigerozne i odontogene potječu od razvojnih ostataka (6).

Ovo je istraživanje imalo zadatak da klinički i epidemiološki analizira pacijente sa cističnim lezijama liječene na Maksilofacijalnoj klinici Sveučilišne bolnice u Plovdivu, u Bugarskoj.

Introduction

Cysts occur in the jaws more commonly than in any other bone due to the presence of developmental, odontogenic, residual, epithelial tissue (1, 2). Cystic lesions play a key role in jaw destruction (3). According to the World Health Organization Criteria cysts are classified into two major groups – with or without an epithelial lining (4, 5). Radicular cysts are inflammatory in their origin, whereas dentigerous cysts and odontogenic keratocysts arise from developmental remnants (6).

The present study aimed at providing a clinical and epidemiological analysis of patients with cystic lesions, treated at the Clinics of Maxillo-Facial Surgery, University Hospital, Plovdiv, Bulgaria.

Materijal i metode

Istraživanje je trajalo 10 godina - od 1998. do 2007., a analiza se temeljila na kliničkim podacima pacijenata. Svi s konačnom dijagnozom ciste u gornjoj ili donjoj čeljusti na temelju klasifikacije Svjetske zdravstvene organizacije (4) iz godine 1992. bili su uključeni u istraživanje, a liječeni su na Maksilofacijalnoj klinici Sveučilišne bolnice u Plovdivu. Ispitane su sljedeće varijable: distribucija prema dobi i spolu, etiologija, patohistološka dijagnoza, lokalizacija, kliničke karakteristike te zahvaćeni zubi. Podaci su analizirani u programu SPSS 11,0.

Rezultati

Tijekom 10 godina liječena su 594 pacijenta sa 621 cistom, te oni predstavljaju 5,41% svih tretiranih pacijenata. Solitarnu cistu imalo je njih 96,3%, zatim je 3% imalo dvije ciste, a 0,5% tri. Jedan je pacijent imao četiri ciste u čeljusti.

Medijan dobi pacijenata u ispitivanoj skupini iznosio je $35,3 \pm 0,73$ godine.

Postotak muškaraca s cistama bio je veći nego li žena, a razlika je statistički bila velika ($t = 3,5$, $P < 0,01$). Odnos muškaraca i žena iznosio je 1,22:1.

Većina cista bila je upalna – njih 435 (70,1%, $Sp = 1,84\%$) te su histološki potvrđene kao radikularne. Dentigeroznih je bilo 146 (23,5%, $Sp = 1,70\%$), odontogenih 22 (3,5%, $Sp = 0,74\%$), a neodontogenih (fisuralnih i pseudocista) 18 (2,94%, $Sp = 0,67\%$). Nevoidni karcinom bazalnih stanica (Gorlin-Goltzev sindrom) dijagnosticiran je kod dva od 22 pacijenta s odontogenim keratocistama.

Nije bilo statistički znatne razlike između muškaraca i žena kad je riječ o tipskoj distribuciji cista ($\chi^2 = 3,29$, $P = 0,35$), ali je dokazana statistički velika povezanost između dobi pacijenata i vrsta cista ($\chi^2 = 209,64$, $P < 0,0001$ - Slika 1.).

Povezanost vrste ciste i dobi potvrđena je jednosmjernim testom ANOVA. Statistička analiza pokazala je znatnu razliku između četiriju ispitivanih vrsta cista ($F = 38,9+$, $P < 0,0001$). Prosječna dob pacijenata s odontogenom keratocistom ($44,5 \pm 4,48$) te radikularnom ($39,38 \pm 0,78$) bila je najviša, a dob onih s dentigeroznom najniža ($22,63 \pm 1,56$). Prosječna dob pacijenata s neodontogenom cistom bila je $28,17 \pm 2,35$ godina.

Od ukupno 621 ciste, 112 (18%) je bilo rezidualnih, 44 (7,1%) egzacerbirajućih te 15 (2,4%) rekurentnih (vidi Tablicu 1).

Materials and methods

The study was conducted over a ten year period – from 1998 through 2007. Analysis was based on patients' clinical records. All patients with final pathological diagnosis "cyst" of the upper and lower jaw based on World Health Organization classification from 1992 (4) were enrolled in the study. They received treatment at the Clinics of Maxillo-Facial Surgery, University Hospital, Plovdiv, Bulgaria. The following variables were tested: sexual and age distribution, etiology, pathological diagnosis, location, clinical features and engaged teeth groups. SPSS 11.0 software was used for data processing.

Results

Five hundred ninety four patients with 621 cysts received treatment over the ten year period. They present 5.41% of all treated patients. 96,3% of the patients had a solitary cyst, 3% presented with two cysts, in 0.5% three cysts were observed. One patient had four jaw cysts.

The median patients' age in the studied group was 35.30 ± 0.73 years.

The percentage of men with jaw cysts was higher compared to that of women, the difference being statistically significant ($t = 3.50$, $P < 0.01$). Males to females ratio was 1.22:1.

Most of the cysts were inflammatory in their origin – 435 cysts (70.1%, $Sp = 1.84\%$) were histologically verified as radicular. One hundred forty six of the cysts were identified as dentigerous (23.5%, $Sp = 1.70\%$). Twenty two were odontogenic keratocysts (3.5%, $Sp = 0.74\%$). Eighteen cysts were non-odontogenic (fissural and pseudo - cysts) (2.9%, $Sp = 0.67\%$). Nevoid-basal cell carcinoma (Gorlin-Goltz) syndrome was clinically confirmed in 2 of all 22 patients with odontogenic keratocysts.

Regarding cysts distribution according to type, no statistically significant difference was found between men and women ($\chi^2 = 3.29$, $P = 0.35$).

Cyst distribution according to age and type showed a statistically significant association between patients' age and cyst type ($\chi^2 = 209.64$, $P < 0.0001$) – Figure 1.

The presence of an association between cyst type and patients' median age was confirmed using one-way ANOVA. Statistical analysis demonstrated a statistically significant difference among the studied four cyst types ($F = 38.89$, $P < 0.0001$). The average age of patients' with odontogenic keratocysts (44.50 ± 4.48) and radicular cysts (39.38 ± 0.78)

Slika 1. Distribucija cista s obzirom na dob pacijenta

Figure 1 Cyst distribution according to age

Tablica 1. Distribucija 621 odontogene i neodontogene ciste po karakteristikama (“rezidualna”, “egzacerbirajuća”, “rekurentna”)

Table 1 Distribution of 621 odontogenic and nonodontogenic cysts by characteristics “residual”, “exacerbate”, “recurrent”

Histološki tip ciste • Histological type of cysts		Rezidualna • Residual	Egzacerbirajuća • Exacerbate	Rekurentna • Recurrent	Bez osobitosti • Without special features	Ukupno • Total
Radikularna • Radicular	Broj • Number %	110 25.3%	40 9.2%	9 2.1%	276 63.4%	435 100%
Dentigerozna • Dentigerous	Broj • Number %	1 0.7%	3 2.1%	1 0.7%	141 96.6%	146 100%
Odontogena keratocista • Odontogenic keratocysts	Broj • Number %	1 4.5%	1 4.5%	4 18.2%	16 72.7%	22 100%
Neodontogena • Nonodontogenic	Broj • Number %	0 0%	0 0%	1 5.6%	17 94.4%	18 100%
Ukupno • Total	Broj • Number %	112 18.0%	44 7.1%	15 2.4%	450 72.5%	621 100%

Tablica 2. Distribucija 621 odontogene i neodontogene ciste po lokalizaciji (moguća je lokalizacija u više od jednog područja)

Table 2 Distribution of 621 odontogenic and nonodontogenic cysts by localization (localization in more than one area is possible)

Histološki tip ciste • Histological type of cysts		Lokalizacija u gornjoj čeljusti • Location in the upper jaw			Lokalizacija u donjoj čeljusti • Location in the lower jaw			
		alveolarni greben • alveolar ridge	maksilarni sinus • maxillary sinus	tvrdo nepce • hard palate	brada • mentum	baza • base	kut • angle	ramus
Radicular/ Radikularna	Broj • Number %	204 84.6%	71 83.5%	4 40.0%	55 77.5%	115 51.8%	22 33.3%	15 33.3%
Dentigerous/ Dentigerozna	Broj • Number %	25 10.4%	14 16.5%	1 10.0%	12 16.9%	89 40.1%	30 45.5%	17 37.8%
Keratocysts/ Keratocista	Broj • Number %	3 1.2%	0 0%	1 10.0%	3 4.2%	14 6.3%	13 19.7%	13 28.9%
Nonodontogenic/ Neodontogena	Broj • Number %	9 3.7%	0 0%	4 40.0%	1 1.4%	4 1.8%	1 1.5%	0 0%
Total/Ukupno	Broj • Number %	241 100%	85 100%	10 100%	71 100%	222 100%	66 100%	45 100%

U donjoj čeljusti bilo je pronađeno 290 cista (46,7%, Sp = 2%), a u gornjoj 331 (53,3%, Sp = 2%), pa je i razlika bila statistički znatna ($t = 2,33$, $P < 0,05$). Ciste u gornjoj čeljusti bile su češće.

Testom Hi-kvadrat bila je ustanovljena statistički velika razlika između vrsta i lokacije cista ($\chi^2 = 48,88$, $P < 0,0001$) – vidi Tablicu 2.

Odontogenih cista bilo je 603 te su činile 97,1±0,67% svih cista. U gornjoj čeljusti bilo ih je 320 (53,1%), a u donjoj 283 (46,9%).

Odontogene ciste razvile su se oko 1305 zuba, radikularne prosječno 2,3 zuba, dentigerozne oko 1,5, a keratociste prosječno oko 4,3 zuba. Odontogene ciste bile su uglavnom uz donje kutnjake i sjekutiće te gornje pretkutnjake, a rijetko oko donjih očnjaka (Tablica 3.).

Rezidualne ciste zahvaćale su distalna područja gornje čeljusti i to uz ekstrahirane kutnjake i pretkutnjake (Slika 2.).

was the highest, and that of patients' with dentigerous cysts (22.63±1.56) was the lowest. The average age of patients' with nonodontogenic cysts was 28.17±2.35 years.

Out of all 621cysts, 112 (18%) were residual, 44 (7.1%) were exacerbated and 15 (2.4%) – recurrent (Table 1).

Two hundred ninety of the studied cyst were located in the lower jaw (46.7%; Sp= 2.00%) and 331 cysts were located in the upper jaw (53.3%, Sp=2.00%), the difference being statistically significant ($t=2.33$; $P<0.05$). In the upper jaw cysts occurred more frequently.

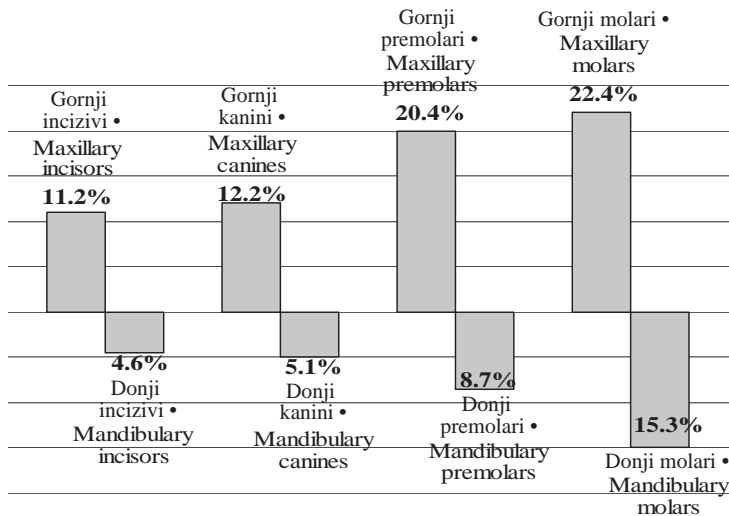
Using χ^2 , a statistically significant difference was established between cyst type and cyst location ($\chi^2=48.88$, $P<0.0001$) – Table 2.

Odontogenic cysts were 603 and presented 97.10±0.67% of all cysts. Of them 320 (53.1%) were located in the upper jaw and 283 (46.9%) were located in the lower jaw.

Odontogenic cysts developed around 1305 teeth. Radicular cysts comprise mean 2.3 teeth, dentigerous – 1.5 teeth, keratocysts – 3.4 teeth. Odontogen-

Tablica 3. Različiti tipovi odontogenih cista te njihova lokacija prema skupinama zuba
Table 3 Different odontogenic cyst types and their location according to teeth groups

Čeljust • Jaws	Skupine zuba • Teeth groups	Radikularne ciste • Radicular cysts	Dentigerozne ciste • Dentigerous cysts	Keratociste • Keratocysts	Ukupno • Total	
Gornja čeljust • Upper jaw	Sjekutići • Incisors	broj zuba • number of teeth %	203 20%	3 1.4%	8 10.7%	214 16.3%
	Očnjaci • Canines	broj zuba • number of teeth %	86 8.5%	20 9.3%	2 2.7%	108 8.3%
	Pretkutnjaci • Premolars	broj zuba • number of teeth %	191 18.8%	12 5.6%	4 5.3%	207 15.9%
	Kutnjaci • Molars	broj zuba • number of teeth %	167 16.4%	17 7.9%	4 5.3%	188 14.4%
Donja čeljust • Lower jaw	Sjekutići • Incisors	broj zuba • number of teeth %	96 9.4%	18 8.4%	10 13.3%	124 9.5%
	Očnjaci • Canines	broj zuba • number of teeth %	41 4.0%	15 7.0%	5 6.7%	61 4.7%
	Pretkutnjaci • Premolars	broj zuba • number of teeth %	89 8.8%	79 36.9%	12 16%	180 13.8%
	Kutnjaci • Molars	broj zuba • number of teeth %	143 14.1%	50 23.4%	30 40%	223 17.1%
Ukupno • Total	broj zuba • number of teeth %	1016 100%	214 100%	75 100%	1305 100%	



Slika 2. Rezidualne ciste i zubi
Figure 2 Residual cysts and their adjacent teeth

ic cysts developed most frequently, adjacent to the lower jaw molars, followed by the incisors and the premolars of the upper jaw. Odontogenic cysts were rare around the canines of the mandible (Table 3).

Residual cysts affected predominantly the distal areas of the maxilla – areas adjacent to extracted molars and premolars (Figure 2).

Rasprava

Naše je istraživanje pokazalo da su 603 ciste (97,1±0,67%) od 621 analizirane bile odontogene. Tortorici je sa suradnicima dijagnosticirao 1273 (97,2%) odontogene ciste od 1310 (7), Grossmann i njegovi kolege pregledali su 2905 cista u čeljusti te pronašli da je 2812 bilo odontogenih, a 93 su bile neodontogene (8). Drugi autori također navode da odontogene ciste predstavljaju 90% svih cista u čeljusti (4,9).

U ovom istraživanju omjer cista gornje čeljusti prema onima u donjoj iznosio je 1,1:1. Varinauskas i suradnici dobili su sličan odnos – 1,5:1. Taj se fenomen vjerojatno može objasniti anatomskim i topografskim razlikama u čeljustima (10).

Na temelju klasifikacije Svjetske zdravstvene organizacije iz godine 1992., a u odnosu prema razdoblju kada su zabilježene (1998. – 2007.), te uspoređujući ih s rezultatima iz literature, pronašli smo da su radikularne ciste najčešća vrsta (435, 70%). Zatim slijede one dentigerozne (146, 23,5%) te odontogene keratociste (22, 3,5%). Ti su podaci u skladu s podacima iz literature, bez obzira na opisane podatke i incidenciju (Tablica 4.).

Muškarci su činili 55,1% ispitanika, a žene 44,9% (1,22:1). Distribucija prema spolu u istraživanju Grossmanna i suradnika bila je sljedeća: 49,26% žene i 48,78% muškarci te u nekim sluča-

Discussion

Our study showed that 603 (97.10±0.67%) of 621 cysts were odontogenic. Tortorici et al. in their research work established 1 273 (97.2%) odontogenic cysts out of 1 310 cysts studied (7). Grossmann et al. examined 2 905 jaw cysts – 2 812 odontogenic and 93 nonodontogenic (8). Other authors also report that odontogenic cysts present 90% of all cysts of the jaws (4, 9).

In the present study, the ratio of upper jaw cysts to lower jaw cysts was 1.1:1. Varinauskas et al. report a similar ratio of upper to lower jaw cysts - 1.5:1. The anatomic and topographic differences of the jaws are a likely explanation of this phenomenon (10).

Based on the 1992 WHO classification with relation to observed period (1998 – 2007) and comparing results with the literature we found that radicular cysts were the most common cyst type - 435 (70%), followed by dentigerous cysts - 146 (23.5%) and odontogenic keratocysts – 22 (3.5%). This data is consistent with the findings presented by other authors, regardless of the wide spectrum of reported data on their incidence (table 4).

In our study 55.1% were men, 44.9% were women (1.22:1). Gender distribution in the study by Grossmann et al. was 49.26% for female and 48.78% for male with note that in some cases gender was undetermined (8). Tortorici et al. report that in their

Tablica 4. Frekvencija radikularnih i dentigeroznih cista te odontogenih keratocista u ovom istraživanju u odnosu na podatke iz literature
Table 4 Frequency of radicular cysts, dentigerous cysts and odontogenic keratocysts in the present study compared with literature data

	Radikularne ciste • Radicular cysts	Dentigerozne ciste • Dentigerous cysts	Odontogene keratociste • Odontogenic keratocysts
Pechalova & Bakardjiev	70%	23.5%	3.5%
Ioannidou et al. (1989) ²¹	59.6%	12%	-
Kreidler et al. (1993) ²²	56.9%	21.3%	10.6%
Daley et al. (1994) ¹⁸	65.1%	24%	4.8%
Nakamura et al. (1995) ¹⁹	41.2%	27%	7.7%
Arotiba et al. (1998) ²³	61.9%	19%	14.3%
Ledesma-Montes et al. (2000) ²⁴	38.8%	35.5%	18.8%
Rim et al. (2000) ²⁵	64%	23%	5.3%
Mosqueda-Taylor et al. (2002) ³	39.9%	33%	21.5%
Bataineh et al. (2004) ²⁶	41.7%	24.8%	6%
Koseoglu et al. (2004) ¹²	59%	14%	27%
Jones et al. (2006) ¹⁵	52.3%	18.1%	11.6%
Meningaud et al. (2006) ¹³	53.5%	22.3%	19.1%
Varinauskas et al. (2006) ¹⁰	86.2%	13.7%	-
Ochsenius et al. (2007) ¹⁴	50.7%	18.5%	14.3%
Grossmann et al. (2007) ⁸	61%	25.3%	7.2%
Tortorici et al. (2008) ¹¹	84.5%	11.4%	17%

jevima neodređen/nepoznat spol (8). Tortorici i suradnici imali su u ispitnoj skupini 54% muškaraca i 46% žena (11). Koseoglu i njegovi kolege (12) pregledali su 90 pacijenata s cistama - 48 muškaraca i 42 žene. Meningaud i suradnici pregledali su više od 695 pacijenata, a odnos muškaraca i žena bio je 1,86:1 (13). Mosqueda-Taylor i njegovi kolege imali su između 856 pacijenata 52,5% muškaraca, no spol je bio nepoznat u 0,5% slučajeva. Analiza 2944 odontogene ciste također je potvrdila dominaciju muškaraca – 52,8% prema 47,2% žena (14). Podaci Jonesa i suradnika o 7212 odontogenih cista pokazali su da su gotovo polovica ispitanika (51,5%) bili muškarci (15).

Naši podaci pokazali su da su odontogene ciste češće kod muškaraca – kod njih je dijagnosticirano 57,7% radikularnih, 52,7% dentigeroznih te 54,5% keratocista. Tortorici i suradnici pronašli su kod svojih pacijenata 53,5% radikularnih cista, 61,6% dentigeroznih i 52,9% keratocista (11). Kod Meningauda i kolega omjer je kod radikularnih cista iznosio 234:138 u korist muškaraca, kod dentigeroznih 108:46 te kod keratocista 87:46 (13). Podaci Koseoglua i suradnika potvrđuju naše rezultate - kod njih je odnos muškaraca i žena bio 30:23 kod radikularnih cista te 7:6 kod dentigeroznih cista. Samo podaci skupljeni u Južnoj Americi pokazuju da su radikularne ciste češće kod žena. Mosqueda-Taylor i suradnici dobili su u Meksiku slične rezultate – den-

study 54% of the patients with cysts were males and 46% were females (11). The study of Koseoglu et al. comprised 90 patients with cysts - 48 were men and 42 were women (12). In a study conducted by Meningaud et al. over 695 patients, the male to female ratio was 1.86:1 (13). In Mosqueda-Taylor et al. research work on 856 cases, the male sex (52.5%) was predominant over the female - 47.0% (in 0.5% of the cases sex was unknown) (3). An investigation on 2 944 odontogenic cysts also established a male predominance - 52.8% men versus 47.2% women (14). Data from Jones et al. on 7 121 odontogenic cysts demonstrated that 51.5% of the patients with odontogenic cysts were males (15).

Our data revealed that odontogenic cysts were prevalent in men – 57.7% of the radicular, 52.7% of the dentigerous and 54.5% of the keratocysts were diagnosed in men. Tortorici et al. report that 53.5% of the radicular, 61.1% of the dentigerous and 52.9% of the keratocysts were identified in men (11). In Meningaud et al. study, the male to females ratio is 234:138 in radicular cysts, 108:46 in the dentigerous cysts and 87:46 (13) in keratocysts. Data from Koseoglu et al. confirm our findings: the male to female ratio is 30:23 in radicular cysts and 7:6 in dentigerous cysts. Only in odontogenic keratocysts, the male to female ratio was 11:13 (12). Interestingly, there is data from South America, that radicular cysts are predominant in females. Mosqueda-Tay-

tigerozne ciste i odontogene keratociste bile su češće kod muškaraca - 56,9%, odnosno 58,7%. Suprotno tome, postotak radikalnih cista bio je viši kod žena - 55,8% (3). U Čileu su Ochsenius i njegovi kolege ustanovili slično stanje – odnos žena s radikalnim cistama prema muškarcima iznosio je 51,8%:48,2%, dok je postotak muškaraca s dentigeroznim cistama i odontogenim keratocistama bio viši - 63%, odnosno 54,9% (14).

Naši podaci pokazali su da su neodontogene ciste češće kod žena – 61,1%. Slično je istaknuo i Tortorici sa suradnicima (11) – 56,8%. Postoje podaci prema kojima su aneurizmalne koštane ciste (16) te one solitarne koštane (15) češće kod žena. No, ostala su istraživanja pokazala podjednaku zastupljenost obaju spolova (17).

Prosječna dob pacijenata u ovom istraživanju iznosila je $35,3 \pm 0,73$ godine, što se može usporediti s populacijom koju su ispitali Tortorici i suradnici (11) – $35,1 \pm 16,7$ godina. Srednja dob koju su ustanovili Varinauskas i njegovi kolege nakon što su pregledali 850 odontogenih cista iznosila je 35,8 godina (10). Meningaud i suradnici imali su mnogo stariju populaciju – $41,8 \pm 15,8$ godina (13).

U našem istraživanju je srednja dob pacijenata s radikalnim cistama iznosila $39,3 \pm 0,78$ godina. Tortorici i suradnici naveli su srednju dob pacijenata s radikalnim cistama od $35,6 \pm 16,1$ godinu (11). Jones i kolege imali su pacijente sa srednjom dobi od 37,3 godina (15), a Ochsenius sa suradnicima ustanovio je da su radikalne ciste najčešće u trećem desetljeću (14).

Kad je riječ o dentigeroznim cistama, srednja dob naših ispitanika iznosila je $22,63 \pm 1,56$ godina. Ti su podaci u skladu s podacima Sheara i Speighta koji su istaknuli da je to najčešći oblik cista u prvom desetljeću života te da njihova incidencija raste tijekom drugog desetljeća, a vrhunac doseže u trećem (6). Daley i Wysocki navode slične podatke (18). No, Ochsenius i suradnici kažu da je vrhunac u drugom desetljeću (14). Ostali autori navode da su dentigerozne ciste najčešće u prvih dvadeset godina (11,13). Naši podaci pokazuju da je 66,4% svih dentigeroznih cista dijagnosticirano kod pacijenata mlađih od 20 godina, što je u skladu s analizama Nakamure i suradnika koji su ispitujući 259 dentigeroznih cista ustanovili da se 60% nalazilo kod pacijenata do dobi od 20 godina (19).

U našem je istraživanju prosječna dob ispitanika s odontogenim keratocistama iznosila je $44,5 \pm 4,48$ godina te su one bile najčešće u petom i šestom desetljeću te zatim u drugom i sedmom. Podaci iz li-

lor et al. research in Mexico provides similar data – dentigerous and odontogenic keratocysts are prevalent in men - 56.9% and 58.7% respectively. On the contrary, the percentage of radicular cysts is higher in women – 55.8% (3). In Chile, Ochsenius et al. present similar data – in radicular cysts the male to female ratio is: 48.2%:51.8%, whereas in dentigerous and keratocysts the male sex is predominant – 63.0% and 54.9% respectively (14).

Our data showed that non-odontogenic cysts were more common in females – 61.1%. Data from Tortorici et al. is similar – 56.8% of non-odontogenic cysts occur in women (11). There is data in the literature that aneurismal bone cysts (16) and solitary bone cysts (15), are more frequent in women, compared to men. However, other studies have documented equal distribution in both sexes (17).

The average age of patients included in this study was 35.30 ± 0.73 years. It is comparable with the data from Tortorici et al. – 35.1 ± 16.7 years (11). Patients' median age established by Varinauskas et al. in a study of 850 odontogenic cysts was 35.8 years (10). In a study by Meningaud et al. over 695 odontogenic cysts, the median age of patients was significantly higher - 41.8 ± 15.8 years (13).

In our study the average age of patients with radicular cysts was 39.38 ± 0.78 years. Tortorici et al report a median age of patients with radicular cysts - 35.6 ± 16.1 years (11); Jones et al report an average age of 37.3 years (15). Ochsenius et al. found out that radicular cysts were most common in the third decade of life (14).

Our data showed that the average age of patients with dentigerous cysts is 22.63 ± 1.56 years. This data is consistent with the data presented by Shear and Speight. They established that dentigerous cysts were the most common cysts in the first decade of life; their incidence was on the rise in the second decade and peaked in the third decade of life (6). Daley and Wysocki report similar findings (18). However, Ochsenius et al. demonstrated a peak of dentigerous cysts in the second decade of life (14). Other authors showed that dentigerous cysts were most frequent in the first two decades of life (11, 13). Our findings show that 66.4% of the dentigerous cysts are diagnosed in patients up to 20 years of age. These findings are consistent with the data from Nakamura et al. Who, in a study of 259 dentigerous cysts, established that 60% of them were seen in patients up to 20 years of age (19).

In our study the average age of patients with odontogenic keratocysts was 44.50 ± 4.48 years.

terature govore o bimodalnoj distribuciji dobi kod odontogenih keratocista, s prvim vrhuncem u drugom i trećem desetljeću te drugim u petom i sljedećim desetljećima (6,14,15).

Također smo pronašli da je 2,4% cista bilo rekurentno - najčešće su se ponovno javljale odontogene keratociste (18,2%), što je u skladu s literaturom (6,8). Odontogene ciste kao komponenta Gorlin-Goltzova sindroma imaju sklonost agresivnom rekurentnom pojavljivanju (8).

U našem je istraživanjem ustanovljeno da je 18% analiziranih cista bilo rezidualno. U usporedbi s ranije objavljenim podacima (11,2% (14), 10,77% (10), 8,8% (20), 2,2% (3)) to je dosad najviši postotak. Prosječna dob pacijenata s rezidualnim cistama iznosila je $47,6 \pm 1,46$ godina. Ochsenius i suradnici ističu da se takve ciste uglavnom javljaju u petom i šestom desetljeću (14).

Oko gornjih sjekutića pojavilo se 20% radikalarnih cista, a 8,5% oko donjih očnjaka. Ako zbrojimo sve podatke vidimo da su te ciste najčešće u prednjem dijelu gornje čeljusti. To dodatno potvrđuje istraživanje Ochseniusa i suradnika (14) u kojemu je 50,7% radikalarnih cista bilo u prednjem dijelu gornje čeljusti. Grossmann i njegovi kolege (8) navode da je 46,7% svih cista bilo u prednjem dijelu gornje čeljusti.

Dentigerozne ciste najčešće su uz donje pretkutnjake (36,9%), a zatim uz donje kutnjake (23,4%) te gornje očnjake (9,3%). Varinauskas i suradnici također kažu da su folikularne ciste najčešće uz donje pretkutnjake (10), a Ochsenius i suradnici ističu da se folikularne ciste uglavnom razvijaju uz donje kutnjake (30,6%) te gornje sjekutiće i očnjake (28,2%). Donji pretkutnjaci rjeđe su zahvaćeni (11,9%) (14). Shear i Speight navode da su dentigerozne ciste najčešće uz donje umnjake i gornje očnjake (6).

U ovom istraživanju ustanovili smo da se 40% odontogenih keratocista javlja uz donje kutnjake. To potvrđuju podaci Ochseniusa i suradnika (14).

Dodatni nalaz jest da se rezidualne ciste uglavnom javljaju uz gornje kutnjake (22,4%) te pretkutnjake (20,4%), ali i donje kutnjake (15,3%). Podaci Ochseniusa i suradnika potvrđuju da su prednji dijelovi gornje čeljusti najčešće zahvaćeni tim cistama (34,5%) (14).

Their incidence peaked in the fifth and sixth decade of life, followed by the second and seventh decade of life. On the contrary, in the literature, there is data on a bimodal age distribution in odontogenic keratocysts with a first peak in the second and third decade of life and with a second peak in the fifth and following decades (6, 14, 15).

We found that 2.4% of 621 cysts were recurrent. The most frequent recurrence was observed in the group of odontogenic keratocysts (18.2%) in accordance with the literature (6, 8). Odontogenic keratocysts are found as a component of the Gorlin-Goltz syndrome with tendency of aggressive recurrence (8).

Our study established that 18% of the studied cysts were residual in character. Compared to data from other authors [11.2% (14), 10.77% (10), 8.8% (20), 2.2% (3)], it is the highest percentage cited in the literature. The median age of patients with residual cysts in our study was 47.60 ± 1.46 years. Ochsenius et al study reports that residual cysts peaked in patients in the fifth and sixth decades of life (14).

Our study established that 20% of the radicular cysts were found around the incisors of the maxilla, 8.5% develop adjacent to the maxillary canines. Accumulated data showed that the anterior part of the maxilla was most commonly affected. Ochsenius et al. study provides further evidence to this finding - they found out that 50.7% of the radicular cysts developed in the anterior parts of the maxilla (14). Grossmann et al. report that 46.7% of all cysts involved the anterior maxilla (8).

In our series, dentigerous cysts occurred most commonly near the premolars of the mandible (36.9%), followed by the molars of the mandible (23.4%) and maxillary canines (9.3%). Varinauskas et al also report that follicular cysts are most frequently found around the premolars of the mandible (10). Data from Ochsenius et al. show that follicular cysts develop most commonly near the mandible molars (30.6%), followed by the maxillary incisors and canines (28.2%). Lower jaw premolars are less frequently affected (11.9%) (14). Shear & Speight report that mandible wisdom teeth and maxillary canines are most frequently affected by dentigerous cysts (6).

In our study it was established that 40% of the odontogenic keratocysts developed adjacent to the molars of the lower jaw. Data from Ochsenius et al. also showed that odontogenic keratocysts occur around the mandible molars in 37.8% of the cases (14).

Zaključci

1. Svi tretirani tijekom deset godina bili su pacijenti s cistama u čeljusti - 5,41%;
2. Muškarci su češći pacijenti s cistama;
3. Prosječna dob pacijenata s cistama u čeljusti iznosila je 35,3±0,73 godine;
4. Prosječna dob pacijenata s radikularnim cistama i odontogenim keratocistama viša je od dobi pacijenata s folikulranim cistama;
5. Ciste su češće u gornjoj čeljusti ($t = 3,5$, $P < 0,01$);
6. U gornjoj čeljusti cistama je najčešće zahvaćen alveolarni nastavak (72,8%), a u donjoj čeljusti baza (76,6%);
7. Odontogenih cista je 97,1±0,67%;
8. Odontogene ciste česte su oko donjih kutnjaka (17,1%), gornjih sjekutića (16,3%) i pretkutnjaka (15,9%), a rjeđe su zahvaćeni donji očnjaci (4,7%);
9. Najčešće rekurentne ciste su odontogene keratociste (18,2%);
10. Rezidualnih cista je 18%;
11. Rezidualne ciste češće su u gornjoj čeljusti (66,2%);
12. Rezidualne ciste uglavnom su u lateralnim dijelovima čeljusti.

Another finding is that residual cysts developed most commonly in relation with the molars (22.4%) and the premolars (20.4%) of the maxilla, as well as around the molars of the mandible /15,3%/. Data from Ochsenius et al show that anterior parts of the maxilla are most frequently affected (34.5%) (14).

Conclusions

1. Patients with jaw cysts present 5.41% of all patients treated over the 10 year period.
2. The male sex is more commonly affected ($t=3.50$, $P<0.01$).
3. The average age of patients with jaw cysts is 35.30±0.73 years.
4. The average age of patients with radicular and keratocysts is higher compared to that of patients with follicular cysts.
5. Cysts affect more frequently the maxilla ($t=2.33$; $P<0.05$).
6. In the maxilla, the alveolar ridge is most frequently affected – 72.8%, in the mandible - the base (76.6%).
7. Odontogenic cysts are 97.1±0.67%.
8. Odontogenic cysts are found commonly around the mandible molars (17.1%), maxillary incisors (16.3%) and premolars (15.9%); mandible canines are less commonly affected (4.7%).
9. The more frequently recurrent cysts are odontogenic keratocysts (18.2%).
10. Residual cysts are 18%.
11. Residual cysts are more common in the upper jaw (66.2%).
12. Residual cysts occur most frequently in the distal areas of the jaws.

Abstract

Objective: Cysts occur in the jaws more commonly than in any other bone due to the presence of developmental, odontogenic, residual, epithelial tissue. The present study aimed at providing a clinical and epidemiological analysis of patients with cystic lesions, treated at the Clinics of Maxillo-Facial Surgery, University Hospital, Plovdiv, Bulgaria. **Material and Methods:** Six hundred twenty one cysts of the jaws in 594 patients were examined. The odontogenic cysts were 97.1±0.67%. The radicular cysts were the most common type of jaw cysts (435 cysts, 70.1%), dentigerous cysts (146 cysts, 23.5%) were the most common in the first and the second decades. The residual cysts were 112 (18%). The average age of patients with jaw cysts was 35,30±0,73 years. **Results:** Jaw cysts were more frequent in the maxilla in comparison with mandible ($t=2.33$; $P<0.05$). The radicular cysts more frequently involved the alveolar bridge of the upper jaw (204 cysts of 435 radicular cysts, 46.9%). **Conclusion:** The dentigerous cysts developed more frequently in the lower jaw (106 cysts of 146 dentigerous cysts, 72.6%), especially in the mandible body (89 cysts, 61%).

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Address for correspondence

Dr. Petia F. Pechalova
Medicine University
Faculty of Dental Medicine
Department of maxillo-facial surgery
Street "Pestersko shose" № 66
Plovdiv, Bulgaria
Tel: 0359/ 898 468 498
pechalova@abv.bg

Key words

Jaw Cysts; Odontogenic Cysts; Radicular Cysts; Dentigenous Cysts

References

1. Cawson RA, Odell EW, Porter S. *Cawson's essentials of oral pathology and oral medicine*. Edinburgh, UK: Churchill Livingstone; 2002. p. 102-21.
2. Regezi JA, Sciubba JJ, Jordan RC. *Oral pathology: clinical pathologic correlations*. St Louis, USA: WB Saunders; 2003. p. 241-54.
3. Mosqueda-Taylor A, Irigoyen-Camacho ME, Diaz-Franco MA, Torres-Tejero MA. Odontogenic cysts. Analysis of 856 cases. *Med Oral*. 2002;7(2):89-96.
4. Kramer IR, Pindborg JJ, Shear M. *Histological typing of odontogenic tumours*. Berlin, Germany: Springer-Verlag; 1992. p. 35-41.
5. Jaffe ES, Harris NL, Stein H, Vardiman JW. *WHO classification of tumours, pathology and genetics, tumour of haematopoietic and lymphoid tissues*. Lyon, France: IARC-Press; 2001.
6. Shear M and Speight PM. *Cysts of the oral and maxillofacial regions*. Oxford, UK: Blackwell Munksgaard; 2007. p. vi; 1-171.
7. Tortorici S, Amodio E, Massenti MF, Buzzanca ML, Burrano F, Vitale F. Prevalence and distribution of odontogenic cysts in Sicily: 1986-2005. *J Oral Sci*. 2008;50(1):15-8.
8. Grossmann SM, Machado VC, Xavier GM, Moura MD, Gomez RS, Aguiar MC, et al. Demographic profile of odontogenic and selected nonodontogenic cysts in a Brazilian population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2007;104(6):e35-41.
9. Neville BW, Damm DD, Allen CM, Bouquot JE, editors. *Oral & maxillofacial pathology*. Philadelphia: WB Saunders Co; 2002. p. 107-36, 589-601.
10. Varinauskas V, Gervickas A, Kavoliūniene O. Analysis of odontogenic cysts of the jaws. *Medicina (Kaunas)*. 2006;42(3):201-7.
11. Tortorici S, Amodio E, Massenti MF, Buzzanca ML, Burrano F, Vitale F. Prevalence and distribution of odontogenic cysts in Sicily: 1986-2005. *J Oral Sci*. 2008;50(1):15-8.
12. Koseoglu BG, Atalay B, Erdem MA. Odontogenic cysts: a clinical study of 90 cases. *J Oral Sci*. 2004;46(4):253-7.
13. Meningaud JP, Oprean N, Pitak-Arnop P, Bertrand JC. Odontogenic cysts: a clinical study of 695 cases. *J Oral Sci*. 2006;48(2):59-62.
14. Ochsenius G, Escobar E, Godoy L, Peñafiel C. Odontogenic cysts: analysis of 2,944 cases in Chile. *Med Oral Patol Oral Cir Bucal*. 2007;12(2):E85-91.
15. Jones AV, Craig GT, Franklin CD. Range and demographics of odontogenic cysts diagnosed in a UK population over a 30-year period. *J Oral Pathol Med*. 2006;35(8):500-7.
16. Kransdorf MJ, Sweet DE. Aneurysmal bone cyst: concept, controversy, clinical presentation, and imaging. *AJR Am J Roentgenol*. 1995;164(3):573-80.
17. Kalantar Motamedi MH. Aneurysmal bone cysts of the jaws: clinicopathological features, radiographic evaluation and treatment analysis of 17 cases. *J Craniomaxillofac Surg*. 1998;26(1):56-62.
18. Daley TD, Wysocki GP, Pringle GA. Relative incidence of odontogenic tumors and oral and jaw cysts in a Canadian population. *Oral Surg Oral Med Oral Pathol*. 1994;77(3):276-80.
19. Nakamura T, Ishida J, Nakano Y, Ishii T, Fukumoto M, Izumi H, et al. A study of cysts in the oral region. *Cysts of the jaw*. *J Nihon Univ Sch Dent*. 1995;37(1):33-40.
20. Tay AB. A 5-year survey of oral biopsies in an oral surgical unit in Singapore: 1993-1997. *Ann Acad Med Singapore*. 1999;28(5):665-71.
21. Ioannidou F, Mustafa B, Seferiadou-Mavropoulou T. Odontogenic cysts of the jaws. A clinicostatistical study. *Stomatologia (Athenai)*. 1989;46(2):81-90.
22. Kreidler JF, Raubenheimer EJ, van Heerden WF. A retrospective analysis of 367 cystic lesions of the jaw--the Ulm experience. *J Craniomaxillofac Surg*. 1993;21(8):339-41.
23. Arotiba JT, Lawoyin JO, Obiechina AE. Pattern of occurrence of odontogenic cysts in Nigerians. *East Afr Med J*. 1998;75(11):664-6.
24. Ledesma-Montes C, Hernández-Guerrero JC, Garcés-Ortiz M. Clinico-pathologic study of odontogenic cysts in a Mexican sample population. *Arch Med Res*. 2000;31(4):373-6.
25. Rim JS, Jang HS, Son HM. Clinical study of cyst in the jaws. *J Korean Assoc Oral Maxillofac Surg*. 2000;26:293-6.
26. Bataineh AB, Rawashdeh MA, Al Qudah MA. The prevalence of inflammatory and developmental odontogenic cysts in a Jordanian population: a clinicopathologic study. *Quintessence Int*. 2004;35(10):815-9.