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Postoperative Evaluation of Patients after Small Jaw Cyst Surgery.

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ABSTRACT

In the so far published literature, no data regarding postoperative symptoms in patients after surgery of small jaw cyst exist. The aim of this research was to determine possible differences in postoperative recovery of the patients after the surgical removal of small jaw cysts. The study involved 35 participants with small jaw cysts, 51.4% male and 48.6% female, age range from 16 to 81 years of age. Cyst location, size and kind of the cysts, including the presence of oedema, swelling, bad breath, consumption of analgesics and antibiotics (pre-and post-operative), and consumption of certain food and drink, The subjective sensation of pain and the working capability of the patients were assessed. The most common symptoms were swelling which appeared on the first, the third and the seventh day in the following percentages: the first day 97.1%, the third day 60% and the seventh day 25.7%. Other difficulties (pain, difficulties with speech and sleeping, bad breath) appeared in a significantly smaller amount, not exceeding 20% out of the total number of the participants. It is also important to mention that 8.6% of the participants had difficulties while eating. The rest of the difficulties (increased temperature, difficulties while eating) did not occur they did not exceed the frequency of 1 (2.9%). 20% of the cysts smaller than 1 cm, followed by 54.3% of the cysts which were between 1 and 2 cm large, and 25.7% of the cysts large between 2 and 3 cm. The most commonly diagnosed were radicular inflammatory cysts (71.4%), followed by the residual cysts (20%), and the rest of the cysts (follicular, lateral periodontal, odontogenic keratocysts) were found in 2.9%. The number of 15 patients experienced troubles sleeping after the procedure, while 73.33% of them were taking antibiotics. The total number of 27 patients experienced difficulties with eating during the period of 14 postoperative days. The total number of 23 participants received analgesics postoperatively, while only two of them did not experience difficulties with feeding. Statistical analysis included Fishers exact test, Chi-square test, Kruskal-Wallis test. The cyst location is not connected to postoperative difficulties, however postoperative difficulties are more frequent with larger cysts. Postoperative difficulties of patients after the surgical removal of small jaw cysts are mostly a result of their own subjective perception. The patients taking postoperative antibiotic and/or analgesic therapy reported a higher intensity of post-operative difficulties.

Keywords: small jaw cyst, oedema, post-operative, complication, quality of life

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INTRODUCTION

The maxillofacial region is more commonly affected by cysts which are cavities in the bone coated with epithelia than any other part of the body (1). According to their etiology, jaw cysts can be odontogenic and nonodontogenic (2). Odontogenic cysts and tumors develop as a result of a pathological process during the development of the tooth or after the tooth had already been developed. The odontogenic jaw cysts are benign formations; however, some of them are locally aggressive and can have a destructive effect on the surrounding tissues (3). The cysts that cause pressure to the surrounding structures with their size and growth might manifest through various symptoms, such as; visible and palpable convexity, pain, paraesthesia, dislocation and floating of the surrounding teeth and inflammation (4). The cysts which show local aggression can resorb the roots of the surrounding teeth and through bone resorption can increase risk of fractures (5).

Besides that fact, some of the cysts may also have a tendency to reccur which is particularly seen within odontogenic keratocysts. Symptoms which indicate the possibility of the cyst existence; such as convexity or tough spherical callosity of bone wall without any mucosal change or with some dark bluish colour on the top of that callosity, require a x-ray and/or computer tomography. The cysts appear on x-rays as pathological cavities within the jaw.

Detailed medical/dental history and the clinical examination, cyst localization, its edges, internal architecture, and the degree of mineralization, size and formation, as well as the connection with the surrounding structures will help to determine a precise differential diagnosis. However, the final diagnosis is determined after the results of the histopathological analysis (6). Small jaw cysts up to three centimeters in diameter, no matter of their location, should be treated by Partsch II method or by enucleation of the cyst, and the bone defect is to be healed through the organization of the blood clot (7,8). Based on the result of the histological analysis, a decision is made on the eventual necessity and the consequential radicality of a second surgical procedure (9). The cyst treatment is based on the complete surgical removal with the preservation of the function of all vital structures, a minimally invasive procedure which is in accordance with the demands of surgery planned. The good clinical practice most often relies on the division according to the World Health Organization in 2005 (10). The radicular cyst is the most common jaw cyst (11). Pechalova et al (12) showed that out of 621 analyzed cysts, 603 were odontogenic; 2.4% of the cysts were recurrent, and most commonly the odontogenic keratocysts were noticed (18.2%). Similarly, Tortoricii et al. (13) diagnosed 1273 odontogenic cysts out of the total number of 1310 analyzed cysts. Other authors (14,15) also reported that the odontogenic cysts represent 90% of all jaw cysts. Given the fact that the odontogenic cyst is one of the most common causes of the jaw destruction, an early diagnosis is of an extreme importance in order to reduce the size of surgical procedure and time needed for the postoperative wound healing (16).

MATERIALS AND METHODS

The research was performed at the Department for Oral Surgery, School of Dental Medicine, University of Zagreb, and was approved by the local Ethic Committee. All patients signed an informed consent prior to the study. Thirty five participants undergone surgical removal of small jaw cysts which were up to 3 cm in diameter.

Prior to the surgery, the following diagnostic methods were performed: detailed medical history, inspection, jaw palpation, the teeth vitality test, x-ray, CBCT and/or puncture of the lesion. The surgery was performed under local anaesthesia (Lidocaine – Adrenaline, Belupo, Koprivnica; 40 mg + 0.025 mg in injections). The quantity of the local anaesthetic in all procedures was up to 4 cm³. Partsch II and a Nowak – Peter section were used in all patients. Osteotomy was performed with a long steel surgical drill with a handpiece with constant irrigation of the operation site with sterile saline. After enucleating the cyst, the surgical wound was sutured with non-absorbable monofilament sutures (0.3 mm, Mersilk 3.0, Ethicon, New Jersey, USA). All patients were given instructions on proper postoperative care of the wound according to the protocol of the Clinical Department of Oral Surgery. After the procedure was completed, all the details of the operation were noted in the questionnaire for the assessment of the clinical status, always by the same experienced oral surgeon. The follow-ups of the healing of the postoperative wound were performed on the first, the third and the seventh day, including the assessment of the symptoms of pain, the existence of debris in the operation area, haemorrhage, haematoma, possible exposure of the bone, pus, followed by oedema, fever, paraesthesia, anaesthesia, trismus, bad breath and the dehiscence of the surgical site.

Fourteen days after the surgery, postoperative difficulties were noted for each patient (1 – absent, up to 4 – intensive). The assessed difficulties were: pain, swelling, difficulties in eating, speaking and sleeping, bad breath; the participants also claimed increased body temperature and reduced working ability, as well as consumption of analgesics and antibiotics. The evaluation of the healing of the wound was conducted on the third and the seventh postoperative day, and on the fourteenth day the patients were contacted by telephone.

After the seventh postoperative day, the sutures were removed and the variety of food the patients consumed during the period after the operation was noted (hot food, carbonated beverages, dairy products), as well as the eventual absence of the sensation of taste and the satisfaction with the procedure.

RESULTS

All results are presented in the Table 1. The study involved 35 participants, 51.4% male and 48.6% female. The age range of the participants was from 16 to 81 years of age.

The most common symptom was swelling. It appeared on the first, the third and the seventh day in the following percentages: the first day 97.1%, the third day 60% and the seventh day 25.7%. Other difficulties (pain, difficulties with speech and sleeping, bad breath) appeared in a significantly smaller amount, not exceeding 20% out of the total number of the participants. It is also important to mention that 8.6% of the participants had difficulties while eating. The rest of the difficulties (increased temperature, difficulties while eating) did not occur or they did not exceed the frequency of 1 (2.9%).

Most of the participants (68.6%) experienced the most severe difficulties on the first day, 40% of the participants on the second day, and merely 11.4% of the participants on the third day. The most severe difficulties during the first week after the surgery, appeared within the first three days.

Within this research there were 20% of the cysts smaller than 1 cm, followed by 54.3% of the cysts which were between 1 and 2 cm large, and 25.7% of the cysts large between 2 and 3 cm. The most commonly diagnosed were radicular inflammatory cysts (71.4%), followed by the residual cysts (20%), and the rest of the cysts (follicular, lateral periodontal, odontogenic keratocysts) were found in 2.9%. The most commonly found cysts within the participants younger than 46 years of age were between 1 and 2 cm in size. Within the participants younger than 30 years of age, the most common cysts were up to 2 cm in size (60%). Within the age group between 31 and 46 only cysts large between 1 and 2 cm were found. Also, the cysts between 2 and 3 cm in size were mostly found in patients older than 46 years of age.

Furthermore, it was noted that a larger number of participants took antibiotics and analgesics after the procedure, opposed to the number of participants who took antibiotics and analgesics before the procedure. Out of the total number of the patients who consumed antibiotics before the surgery, 83% continued with the antibiotic therapy after the surgery. Also, 62 participants who did not take any antibiotics before the surgery did not take any even after the surgery. The total of 60% of the participants began using antibiotics postoperatively, without using them prior to the procedure. On the seventh postoperative day, the number of the participants who were using antibiotics was reduced to 8.6%.

The largest number of the participants (80%) claimed having only two postoperative symptoms during the postoperative period of seven days. Three or more symptoms were indicated among 8.6% of the participants. The Chi-square test of the risk level of 5% and 1% determined that there was no statistically significant connection between the experienced difficulties during the first day and any of the following conditions: overcome illness, momentary illness, systematic illness, the use of medication and smoking. The Kruskal-Wallis test showed that patients with larger cysts, tended to have more difficulties while eating on the third postoperative day ($\chi^2=6.304$; $df=2$; $p=0.043$; $\eta^2=0.82$). Furthermore, the Mann-Whitney test showed that the difficulties with feeding were more intense in patients with cysts between 2 and 3 cm large when compared to cysts between 1 and 2 cm large ($U=40,000$; $Z=-2,479$; $p=0,013$; $AUC=0,23$).

The pain was present at least on one examination in 22 out of the total number of patients. Through the series of logical regressions the connection between certain predictors (general condition and the information about the patient, the type of the cyst and the application of medications) and the appearance of pain after the procedure has been confirmed. Out of the total number of the participants who used antibiotics

postoperatively, 81.3% reported postoperative presence of pain. The other predictors were not significantly connected to the appearance of pain.

The total number of 27 patients experienced difficulties with eating during the period of 14 postoperative days. The correlation between the postoperative application of analgesics and the difficulties with eating was significant. The total number of 23 participants received analgesics postoperatively, while only two of them did not experience difficulties with feeding.

The number of 15 patients experienced troubles sleeping after the procedure, while 73.33% of them were taking antibiotics. All the participants were satisfied with the results of the procedure. Most of the participants (68.6%) assessed that their physical appearance was not deteriorated after the surgery.

The statistical analysis of the results provided by this research determined the level of statistical significance at $p < 0.05$ while all the intervals of reliability were at the confidence level of 95%. All the cases involved two-tail tests of the statistical significance. The normality of the distributions was performed by the Shapiro-Wilk tests with the samples under $n=30$, and by the Kolmogorov-Smirnov tests with larger samples. Considering the fact that these tests detected statistically significant deviations from normal distributions in most cases, a median and the interquartile ranges were used as measures of central tendency and dispersion. The statistical significance of the connection between two binary variables was inspected by the Fishers exact test. With the mentioned test, a phi-coefficient of correlation was applied as a standardized measure of the effect magnitude. The Chi-square test was applied to inspect the statistical significance of the connection between two variables with more than two categories. The Mann-Whitney test was applied within the analysis of the differences within the mid values (median) on a continual, numeric variable between two categories of a nominal variable, and with higher categorical nominal variables the Kruskal-Wallis test was applied. The standardized measure of effect was η^2 . All the statistical procedures were conducted within the package SPSS 17.0 (SPSS Inc., Chicago, IL, USA).

DISCUSSION

To our best knowledge, within published literature, no research has been conducted regarding the postoperative difficulties after the surgical removal of small jaw cysts. Within this study, radicular cysts were most commonly found (71.4%), followed by residual cysts (20%), which is in accordance with numerous researches (17,18,19). Açıkgöz et al. (17) conducted the study on 459 participants and reported that the radicular cysts were the most common ones (54.7%), followed by follicular cysts (26.6%) and residual cysts (13.7%). Bataineh et al. (18) published similar findings on 654 participants, 41.7% of their patients had radicular cysts. Nakamura et al. (19) found 41.2% radicular cysts, 27% follicular cysts and 21.6% odontogenic keratocysts in their study on 1243 participants.

The results of our study showed that there were more residual than follicular cysts, which is not in accordance to the previously mentioned researches, and it can be explained by the fact that the patients under the age of 30 represented with the smallest amount. This research found out that the size of the cyst increased with the increasing age of the patients, therefore the largest cysts were found in patients older than 46 years.

As expected, swelling was the most frequently found difficulty, due to the fact that the surgical procedure caused a trauma of the tissue within the area of the operation. It is known that swelling depends on the degree of the trauma of the tissues and the patients variability for oedema development (20). There was no significant correlation between the size of the cyst and the swelling; it can be explained by the fact that span value of the cysts was no significantly large enough, as well as the fact that the applied surgical procedure was the same for all cysts.

The connection between the medication and the postoperative appearance of pain, sleeping disturbances and difficulties while eating were significant. More than half of the patients who used analgesics prior to the surgery continued their use postoperatively. Even though the preemptive analgesic therapy leads to the decreased need for postoperative analgesic therapy, this was not proven within this study. The patients who took analgesics preoperatively due to fear of excessive postoperative pain after the effect of the analgesics wears off, started using analgesics even before they experienced real pain.

We expected that the patients who took antibiotics postoperatively will experience a lower intensity of pain than those patients who did not use antibiotics, the results of this study showed opposite. It seems that the patients who have not experienced any pain probably did not feel the need for the postoperative use of antibiotics.

Also, the results of this study showed that the patients who took analgesics postoperatively had more frequent difficulties with feeding, than those who did not use analgesics. It is assumed that those patients who had the need for the use of analgesics experienced pain on a more intense level, which caused their problems while eating.

Pain and oedema as objective indicators and other difficulties (difficulties in eating, speaking and sleeping, bad breath, increased body temperature and reduced working ability), as well as deteriorated physical appearance can be explained by the subjective perception of patients, because most of the mentioned difficulties were noted in the part of the questionnaire where the patients were asked to subjectively assess the level of the intensity of the difficulties. It is known that patients have different levels of sensibility and self-perception of their personal appearance and condition.

Table 1. The prediction of the appearance of pain within the postoperative period of 14 days.

	No pain		Pain present		total		OR	95 % CI
	n	(%)	n	(%)	n	(%)		
Gender								
Male	8	(44.4)	10	(55.6)	18	(100.0)		
Female	5	(29.4)	12	(70.6)	17	(100.0)	1.920	(0.475 – 7.766)
Smoker								
Yes	4	(40.0)	6	(60.0)	10	(100.0)		
No	9	(36.0)	16	(64.0)	25	(100.0)	1.185	(0.263 – 5.343)
Momentary illness								
Yes	4	(44.4)	5	(55.6)	9	(100.0)		
No	9	(34.6)	17	(65.4)	26	(100.0)	1.511	(0.323 – 7.071)
The type of the cyst								
apical cyst	8	(32.0)	17	(68.0)	25	(100.0)		
other cysts	5	(50.0)	5	(50.0)	10	(100.0)	0.471	(0.105 – 2.104)
The size of the cyst								
0 – 1 cm	1	(14.3)	6	(85.7)	7	(100.0)		
1 – 2 cm	7	(36.8)	12	(63.2)	19	(100.0)	0.286	(0.028 – 2.887)
2 – 3 cm	5	(55.6)	4	(44.4)	9	(100.0)	0.133	(0.011 – 1.611)
The location of the cyst								
upper right quadrant	5	(38.5)	8	(61.5)	13	(100.0)		
upper left quadrant	7	(50.0)	7	(50.0)	14	(100.0)	0.625	(0.135 – 2.891)
lower left quadrant			3	(100.0)	3	(100.0)	-	-
lower right quadrant	1	(20.0)	4	(80.0)	5	(100.0)	2.500	(0.214 – 29.254)
Antibiotics, preoperatively								
Yes			6	(100.0)	6	(100.0)		
No	13	(44.8)	16	(55.2)	29	(100.0)	-	-
Antibiotics, postoperatively								
Yes	3	(18.8)	13	(81.3)	16	(100.0)		
No	10	(52.6)	9	(47.4)	19	(100.0)	0.208	(0.044 – 0.974)
Analgesics, preoperatively								
Yes	2	(66.7)	1	(33.3)	3	(100.0)		
No	11	(34.4)	21	(65.6)	32	(100.0)	3.818	(0.311 – 46.929)
Analgesics, postoperatively								
Yes	8	(34.8)	15	(65.2)	23	(100.0)		
No	5	(41.7)	7	(58.3)	12	(100.0)	0.747	(0.178 – 3.129)
	MD	(IQR)	MD	(IQR)	MD	(IQR)		
Age	36	(23 – 56)	44	(30 – 53)	43	(30 – 55)	1.017	(0.972 – 1.064)

Abbreviations: OR – odds ratio; 95 % CI = 95-per cent interval of reliability for the OR

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