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OPEN ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

The Efficacy of Tonsillar Ablation with Coblator in Treating Pediatric Halitosis Due to Chronic Caseous Tonsillitis

Çocuklarda Coblator Parsiyel Tonsillektominin Kazeoz Tonsillite Bağlı Halitozis Tedavisinde Etkinliği

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ÖZET

Amaç: Ağız kokusu bireyi ve sosyal çevreyi etkileyen bir sorundur. Halitozisin en sık kaynağı oral kavitedir. Palatin tonsillerin kriptlerinde biriken kazeom halitozise neden olabilir. Palatin tonsil kazeomu tedavisinde total tonsillektomi veya koblator gibi aletlerle tonsil ablasyon cerrahileri yapılmaktadır. Bu retrospekrif çalışmanın amacı çocuk hastalarda kronik kazeoz tonsillite bağlı halitozis tedavisinde coblator ile parsiyel tonsillektominin etkinliğini değerlendirmektir.

Hastalar ve Yöntem: Haziran 2016- Haziran 2019 tarihleri arasında kronik kazeoz tonsillit nedeniyle coblator ile parsiyel tonsillektomi uygulanan 116 çocuk çalışmaya alındı. Adenoid hipertrofisi olan ve eş zamanlı adenoidektomi ameliyatı yapılan hastalar çalışmaya dahil edilmedi. Operasyon öncesi ve sonrası koku olup olmadığı Finkelstein testi ile değerlendirildi. Koku şiddeti ise Vizüel Analog Skala ile değerlendirildi. Postoperatif koku düzelme oranı ebeveynler için oluşturulan ölçek ile değerlendirildi.

Bulgular: Hastaların tamamında kazeom varlığı ameliyat öncesi teyit edildi. Çalışmaya dahil edilen hastaların yaş ortalaması 6,77 idi. Çalışmaya alınan olguların 65'i erkek; 51'i kızdı. Hastaların takip süresi 10 ile 43 ay arası (ort 25,9) değişmekteydi. Coblator tonsil ablasyonu öncesi Vizüel Analog Skala ile ölçülen kötü koku düzeyi 6,97 iken, cerrahi sonrası 1,75 bulundu. Sonuçlar istatistiki olarak çok anlamlı bulundu ($p < 0,001$). Finkelstein testinde tonsillerin palpe edilip hasta ebeveynine koklatılarak koku olup olmadığı soruldu. İşlem öncesi tüm hastalarda Finkelstein testinde koku mevcuttu. Postoperatif hastaların %71'inde (n= 82) Finkelstein testinde koku saptanmadı. Annelere postop kokunun düzelme düzeyi soruldu. Ebeveynler tarafından Hastaların % 82'sinde (n= 95) kokunun tam ve tama yakın düzeldiği bildirildi. Hiç düzelme olmayan hastalar ise % 6 idi (n=7).

Sonuç: Coblator ile parsiyel tonsillektomi çocuk hastalarda tonsil kazeomuna bağlı halitozis tedavisinde etkinliği yüksek ve güvenli bir yöntemdir.

Anahtar Kelimeler: Pediatrik halitozis, coblator, kazeom, tonsillit

ABSTRACT

Aim: Halitosis is a condition that impacts both the individual and their social interactions. The most common source of halitosis is the oral cavity. Caseum accumulated in the crypts of the tonsils can cause halitosis. In treating tonsil caseum, total tonsillectomy or tonsil ablation surgeries are performed with instruments such as coblator. This retrospective study evaluates the effectiveness of tonsil ablation with coblator in treating halitosis caused by caseous tonsillitis in children.

Patients and Methods: A total of 116 children who underwent tonsil coblation for caseous tonsillitis between June 2016 and June 2019 were included in the study. Patients who underwent simultaneous adenoidectomy were not included in the study. The presence of odor before and after the operation was evaluated using the Finkelstein test. The pre-operative and post-operative halitosis levels were evaluated with a Visual Analog Scale. The recovery levels were determined by the postoperative halitosis recovery scale.

Results: The presence of caseum was confirmed perioperatively in all patients. The mean age of the patients was 6.77 years, with 65 males and 51 females included in the study. The follow-up periods of the patients varied between 10 and 43 months (mean: 25.9). The level of halitosis on the visual analog scale before tonsil coblation was 6.97, and it was found to be 1.75 in the postoperative evaluation. The results were statistically significant ($p< 0.001$). The mothers were asked about recovery in postoperative halitosis levels. Mothers reported that 82% of patients (n = 95) had complete or nearly complete improvement in halitosis. 6% of patients (n = 7) showed no improvement.

Conclusion: Palatine tonsil coblation is an effective and safe method for the treatment of halitosis because of tonsil caseum.

Keywords: Pediatric halitosis, coblator, caseum, tonsillitis

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INTRODUCTION

Halitosis refers to bad breath, which can affect not only the individual but also their family and social environment. The terms "breath odor" or "malodor" are also used synonymously with halitosis. Halitosis is a general term used to describe unpleasant breath, regardless of its source, whether intra or extra-oral. The air exhaled through the nose is also included in halitosis. The term 'oral malodor' specifically refers to the smell that originates from the oral cavity (1). Halitosis is common in society with a prevalence varying between 30-40% in children (2). Causes originating from the oral cavity constitute 85-90% of halitosis. Frequently, tooth, tongue, and tonsil pathologies in the oral cavity are the sources of halitosis. However, the cause of halitosis is also extra-oral sinonasal diseases, respiratory and gastrointestinal system diseases, liver-kidney disorders, and metabolic syndromes at a rate of 10-15% (3,4).

A common cause of chronic halitosis is palatine tonsils. Crypts show tubular extension from the surface of palatine tonsils toward their deep parenchyma. Epithelium debris, keratin debris, and foreign particles accumulate in these crypts and form yellowish caseum with a bad odor resembling cheeseballs. Caseum may be seen in both genders, in one or both tonsils. Caseum may be seen not only in large-sized tonsils but also in small-size tonsils. Besides halitosis because of caseum, symptoms such as discomfort in the throat, stinging, and feeling a foreign object in the throat may also occur (4). Volatyl Sulfur Components (VSCs) are formed as a result of metabolizing substances that constitute the caseum by proteolytic anaerobe bacteria. These gases are the source of the characteristic sulfur smell in bad breath. H2S, CH3SH, and CH3SCH3 make up 90% of VSC gases, which cause oropharyngeal halitosis (5).

All studies in the literature on surgical treatments of chronic caseous tonsillitis (CCT) induced halitosis other than total tonsillectomy have been conducted in adult patients (4,6-10). In this study, the effectiveness of tonsil ablation with a coblator treatment method in the treatment of CCT-induced halitosis in children was investigated.

PATIENTS AND METHODS

Trial design and participants

A total of 116 children who underwent tonsil coblation for caseous tonsillitis between June 2016 and June 2019 were included in the study. Local ethics committee approval was obtained for the study (protocol number of ethics committee approval: 2020/003).

All patients had halitosis complaints with recurrent tonsillitis. It was seen that caseum was discharged from crypts with tonsil palpation before perioperative ablation in all patients. Patients without halitosis who underwent coblator tonsil ablation because of snoring or only chronic tonsillitis, patients with dental diseases, patients who did not live with their mothers, those with type 1 diabetes, patients with gastroesophageal reflux disease, patients with postnasal drainage detected during examination and patients who were on chronic medication were not included in the study. In addition, patients with adenoid hypertrophy and those who underwent simultaneous adenoidectomy were not included in the study.

Forms and scales used in the study

Written informed consent forms stating the benefits and risks of the treatment of the disease were received from all parents. Detailed anamnesis and oral and endoscopic nasal examinations were performed in the evaluation of all patients. Finkelstein's palpation test was used to determine whether the source of the odor was the tonsil. In this test, tonsils are palpated.

The patient's mother was asked whether there was any smell or not by smelling it. The same test was used in the post-treatment evaluation. Palpation was performed with a latex-free plastic bag glove. In this way, the latex smell was prevented from being felt. It was asked by the mothers of the patients to score the halitosis disorder with VAS before and after the treatment. They were asked to score between 0 and 10 by using VAS to indicate how the child perceived the severity, frequency, and duration of halitosis, how uncomfortable they were with halitosis, "0" showing no odor, and "10" severe odor. The mothers of the patients were also asked to score the rate of recovery after the treatment. The mothers were asked to indicate the rate of odor improvement after treatment in the prepared form (1= complete improvement, 2= nearly complete improvement, 3= moderate improvement, 4= improvement in a small amount, and 5= no improvement).

Interventions

All patients who were included in the study underwent tonsil ablation with coblator under general anesthesia with Arthrocare ENT Coblator® II device and Evac 70 coblator probe. Coblator probe has 2 pedals in the foot compartment. The power mode was set as 8 with the ablation pedal. The power mode was set as 6 in the cobalt pedal used for bleeding control. Local anesthesia or dexamethasone injection was not applied to patients before the procedure. Tonsil volume was reduced by approximately 90% by preserving the anterior and posterior tonsil plicas by using the ablation probe. All cryptic surfaces of the tonsils have been removed.

The cauterization feature of the same probe was used for bleeding control. No plica suturation was performed in any patient. Patients were hospitalized for 6 hours in the postoperative period and were given intravenous acetaminophen for postoperative pain control. All patients were discharged on the same day by prescribing oral paracetamol and amoxicillin-clavulanate. Patients who had a penicillin allergy were prescribed oral clarithromycin. Patients were called for follow-ups 1 week after the surgery and were evaluated in terms of pain and diet.

Statistical Analysis

The data, such as name, gender, age, follow-up time, Halitosis improvement levels, and VAS scores of patients were recorded in SPSS for Windows 11.5 Statistical Analysis Program (Statistical Package for the Social Sciences SPSS Inc., Chicago, Illinois, USA). The mean values of the continuous variables (i.e. age, halitosis duration, follow-up times, VAS scores), standard

Table 1. Post-operative recovery rates according to the statements of the mothers of children with halitosis.

Recovery rate	n
Complete	41 (35.3%)
Near-complete	54 (46.6%)
Moderate	8 (6.9%)
Mild	6 (5.2%)
No recovery	7 (6%)

deviation, minimum-maximum values, and normal dispersions were analyzed in statistical analyses. The difference between preoperative and postoperative VAS scores was analyzed with a Paired Samples t-test, and comparative analyses were also performed. Post-treatment recovery rates were calculated using the Chi-Square Test. $P \leq 0.05$ was considered as statistically significant.

RESULTS

A total of 65 of the 116 patients included in the study were male (56%), and 51 were female (44%). The age range of the patients was 2–14, and the mean age was 6.77±2.316. Patients were followed up for an average period of 25.1±9.95 months (10 months - 43 months).

In the Finkelstein test, the tonsils were palpated and the mothers were asked to smell whether there was any odor. Before the procedure, odor was present in the Finkelstein test in all patients. No odor was detected in the Finkelstein test in 71% of postoperative patients (n=82).

Halitosis VAS scores that were reported by mothers before and after the treatment were 6.97±1.93 and 1.75±2.14, respectively. According to a paired sample t-test done to compare odor VAS values, VAS halitosis scores decreased after treatment at statistically significant levels (p=0.0001). Mothers were asked how much the surgery decreased halitosis. Complete improvement was achieved in 41 patients (35.3%), near-complete improvement was achieved in 54 (46.6%), and moderate improvement was achieved in 8 (6.9%) patients. Mild improvement was reported in 6 patients (5.2%), and the number of patients with no improvement was 7 (6%) (Table 1).

None of the patients had velopharyngeal insufficiency, and no patients were hospitalized again because of malnutrition. Postoperative hospitalization was needed in 2 patients because of bleeding. Bleeding control was achieved by conservative methods in these patients. Tonsil ablation was well tolerated in all patients. No serious side effects were seen in any patient.

DISCUSSION

The crypts in the structure of palatine tonsils are tubular structures extending to the deep tissue of tonsils from their surface. Epithelial debris, keratin debris, and foreign particles accumulating in crypts constitute the caseum, which are also known as tonsil stones (4). Anaerobic proteolytic bacteria decompose this caseum and cause VSC to appear, which causes the halitosis smell. Approximately 77% of patients with CCT have halitosis (6). It was shown with objective measurement methods in previous studies that patients with halitosis due to palatine tonsil caseums had high levels of VSCs (7,11).

Antibiotics, such as Metronidazole or Amoxicillin-Clavulanate can provide temporary relief in the medical treatment of CCT. Mouthwash solutions, mouth sprays, tonsil massages, or removing the caseum gently are among other methods employed in this respect (12). Mouthwash, alcoholic mouthwashes, or sprays are not easy to use in children. Also, occasional tonsil massage or caseum removal will not be easy, especially in children.

The most effective treatment of CCT is total tonsillectomy. The recovery in total tonsillectomy might be prolonged up to 2 weeks. Difficulty in feeding because of the pain during this period is a common condition; and bleeding might also occur, which is one of the most undesirable complications of total tonsillectomy because of secondary infection in the tonsil bed (4).

Many studies are conducted on radiofrequency or laser cryptolysis, which are more conservative methods compared with tonsillectomy in the treatment of CCT-related halitosis in adults (4,6-9). It was reported that tonsil ablation with radiofrequency could reduce halitosis in more than 70% of patients in a single session (4). It was reported in another study that it was 90% effective when two sessions were performed (8). In studies conducted with laser cryptolysis, 52.8% improvement was reported in a single session (9). In another study, improvement was reported in all patients as a result of 4-session laser cryptolysis (7). Although satisfactory results can be achieved with laser cryptolysis, there is the risk of laser-related eye damage and burns (4).

Coblation is a technique using bipolar radiofrequency energy for soft tissue dissolving. The serum is separated into physiological ions in coblation with an electric current, and a plasma medium consisting of active ions ablating the tissue occurs. Coblation causes molecular dissolution at low temperatures (60°C). In this way, coblation causes minimal necrosis in the neighboring tissue and reduces the target tissue in terms of volume (13). In tonsils ablation with coblator, nutrition is better because the pain is less than in total tonsillectomy. Returning to a normal diet is faster, and wound healing is also faster compared to total tonsillectomy. Also, the amount of intraoperative and postoperative bleeding is less. In coblation tonsil ablation, the surgical duration is shorter than in traditional tonsillectomy; and the hospitalization duration of patients is also shorter (13,14). It is a significant disadvantage that the coblation hand probe is costly as it has a disposable use feature (14).

In a study evaluating the effectiveness of tonsil ablation with coblator in the treatment of halitosis due to chronic caseous tonsillitis in adult patients, organoleptic measurements showed that 75% of the patients did not have halitosis after surgery (10).

In our study, complete and near-complete recovery rates were achieved in 82% of patients as a result of the single-session coblator tonsil ablation, which is a more conservative method in the treatment of CCT-related halitosis compared to

total tonsillectomy. The preoperative VAS halitosis score was 6.97±1.93 and dropped to 1.75±2.14 after the procedure, which was found to be statistically significant. Since mothers spend a lot of time with their children and are often responsible for their care, they can better grasp the illnesses of their children than fathers (15). For this reason, the halitosis levels and recovery rates of children were evaluated only with the expressions of mothers in our study. No significant complications were seen because of the coblation in the patients who were included in our study. Postoperative bleeding was seen in only 2 patients, who were treated with conservative methods.

There are some limitations in the study. This study is first conducted regarding the coblator tonsil ablation in children because of tonsil caseum. However, subjective VAS scale and subjective recovery rate scales that were filled according to the declaration of mothers for their children with halitosis were used in the study. The effectiveness of coblator tonsil ablation in the treatment of tonsil-related halitosis in children must be validated with future studies in which VSCs are measured objectively.

CONCLUSION

Cryptolysis with local anesthesia and with radiofrequency and laser, which is reported to be effective in adults, might be difficult to tolerate in children. There is also the risk of laser-related eye damage and burns. More than one session may be necessary in both methods. Cryptolysis may be carried out with laser or radiofrequency in children under general anesthesia. However, since more tonsil ablation can be done in a single session with coblator, coblation may be a more suitable method in CCT treatment in children.

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