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A Different Technique in Silicone Tube Stabilization in Dacryocystorınostomy Surgery

Dakriyosistorinostomi Cerrahisi Silikon Tüp Stabilizasyonunda Farklı Bir Teknik

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ÖZET

Amaç: Dakriyosistorinostomi (DSR)'de silikon tüp serbest uçlarının, düğümleme yönteminden farklı bir teknik olan silikon kılıf kullanılarak sabitlendiği hastalar ile klasik düğümleme tekniği kullanılarak sabitlendiği hastaları operasyon sonrası semptomlar ve DSR başarısı açısından karşılaştırmak.
Gereç ve Yöntem: Epifora şikayeti ile başvurup kronik dakriyosistit tanısı alan ve tek taraflı endonazal DSR uygulanan 97 hastanın dosyaları tarandı. Silikon tüpün düğümlenerek sabitlendiği hastalar ve silikon kılıfla sabitlendiği hastalar olmak üzere iki grup oluşturuldu. Erken ve geç dönem kontrollerdeki sonuçlar kaydedildi. Epifora varlığı, silikon tüpe bağlı irritasyon semptomları ve lakrimal drenaj sisteminin açık olup olmaması ile ilgili bilgiler kaydedildi.
Bulgular: Silikon tüpün kanalda kalma süresi Grup 1'de daha uzundu (p=0,015). Nüks sayısında anlamlı fark görülmedi (p=0,618). Grup 1'de nüksün daha geç ortaya çıktığı görüldü (p=0,038). İrritasyon belirtileri Grup 2'de anlamlı olarak daha fazlaydı (p=0,001).
Sonuç: Silikon kılıfla sabitleme, irritasyon şikayetinin daha az olması ve daha iyi fiksasyon sağlaması açısından düğümleme yöntemine alternatif olabilir.

Anahtar Kelimeler: Dakriyosistit, epifora, irritasyon, nüks, silikon kılıf

ABSTRACT

Objective: To compare the patients in whom the free ends of the silicone tube were fixed using a silicone sleeve, which is a different technique from the knotting method, and the patients in which the free ends of the silicone tube were fixed using the classical knotting technique, in terms of post-operative symptoms and DSR success in dacryocystorhinostomy (DSR).
Materials and Methods: The files of 97 patients who presented with epiphora and were diagnosed with chronic dacryocystitis and underwent unilateral endonasal DSR were reviewed. Two groups were formed as patients in whom the silicone tube was fixed by knotting and patients in whom the silicone tube was fixed with a silicone sleeve. The results of early and late controls were recorded. Information about the presence of epiphora, silicone tube-related irritation symptoms, and whether the lacrimal drainage system was open or not were recorded.
Results: The duration of silicone tube in the canal was longer in Group 1 (p=0.015). There was no significant difference in the number of recurrences (p=0.618). Recurrence occurred later in Group 1 (p=0.038). Irritation symptoms were significantly more in Group 2 (p=0.001).
Conclusion: Fixation with silicone sleeve may be an alternative to knotting in terms of less irritation complaints and better fixation.

Key words: Dacryocystitis, epiphora, irritation, recurrence, silicone sleeve

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INTRODUCTION

Obstruction of the nasolacrimal duct is the leading cause of epiphora, which can result in chronic and acute dacryocystitis, as well as potentially severe conditions like abscess formation in the lacrimal sac and orbital cellulitis (1). Establishing nasolacrimal patency is the primary objective of DCR, which involves creating a new drainage pathway from the lacrimal sac to the nasal cavity. DCR is widely regarded as the gold standard for treating nasolacrimal duct obstruction (2). Caldwell provided the initial description of the intranasal approach for DCR in 1893. Following that, in 1904, Toti carried out the inaugural external approach (3). Due to the anatomical and functional challenges associated with intranasal DCR, ophthalmologists began to prefer external DCR more frequently. However, with the advancements in nasal endoscopy and other surgical equipment in the 1990s, endonasal DCR started to be preferred by surgeons as well (4).

The primary reason for DCR failure is typically the closure of the rhinostomy or distal common canal caused by scarring (5). The use of silicone tubes has been introduced to increase surgical success by maintaining patency of the canaliculi through the healing period (2). Starting from the 1970s, DCR with silicone tube intubation has been increasingly preferred by ophthalmologists over tubeless DCR (6-8). Tube loosening is one of the most frequent complications linked to canalicular silicone tube intubation (5,9). Following surgery, the silicone tube can completely dislodge from the intubated canal, either early or late in the postoperative period, or it can prolapse outward through the punctum, causing irritation in the ocular surface. To prevent such complications, it is a common practice to secure the free ends of the silicone tube intranasally. Numerous methods have been outlined for tube fixation, such as knotting the tube onto itself, using silk sutures, nasal vestibule suturing, ligaclips and securing with a silicone sleeve (9-12).

The impact of different methods for securing the tubes on DCR outcomes and symptoms is not well-known. Our study's objective is to examine the impact of the conventional knotting technique and the application of a silicone sleeve (Figure 1) for fixation on the success of DCR and postoperative symptoms.

MATERIALS AND METHODS

The data of 97 patients who were admitted to Sutcu Imam University Faculty of Medicine due to primary acquired nasolacrimal duct obstruction and who had unilateral chronic epiphora and underwent silicone tube intubation between 2017-2022 were retrospectively analyzed and included in the study. The patients' age, gender, duration of tube placement, presence of recurrence, duration of recurrence and sensation of tube-related irritation were evaluated. Preoperative examination records showed that all patients had epiphora, and during lacrimal irrigation no fluid passage to the nasal cavity was observed along with reflux. All patients were evaluated by reviewing their medical history, nasolacrimal lavage, biomicroscopic examination and consultation records from otolaryngology. Other causes of epiphora were ruled out. Exclusion criteria included a history of previous lacrimal or nasal surgery and the presence of any nasal, canalicular, eyelid, or anterior segment pathology that

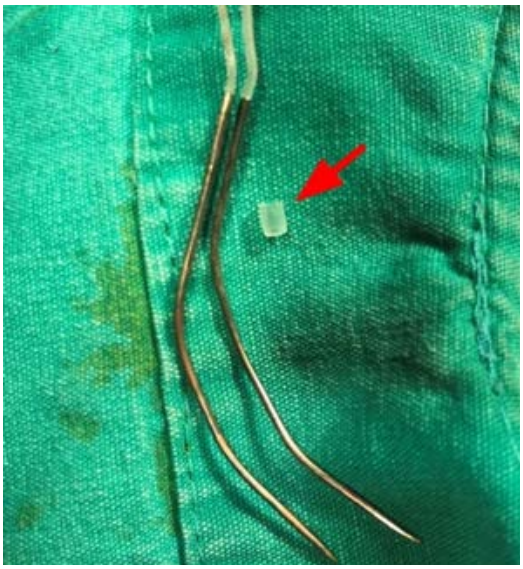

Figure 1. Silicone Sleeve (red arrow)

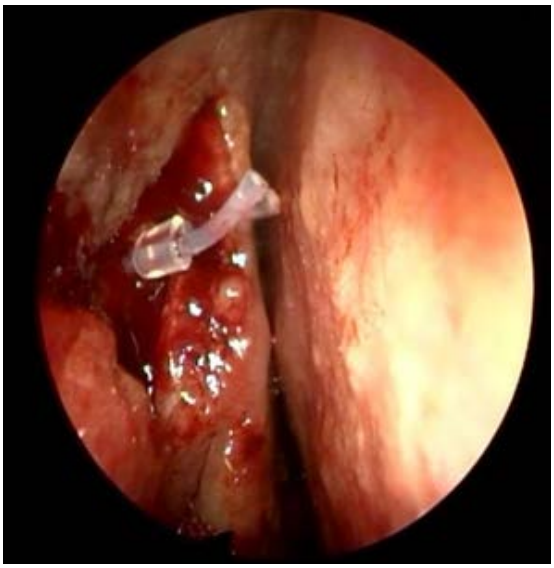

Figure 2. Silicone Tube Fixed with Silicone Sleeve

Table 1. Comparison of Groups In Terms of Recurrence, Irritation Complaints and Tube Removal Time

	Group 1 (n=51)	Group 2 (n=48)	P value
Recurrence (n, %)	4, (7.8 %)	5, (10.8 %)	0.618
Recurrence time (mounth) (mean±SD)	8±2.73	4±1.63	0.038
Irritation complaints (n, %)	3, (5.8 %)	15, (32.6 %)	0.001
Tube removal time (mounth) (mean±SD)	5.18±3.40	3.83±1.78	0.015

could cause epiphora. Patients were divided into two groups based on the method of tube fixation. In Group 1, the silicone tube of 51 patients was secured with a silicone sleeve, while in Group 2, the silicone tube of 46 patients was applied knot-tying method. In Group 1, during surgery, both ends of the silicone tube were passed through the silicone sleeve, and the looseness of the tube was adjusted as desired and secured (Figure 2). In Group 2, the silicone tubes were slightly pulled out and knotted on themselves 8-10 times before placement. All fixation procedures were performed by the same surgeon.

The statistical analysis of the work data was performed using Statistical Package for the Social Sciences version 22.0 software (SPSS IBM Inc., Armonk, NY, USA). The distribution of the data was evaluated using the Shapiro-Wilk test. For data that followed a normal distribution, the Student t-test was used for comparisons between two groups, while the Mann-Whitney U test was used when the data did not follow a normal distribution. Continuous variables were presented as mean ± standard deviation (SD), while categorical variables were presented as number (n) and percentage (%).

RESULTS

All patients were seen for early postoperative follow-up at day 1, week 1 and month 1. Presence of epiphora, irritation related to the silicone tube and patency of the nasolacrimal canal were evaluated during long-term follow-up visits at 3 months, 6 months and 12 months. Disappearance of symptoms during the postoperative period and demonstration of anatomical patency through lacrimal lavage were considered as successful outcomes. There were 51 patients (39 Female/12 Male) in Group 1 and 46 patients (38 Female/8 Male) in Group 2. No significant difference in terms of gender distribution was found between the groups (p=0.461). The mean age of patients in Group 1 was found to be 48.59±9.43 years, while in Group 2 it was 49.30±9.55 years. There was no statistically significant difference in terms of age between the groups (p=0.711).

No significant difference in terms of recurrence was observed between the groups during the 12-month follow-up period. In Group 1, recurrence was noted in 4 patients (7.8%), whereas in Group 2, it was observed in 5 patients (10.8%) (p=0.618). The mean time to recurrence was 8±2.73 months after surgery in Group 1, and 4±1.63 months after surgery in Group 2 (Table 1). It was determined that patients who underwent knot-tying method had a significantly earlier recurrence (p=0.038). Statistically, the complaint of irritation was more common in the patient group who underwent the knot-tying method. In Group 1, irritation was reported in 3 patients (5.8%), whereas in Group 2, it was observed in 15 patients (32.6%) (p=0.001). In relation to this result, it was statistically significant that the tube remained in the canal longer in the silicone sleeve group due to less complaints of irritation (p=0.015). The mean duration of the tube in the canal was 5.18±3.40 months in Group 1 and 3.83±1.78 months in Group 2 (Table 1).

DISCUSSION

Although there have been no large prospective studies demonstrating an advantage of using a stent during DCR, it has been hypothesized that the currently used silicone tubes are a stable, non-antigenic material is employed to preserve the patency of the newly established fistula and to deter stenosis and scarring at the ostium (2). Although the success rate of intubated DCR is high, there have been some studies of increased failure and complication rates associated with the silicone tube. Furthermore, studies have indicated that the success rates of DCR are similar between procedures with silicone tubes and those without them (2,13,14). In our study, recurrence was observed in 4 individuals in Group 1 and 5 individuals in Group 2. When considering recurrence, the success rate was found to be 92.1% in Group 1 and 89.1% in Group 2. The recurrence rates in our study are similar to the literature, and no significant difference in DCR success was detected between the two groups.

Adverse conditions such as irritation on the ocular surface due to loosening of the silicone tube from the punctum, canalicular damage due to excessive tension on the tube, secondary infection, granuloma formation at the ostium along with adhesions, allergic reactions to silicone and intranasal irritation have been reported (15-17). In our study, irritation complaints related to the silicone tube were observed in 18 out of 97 individuals. Statistically, the complaint of irritation was higher in the patient group where the knot-tying method was used. Tube loosening or extrusion

from the interpalpebral space or medial canthus is one of the most frequent complications associated with silicone tubes (5,9). Stent prolapse rates of 10% to 17% have been reported. The sagging of the silicone tube often requires repositioning within the canal or early removal (12).

Therefore, several techniques have been used to prevent the silicone tube from loosening and to secure it in place. One of these techniques is to suture the ends of the tubes together or to suture the tubes to the nasal wall. Typically, a suture is used to secure the distal end of the silicone tube to the lateral nasal vestibule. Nevertheless, this approach comes with the risk of suture erosion and extrusion along the nasal mucosal surface. Alternative methods to prevent tube sagging include self-tying the tubes, securing the arms of the silicone tube with a silicone sleeve, or aneurysm clip as a safety plug (9-11). The disadvantages of these techniques mainly revolve around the proper adjustment of fixation and difficulties related to tube removal.

The utilization of silicone sleeves was initially introduced by Hopkisson in 1995 (12). During both external and endonasal DCR procedures, some surgeons prefer silicone sleeves for their convenience, capability to stabilize the tubes and widespread availability. Silicone sleeves are positioned near the ostium at a distance that prevents tube sagging while still allowing tube movement. Apart from the ease of adjustment, the primary advantage is the quick and straightforward technique for removing the tube. In a study covering 166 DCR cases, no complications related to silicone sleeves were observed, with only partial medial canthal tube prolapse seen in 3 patients (18). In our study, the complaint of irritation was significantly higher in patients where the knot-tying method was applied compared to patients where silicone sleeves were used (p=0.001).

Additionally, by using a silicone sleeve, the ends of the silicone tube can be easily secured, preventing it from dislodging when properly adjusted. It allows for quick and easy removal from the medial canthus, leading to time and cost savings associated with endoscopy. Silicone sleeve provides advantages in terms of stabilizing the tube, preventing displacement, and facilitating efficient removal, ultimately enhancing patient comfort and reducing procedural complexities. It also offers benefits in terms of time management and cost-effectiveness related to endoscopy (12,19).

CONCLUSION

Using a silicone sleeve to connect the ends of a silicone tube can offer advantages in DCR, with a notable focus on enhancing patient comfort and facilitating quicker and simpler adjustments and tube removal. By providing stability and preventing displacement, the silicone sleeve contributes to an improved experience for the patient. Additionally, silicone sleeve offers benefits in terms of time management and procedural simplicity when compared to traditional methods.

Etik Kurul: The study was approved by Sutcu Imam University Faculty of Medicine Ethics Committee (Date:31.07.2019, Protocol No:2019/14) and all procedures were applied in accordance with the Declaration of Helsinki.

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