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ORIGINAL INVESTIGATION

One-week intubation in external dacryocystorhinostomy– a report on long-term outcome

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ABSTRACT

Purpose: The role of silicone stent intubation in dacryocystorhinostomy (DCR) is not clear, and conclusions presented in the literature are contradictory both regarding if intubation should be recommended and if so, the appropriate duration of intubation. This paper reports on the long-term outcome of a comparatively short duration of silicone stent intubation, one week, and discusses the possibility of an optimal duration of intubation where the benefit of the silicone stent is utilized but with minimal risk of complications.

Methods: A total of 70 cases of DCR were followed in 67 patients for four years in a descriptive case series of uncomplicated external DCR with one-week silicone stent intubation. Pre- and perioperative findings, complications, and the need for additional surgery were recorded. At end of follow-up, a questionnaire was sent to the patients asking them to grade the frequency of epiphoric problems. If graded often/constant, a follow-up visit was offered.

Results: One patient received additional surgery during follow-up due to persistent epiphora caused by synechiae between the middle turbinate and lateral nasal wall. The response rate to the questionnaire was 88%, with 93% of the respondents reporting epiphora never/seldom. Four patients reported persistent problems: one declined further examination, the tear duct was anatomically patent in two, and one was referred to the ENT department due to inflamed nasal mucosa and extensive adhesions. The long-term functional or anatomical success rate was 97%.

Conclusions: This study shows that a high long-term success rate for uncomplicated DCR is possible with only one-week silicone stent intubation.

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Dacryocystorhinostomy; epiphora; silicone stent intubation; success rate

Introduction

The role of intubation in dacryocystorhinostomy (DCR) is the subject of debate in the field of lacrimal surgery. Previously the focus of the discussion has been stenting versus no stenting with some surgeons recommending stenting,[1–6] while others argue that they are not needed in cases showing no canalicular stenosis, fibrotic lacrimal sac or other complicating factors.[7–13] Published studies have given contradictory results and they are difficult to compare as they vary regarding inclusion criteria and follow-up. Concerns have been raised that some of the studies were underpowered to detect a difference.[14,15] A major review by Kalin-Hajdu et al in 2016 revealed no evidence supporting routine intubation.[16] One recent meta-analysis of randomized controlled trials showed a 5% higher success rate with silicone intubation (all DCR modalities),[17] while another found no additional advantage of intubation in endonasal DCR,[18] and a third no advantage regardless of DCR modality (external, endonasal or laser-assisted).[19]

A factor that has not received much attention is whether or not the duration of intubation may affect the outcome. No consensus exists regarding the duration of intubation among surgeons advocating silicone stent intubation in conjunction with DCR and in published studies the duration varies between four weeks and six months.[1–6] Few studies have taken the length of silicone stent intubation into account. Vicinanzo et al investigated the consequence of premature silicone stent loss (before 2 months) in primary external DCRs and did not find any significant difference in success rate.[20] In an retrospective chart review combined with telephone survey, Charalampidou and Fulcher compared external DCRs with early silicone stent removal (<8 weeks), routine silicone stent removal (8–16 weeks) and late silicone stent removal (>16 weeks) and found 95%/90.5%/91.3% of patients with complete or partial resolution of epiphora but this result was not statistically significant.[21] The study is, however, limited as compared groups were small with 19/63/46 patients in the early/routine/late removal groups respectively.

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Could there be an optimal duration of intubation which improves the success rate, but beyond which silicone stent placement may become a negative factor, resulting in a worse outcome than if no stent had been inserted? If so, may this be one reason for the inconsistent findings reported in the literature where length of intubation varies greatly? It is known that silicone stents may cause granulomas via a foreign body reaction and contribute to DCR failure.[22–27] Post DCR granulomas occur 6.5–7 weeks after surgery and apart from being caused by silicone stent related foreign body reactions, other suggested causes are bare bone left for second intention healing, the surgical trauma itself or patient related factors.[22,28] However, if a granuloma develops at inner puncta, in contact with the silicone stent, the functional success rate is significantly worse (60%) than if a granuloma occurs at any other location (87.8–98%).[28] When a peritubular granuloma is found, stent removal combined with steroid treatment (ocular topical and nasal or intralesional) is recommended.[22,28] Other intubation-associated complications frequently reported in the literature are extrusion or prolapse of stent, patient discomfort and laceration of the lacrimal canaliculi and theoretically a longer intubation period would increase the risk for these complications.[3,8,21,29–32]

At the St. Erik Eye Hospital in Stockholm, Sweden, the standard care for acquired lacrimal duct obstructions is external DCR with the insertion of a bicanalicular silicone stent. In uncomplicated cases, the stent is removed one week after surgery at the same time as the removal of skin sutures. This is a shorter duration than in other published studies reporting success rates for DCR with silicone intubation. It was initially chosen both for the ease of the patient and the effectiveness of healthcare avoiding the need for a routine second follow-up visit. This practice has been in place for the last two decades. However, if canalicular stenosis or a scarred lacrimal sac is encountered during surgery, or the surgeon decides that flaps are suboptimal, the silicone stent is left in place for 3–4 months. This study was performed to investigate the long-term outcome of uncomplicated external DCR with only one-week intubation.

Materials and methods

The study was conducted as a descriptive case series. Consecutive adult patients (>18 years) with nasolacrimal duct obstruction of any etiology, treated with external DCR with one-week silicone tube intubation, were invited to participate. The exclusion criterion was the inability to give informed consent due to functional or language difficulties. All surgical procedures were performed between May 2011 and September 2012. Atypical perioperative findings, postoperative complications and additional lacrimal surgeries during follow-up were recorded. A questionnaire was sent to the patients four years after surgery asking them to grade the frequency of current epiphora problems as never/seldom or often/constant in the operated eye. In the case of bilateral epiphora, patients were asked to provide responses for each eye. Patients categorizing their problems as often/constant were offered a follow-up visit.

Surgical procedure

Dissection is carried out to the anterior limb of the medial canthal tendons through a skin incision on the side of the nose. The tendon is cut and the periosteum elevated, exposing the bone in, and anterior to, the lacrimal fossa, to create a large osteotomy. A probe is inserted into the lacrimal sac to facilitate the formation of anterior and posterior flaps. Corresponding flaps are formed using the nasal mucosa. The posterior flaps are sutured, bicanalicular silicone stent intubation performed and, finally, the anterior flaps are sutured before the skin is closed with a running suture. The ends of the silicone stent are taped to the nasal ala. Postoperative care includes local treatment with fucidic acid twice daily for one week, and if severe inflammation of the lacrimal sac is observed during surgery, additional systemic antibiotics are prescribed. Skin sutures and the silicone stent are removed after one week.

Ethics

The Ethics Committee of Karolinska Institutet, Stockholm concluded that the study was a quality assurance study and thus exempt from the need of ethical approval. The study was conducted in accordance with the Declaration of Helsinki.

Results

Seventy cases of primary external DCR (67 patients) with one-week intubation were included between May 2011 and September 2012. All cases were uncomplicated as complicating factors such as canalicular stenosis, fibrotic lacrimal sacs or suboptimal flaps would prompt the surgeon to decide to let the silicone stent remain in place longer than one week.

Of the 70 cases, 53 (76%) were in women, and 39 (56%) affected the right lacrimal drainage system. The mean age was 58 years (median 57 years, range 24–88 years).

A history of acute dacryocystitis or signs of current chronic infection were found in 38 cases. During surgery, concretions were found in two cases, and a retained silicone stent from a previous lacrimal probing and silicone tube intubation in one. Complications were limited to one case of postoperative epistaxis; no cases of postoperative infection were encountered.

Additional lacrimal surgery was needed in one case. Upon examination of this patient due to persistent epiphora, the middle concha was found to partly cover the osteotomy, with a small adherence between the concha and the lateral wall. Reoperation was performed endoscopically for reduction of the concha and debridement of the adherence.

At the end of the four-year follow-up period the questionnaire was sent to 63 patients (66 cases), as 3 patients cases (3 cases) had died of unrelated causes, and the above-mentioned case was excluded due to additional surgery. Answers were received for 58 cases, giving a response rate of 88%. In 54 cases (93% of responses) epiphora was classified as never/seldom, and in 4 cases (4 patients) as often/constant. Of the 4 patients with persistent epiphora, one declined a further examination, two were found to have anatomically patent tear ducts but with coexisting functional epiphora or reflex tearing, and one was referred to the ENT department due to multiple adherences on both sides of the nasal septa. This patient later moved abroad before any diagnosis could be made. With deceased and non-responding patients excluded, the functional or anatomical four-year success rate was 97%.

Discussion

This study is the first to present long-term outcome of DCR surgery with only one-week intubation. With high rate of success (97%) and no cases of canalicular laceration, stent prolapse or extrusion it shows that short intubation time in uncomplicated cases is possible with results comparable to the highest reported success rates in the literature.[6,33–35] It is also higher than the achieved success rate (90.5% partial or complete resolution of epiphora) in the routine intubation time group (8–16 weeks) reported by Charalampidou and Fulcher.[21] In addition, a short intubation time is cost-effective and practical for the patient as it eliminates the need for a second routine follow-up visit.

When discussing intubation in DCR, the important question is what mechanism is responsible for any beneficial effects. It has been suggested in the literature that the silicone stent prevents mal-adhesion of the nasal and lacrimal sac flaps, as well as later contracture of the osteotomy.[36] If this is the case, silicone stents should remain in place until the healing process is completed, i.e. for 3–4 months. Given the difference in size between the silicone stent and the anastomosis, it can be questioned whether this is the case. Ali et al concluded that the important factors for achieving a stable post-DCR osteotomy size are creation of an adequately sized osteotomy intraoperatively, fully exposing the lacrimal sac, and that the opening are allowed to heal by primary intention i.e. not the presence of a silicone stent.[37]

A theory proposed by Rose suggests that the role of the stent is to prevent cross-adhesion due to epithelial abrasion in the puncta, canaliculi and valve of Rosenmuller caused by the insertion of the probe or in the case of endonasal DCR, the light pipe, by preventing the build-up of fibrin exudate in these areas.[38] This is even more important if the epithelium is inflamed, as in chronic dacryocystitis. However, the stent would only be needed until fibrin exudation has ceased, i.e. a few days. This theory is in line with the proposed existence of an optimal duration of intubation, as suggested in the introduction, where it was proposed that the stent is beneficial initially, but may become a negative factor if left in place too long. The present study is limited by its non-comparative nature and that the majority of patients have not been reexamined to confirm anatomical patency and determine if granuloma at inner puncta may occur despite only one week intubation. To establish whether an optimal duration of intubation exists, further, adequately powered, randomized studies are needed. Such studies should also take the degree of inflammation in the lacrimal epithelium into consideration. One week, based on the present study, could then be used as length of intubation for the short-term intubation control group.

In conclusion, this study shows that the long-term success rate was high when the silicone stent was left in place for one week following uncomplicated external DCR. However, future studies on DCR should not only compare intubation with non-intubation, but also different durations of intubation.

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Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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