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RESEARCH ARTICLE

Evaluation of the Role of Silicone Intubation in Non-complicated External Dacryocystorhinostomy

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Abstract:

Aim:

Evaluation of the role of silicone intubation in non-complicated External dacryocystorhinostomy (Ext-DCR).

Background:

Silicone intubation is described as a step of Ext-DCR. It was proposed that it may prevent obstruction involving the osteotomy or the common canaliculus. However, its necessity in non-complicated Ext-DCR is controversial.

Objective:

To study the effect of intubation and its duration on the results of non-complicated Ext-DCR.

Methods:

A prospective randomized interventional study that included 75 Ext-DCRs. Patients with a high risk of failure were not included. Patients were randomly distributed between 3 equal groups with either traditional 3 months intubation (group A), short-term intubation for 2-3 weeks (group B), or non-intubation (group C).

Results:

The success rate was 92%, 96%, and 92% in groups A, B, and C, respectively, with no significant differences ($P = 0.853$). Temporary foreign body sensation was reported in 16% in group A and 12% in group B. No significant complications were recorded in any of the 3 groups.

Conclusion:

Intubation (either short-term or 3 months) did not affect the results of Ext-DCR, which gives more evidence that it is not necessary in non-complicated cases.

Keywords: Silicone intubation, Dacryocystorhinostomy, Silicone tube, Nasolacrimal duct obstruction, Epiphora, External dacryocystorhinostomy.

Article History

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1. INTRODUCTION

External dacryocystorhinostomy (Ext-DCR), since it was first described in 1904, has been well known as the operation of choice for the management of Nasolacrimal Duct Obstruction (NLDO). It helps in tear drainage by communicating the lacrimal sac and nasal mucosa through an ostium in the lacrimal bone [1, 2].

The use of a silicone tube for nasolacrimal intubation was first described in 1968. The procedure then has been subjected to modifications and used as a step of Ext-DCR. It was proposed that intubation may prevent obstruction involving the osteotomy or the common canaliculus [3 - 5].

Recently, controversy exists about the necessity of intubation in Ext-DCR surgeries done for acquired NLDO. This study was conducted to evaluate the role of bicanalicular intubation in non-complicated Ext-DCR.

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2. PATIENTS AND METHODS

This was a prospective randomized study that included patients presented to the out-patient clinic, Tanta University Eye Hospital, Egypt, over a period of two years with chronic dacryocystitis or primary acquired NLDO. All included patients had chronic epiphora of 6 months or more. The study adhered to the principles of the declaration of Helsinki and was approved by the institutional ethical committee. Patients with a history of previous failed DCR, distal, or common canalicular stenosis, history of medial canthal trauma, NLDO secondary to tumors, or chemotherapy were excluded from the study.

Patients' evaluation depended on clinical data including full patient history, regurgitation test, Fluorescein Dye Disappearance Test (FDDT), diagnostic probing, and syringing.

The study included 75 patients who were treated by 75 Ext-DCR procedures. They were randomly distributed between 3 groups:

- Group A: Included 25 Ext-DCR procedures with conventional 3 months intubation.
- Group B: Included 25 Ext-DCR procedures with short-term intubation (2-3weeks).
- Group C: Included 25 Ext-DCR procedures without intubation.

Surgeries were performed by the second and third authors (M.E. and O.S.). All patients received combined antibiotic steroid eye drops 4 times daily for 1 week post-operative. They were seen 1 week, 2-3 weeks, 3 months, and 6 months post-operative. They were evaluated for symptomatic relief, FDDT, and lacrimal syringing. Successful surgery was defined as the resolution of epiphora with negative FDDT and patent syringing. Skin sutures were removed after 1 week. The silicone tube was removed after 2-3 weeks in group B and after 3 months in group A.

All patients were subjected to nasal endoscopic examination 1 month, 3 months, and 6 months post-operative to check the patency of the ostium and to detect any nasal tube related complications as synechia or granuloma formation. This was not one of the criteria for evaluation of the success of procedures, which was evaluated on the clinical basis as mentioned earlier.

3. STATISTICAL ANALYSIS

Patients' data were collected and statistically analyzed using the mean value, standard deviation, Chi-square test, and ANOVA test, using SPSS Statistics for Windows. (Version 20.0. Armonk, NY: IBM Corp). A value of p less than 0.05 was considered statistically significant.

4. RESULTS

The study included 42 females (56%) and 33 males (44%). Group A included 14 females (56%) and 11 males (44%), group B included 15 females (60%) and 10 males (40%), while group C included 13 females (52%) and 12 males (48%), with no significant differences between the 3 groups ($P=0.736$)

(Table 1). The mean age in groups A, B, and C were 43.2 ± 11.7 years, 44.3 ± 10.1 years, and 42.1 ± 10.7 years, respectively, with no significant differences between the study groups ($P=0.674$) (Table 1).

Table 1. Demographic data of the study patients.

-	Patients' Sex				P-value
	Females		Males		
	No.	%	No.	%	
Group A	14	56%	11	44%	0.736
Group B	15	60%	10	40%	
Group C	13	52%	12	48%	
Patients' age in years					P-value
Range		Mean	SD		
Group A	20-63		43.2	11.7	0.674
Group B	21-67		44.3	10.1	
Group C	18-61		42.1	10.7	

At the end of the follow-up period, the final outcome was successful in 23 cases (92%) in group A, 24 cases (96%) in group B, and 23 cases (92%) in group C with no significant difference ($P=0.853$). Nasal endoscopic examination showed no tube related nasal mucosal complications, such as synechia or granuloma formation, either in short-term or conventional 3 months intubation groups. No other significant tube related complications, such as punctal and canalicular lacerations or tube loss, were recorded in silicone intubation groups. Discomfort and foreign body sensation were reported in 4 patients (16%) in group A and in 3 patients in group B (12%). These were temporary findings noticed during the first 5-7 days post-operative.

5. DISCUSSION

The use of intubation in Ext-DCR and its advantages and disadvantages have been recently a controversial issue. Many studies found the role of intubation is unclear with no evidence favoring its use, especially in cases of routine Ext-DCR done for uncomplicated primary NLDO. They found no benefit of silicone intubation in such cases [6 - 8].

Similar findings were also reported in endonasal dacryocystorhinostomy (EN-DCR). A systemic review and meta-analysis which studied the benefit of silicone stents in primary EN-DCR found the success rate of EN-DCR was 93.4% with silicone tube and 92.2% without silicone tube, with no statistically significant difference in outcomes [9]. Another systematic review reported a success rate of 92.9% with silicone tube and 91.2% without silicone tube, with no statistically significant heterogeneity among the included studies [10].

On the other hand, a sequential meta-analysis comparing the rate of success of DCR with and without intubation found that DCR with intubation had a better success rate which was statistically significant [11]. A meta-analysis of randomized controlled trials of DCR with and without silicone intubation found a 5% statistically significant improvement in DCR success rate with silicone intubation [12].

Other comparative studies found a higher success rate of

Ext-DCR with silicone intubation [13, 14]. Rather and Singh mentioned that the better results with intubation can be explained by preventing the obstruction of the common canalicular opening into the lacrimal sac, one of the most important causes of DCR failure. They reported trauma and unnecessary intraoperative probing of the common canaliculus as causes for post-operative common canalicular fibrosis [13]. We believe that avoiding intubation of intact common canaliculus can prevent this unnecessary trauma and its sequelae.

In this study, no difference was found in the success rate between intubation (either short-term or conventional 3 months) and non-intubation groups ($P=0.853$).

Other authors preserved intubation for DCRs done for complicated cases. Sodhi *et al.* used intubation as a step of Ext-DCR only in patients with a high risk of failure. Their study included only cases with previous medial canthal trauma, previously failed DCR, or following attacks of acute dacryocystitis. They reported a success rate of 76% [15]. Hwang *et al.* studied the results of DCR with canaliculoplasty and double or single silicone intubation. Their study included only cases with distal or common canalicular obstruction. They reported a functional success rate of 88.3% in double intubation and 81.2% in single intubation [16]. In a study done by Choung and Khwarg, intubation was selectively not performed in cases with large lacrimal sac and wide nasal cavity. They reported anatomic patency of rhinostomy in all non-intubation cases and concluded that intubation can be avoided in 50% of Ext-DCR surgeries [17].

In this study, cases with distal or common canalicular problems were excluded. Also, cases with a history of trauma or previous failed DCR were not included.

A few complications have been reported with the use of silicone intubation including punctal and canalicular lacerations, tube loss, foreign body sensation, and conjunctival irritation [15, 18]. It was also assumed that the silicone tube (as a foreign body) may incite nasal granuloma formation and even predispose to failure of Ext-DCR [18]. Tube prolapse is another rare complication which was reported to occur in 2.5% [19].

Another reported disadvantage of intubation is increasing the costs of surgery. Saiju *et al.* reported that it increased the surgical costs by 20%, while Gul *et al.* calculated its cost as 25% of the total cost of surgery [7, 20].

In this study, no complications were reported in patients of silicone intubation groups. Nasal endoscopic examination was done to exclude nasal granuloma formation, and it was not found in any case.

The suitable duration to keep the tube is another controversial issue. Some authors recommended its use for 6 months in cases with common canalicular problems or high risk of failure [15, 16]. While, in non-complicated cases, other authors used it for 3 months [20, 21]. Eight weeks of intubation was also reported in association with Ext-DCR [22]. Other investigators used the silicone tubes in patients treated by endoscopic DCR for shorter periods of 6 weeks or 8 weeks [23 - 26]. Rather & Singh reported that, with Ext-DCR, the

optimum duration of intubation is 4 weeks and keeping it for longer durations increases the possibility of punctal and canalicular erosions [13]. This is, to our knowledge, the first prospective study comparing the conventional duration of intubation (3 months) with a shorter period of intubation (2-3 weeks) in Ext-DCR, and no differences in success rates were recorded. Bazzazi *et al.* compared the results of DCR after 3 months of intubation with results in patients where the tube was extruded or had to be removed before the planned time, and found no significant difference [27]. In their study, the time of early tube removal was not planned, and tubes were removed or lost at different durations ranged between 7 and 85 days.

CONCLUSION

This study supports the evidence that silicone intubation is not necessary in non-complicated cases of Ext-DCR. No differences in results or complications incidences were found between non-intubation, short-term intubation, and conventional 3 months intubation.

LIST OF ABBREVIATIONS

Ext-DCR	= External Dacryocystorhinostomy.
NLDO	= Nasolacrimal Duct Obstruction.
FDDT	= Fluorescein Dye Disappearance Test.
EN-DCR	= Endonasal Dacryocystorhinostomy.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Ethical committee, Faculty of Medicine, Tanta University, Egypt. Approval reference number: 30727/01/16.

HUMAN AND ANIMAL RIGHTS

No animals were used in this research. All human research procedures followed were in accordance with the ethical standards of the institutional committee and with the Declaration of Helsinki.

CONSENT FOR PUBLICATION

Informed written consent was obtained from all the patients included in the study.

AVAILABILITY OF DATA AND MATERIALS

Not applicable.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

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