



## Original Research Article

## Comparative study of effectiveness of external dacryocystorhinostomy with silicone tube placement versus silicone tube with application of Mitomycin–C in nasolacrimal duct obstruction

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## ABSTRACT

**Purpose:** To compare the effectiveness of external dacryocystorhinostomy(DCR) with Silicone tube(SI) placement versus Silicone tube with application of Mitomycin–C(MMC) in Nasolacrimal Duct Obstruction(NLDO).

**Materials and Methods:** The study was conducted in the department of Ophthalmology, at BRD medical college, Gorakhpur, U.P., India between March 2018 to June 2019. It was a prospective randomized study, where we studied 88 eyes from patients who presented with simple epiphora due to primary acquired NLDO. The patients were randomly assigned into two groups, where one group was subjected to external DCR along with the placement of a silicone tube, and the other group underwent silicone tube placement followed by the application of 0.2mg/ml of anti-metabolite MMC.

**Results:** After a 6 month follow-up, it was noted that there was no statistically significant difference between the two groups, i.e., when considering patients with simple epiphora secondary to primary acquired NLDO, external DCR with silicone tube and silicone tube with MMC(0.2mg/ml) application are at par with each other in terms of effectiveness. However, silicone intubation with MMC is a minimally invasive procedure when compared to external DCR with silicone tube placement.

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## 1. Introduction

NLDO whether congenital or acquired, is a very common condition where patients present with persistent watering and/or discharge. The acquired variety presents later in life generally in the fifth to seventh decades, manifesting more in females than males(3:1).<sup>1</sup> When it comes to cases of NLDO, DCR is considered to be the gold standard. The first to describe endonasal and external DCR were Caldwell and Toti respectively.<sup>2,3</sup>

Formation of scar tissue in the nasal cavity, granulation tissue or adhesions at the osteotomy site cause it to block, are some of the factors that lead to a failure of both endonasal as well as external DCR, accounting to failure rates as high as 18%.<sup>4–8</sup> Recent advances in the form of adjunctive methods

like silicone intubation<sup>9–11</sup> and the use of anti-metabolites like MMC<sup>12–14</sup> have gone into increasing the success rate of DCRs, as they serve to maintain the patency of the osteotomy site.

Our chief objective in this comparative study is to establish the role and effectiveness of external DCR along with SI versus effectiveness of SI with application of MMC in evaluating patients with simple epiphora attributable to primary acquired NLDO.

## 2. Materials and Methods

This prospective, randomized study was performed in the Ophthalmology department at BRD medical college, Gorakhpur, U.P., India between March 2018 –June 2019. Here we selected patients who presented in the OPD with the chief complaints of watering and/or discharge secondary to primary acquired NLDO.

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Our exclusion criteria included patients presenting with other causes of epiphora and discharge like deformities of the lid, obstructions in the canalicular and common canalicular pathways. We selected 82 patients in whom we considered 88 eyes presenting with watering and/or discharge of <6 months duration. A well informed written consent was obtained from the patients after which they were subjected to a thorough systemic and local ocular examination including an assessment of visual acuity, slit –lamp examination, lacrimal drainage system check in the form of patency evaluation by lacrimal syringing and a dye disappearance test were performed. A nasal examination was also performed to rule out any deviation of the nasal septum, any turbinate hypertrophy, nasal polypoidal growth.

After examination, the patients were divided into two groups. Group –A, that was later subjected to external DCR along with SI and the second group-B, where the study subjects had to undergo a silicone tube placement together with application of MMC (intra-operative 0.2mg/ml mitomycin-C ). Follow-up visits were scheduled at 1 week, 2weeks, 3 months and 6 months post-operatively. Successful outcome was indicated by symptom –free interval of 6 months i.e. no watering and/or discharge. A prior approval was sought from the ethical committee of the respective institution for subjecting the patients to the aforementioned procedures.

Statistical analysis was performed using SPSS version 22.0 for windows. Analysis of variance test and student-t test were applied to study the comparison between the two groups. Chi-square test was used to assess the success rate of the respective procedures performed. P value( $P < 0.05$ ) was regarded as being statistically significant.

### 2.1. Technique of surgery

#### 2.2. External DCR with Silicone intubation

The group-A patients after an informed consent and adequate local anaesthesia were first subjected to external DCR, wherein a 10-12mm curvilinear skin incision was made along the anterior lacrimal crest. Further dissection was carried out to separate out the soft tissue and reach upto the periosteum of the anterior lacrimal crest, after which the medial canthal ligament was split. A blunt dissection was then carried out to reach upto the periosteum of the inferior orbital rim in front of the anterior lacrimal fossa. The periosteum was lifted with the help of a perisosteum elevator, thus revealing the lacrimal sac fossa. An osteotomy of 12x12 mm was created after puncturing the lamina papyracea, with the help of a bone punch.

The lower punctum was dilated and a probing performed through the lower canaliculus. Lacrimal sac and nasal mucosal flaps were fashioned and then sutured with each other after making an incision through the lacrimal sac and nasal mucosa respectively. A silicone intubation was

then performed using a 27 gauge SI tube. The flaps and subcutaneous tissue were sutured followed by skin closure, after which a lacrimal irrigation was performed.

#### 2.3. Silicone intubation with application of MMC(0.2mg/ml)

The group –B patients were subjected to SI along with application of MMC(0.2mg/ml) after achieving adequate local anaesthesia. The procedure followed was a dilation of the upper and lower puncta following which probing was done through the lower canaliculus with the help of a Bowman's lacrimal probe. After passing through the lower canaliculus, when a hard stop was encountered, the probe was gently rotated and passed into the nasolacrimal duct, to reach below the inferior concha. The same procedure was repeated for the upper canaliculus. Patency of the duct was ascertained by irrigation with normal saline, after which the same was repeated using 1ml of 0.2mg/ml of MMC. The ocular surface was then thoroughly washed with normal saline.

Silicone intubation was then performed through the lower canaliculus using a 27 gauge SI tube. The same was repeated through the upper canaliculus. The two silicone tubes were tied and fixed to the lateral wall of the nose.

#### 2.4. Postoperative management

Group-A patients who underwent external DCR with SI were given oral Ciprofloxacin 500mg bd and oral analgesics for 7 days. Topical moxifloxacin eye drops were instilled 6 times a day. After careful observation, the nasal pack was removed after a period of 24 hours and the wound site inspected. Topical medication was continued for 2 weeks and the silicone tubes were left in place for 3 months. Follow-up visits were scheduled at 1 week, 2weeks, 3 months and 6 months post-operatively. During each visit success and failure rates were analysed by assessing the patency of the lacrimal drainage pathway through lacrimal irrigation.

### 3. Results

We selected 82 patients in whom we studied 88 eyes for NLDO. 28 males, 54 females, and mean age 30.51, SD=7.33 years. Details of the characteristics of the patients are outlined in the Table 1 :

Successful outcome was indicated by symptom –free interval of 6 months i.e. no watering and/or discharge. In the eyes that underwent external DCR with silicone intubation, 25 (56.8%) eyes had a successful outcome where as in the group that underwent silicone intubation along with MMC(0.2mg/ml), 19(43.1%) eyes were symptom free. It was seen that there was no statistically significant difference between the two groups P value  $< 0.05$ .

**Table 1:**

Group	No. of eyes	Treatment	No. of eyes with successful outcome *	Male/female	Age(mean± SD)	OD/OS
A	44	Ext.DCR+ SI	25 (56.8%)	15/26	30.51±11.43	20/24
B	44	SI+MMC(0.2mg/ml)	19 (43.1%)	13/28	28.2±13.32	23/21

\*Chi-square=0.946, P=0.331 SI:silicone intubation, MMC:mitomycin-C, SD:standard deviation

#### 4. Discussion

Patients presenting with epiphora and/or discharge is a very common sight and NLDO accounts for a vast majority of such cases. The acquired variant of NLDO presents later in life. When it comes to cases of NLDO, DCR is considered to be the gold standard. It has shown good results. There have been some instances where surgeons have preferred to use adjunctives in the form of silicone tube along with DCR which have led to an increased success rate of the procedure,<sup>15,16</sup> as silicone intubation serves to keep the osteotomy site patent, thereby decreasing failure rates.

In a study by Buttarni et al, the use of adjunctive silicone tube in cases that underwent external DCR, there was a marked improvement in the success rates (76%). Kacaniku et al, confirmed the same finding that use of silicone tube along with external DCR goes on to increase the surgical success of the procedure.<sup>17</sup>

Liu and Bosely evaluated the efficacy of SI with MMC.<sup>18</sup> Owing to the fact that MMC decreases fibroblast collagen synthesis, it favourably affects success rate as it helps to maintain the patency of the ostium and can therefore be used as an adjunct. Tabatabaie et al,<sup>19</sup> also conducted a study wherein he corroborated the result that SI and MMC go hand in hand in improving the success of treatment of NLDO, especially in patients with more than 6 months of watering.

Hence in our study we have seen that when considering cases of simple epiphora and/discharge secondary to primary acquired NLDO, subjecting the patients to external DCR with SI and SI with MMC(0.2mg/ml) have borne almost equal results.(P value<0.05% i.e. statistically insignificant).

#### 5. Conclusion

In uncomplicated and simple cases of primary NLDO and of a short duration of symptoms(<6 months), Both external DCR +SI and SI+MMC(0.2mg/ml) are at par with each other in terms of a successful outcome. However, considering invasiveness, external DCR is definitely a more invasive surgical procedure when compared to SI+MMC. Hence, treatment protocol should be tailored as per the patient requirements and feasibility.

#### 6. Acknowledgements

None.

#### 7. Conflict of interest

None.

#### 8. Financial disclosures

None.

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