

## Original Research Article

# Role of mitomycin-C in endoscopic dacryocystorhinostomy with lacrimal sac stenting

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**Received:** 29 August 2020

**Revised:** 10 October 2020

**Accepted:** 12 October 2020

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### ABSTRACT

**Background:** This study critically evaluates the effectiveness of mitomycin-C in conventional endoscopic dacryocystorhinostomy (ENDODCR) that minimizes the reclosure of a neo-ostium by retaining an enlarged marsupialized lacrimal sac.

**Methods:** The combined retrospective and prospective study included 24 patients in the study group, who underwent endoscopic dacryocystorhinostomy in the Department of Otorhinolaryngology and Ophthalmology in a period of 1.5 years (June 2006 to January 2008).

**Results:** An 83.33% primary success rate was observed, without any serious complications. Obstruction of the neo-ostium with granulation tissue was observed in 20.83% cases. Overall, the success rate of group I was 91.67% as compared to 75% in group II.

**Conclusions:** Intra operative mitomycin-C application is effective in increasing the success rate of DCR surgery in standard nasolacrimal duct obstruction, and no significant complications resulted from its use.

**Keywords:** ENDODCR. Mitomycin-C, Stenting

### INTRODUCTION

Nasolacrimal duct obstruction is a common disorder clinically manifested by the presence of epiphora. Recurrent infection may also occur as a result of stagnation and the most likely site being at the junction of the lacrimal sac and the nasolacrimal duct.<sup>1</sup>

Various techniques are used to treat the symptoms of epiphora, namely medial canthal lacrimal sac massaging, nasolacrimal duct syringing, silicone intubation and dacryocystorhinostomy. (DCR) Dacryocystorhinostomy may be undertaken via an external or an internal approach. Unsuccessful outcome of DCR is likely due to obstruction of the common canaliculus and synechia at the neo-dacrostome.<sup>2,3</sup>

Silicone stents utilized to maintain patency of the dacrostome post DCR; lead to a foreign body reaction and thereby granulation tissue.<sup>4</sup>

Anti-proliferative agent applied at the neo-ostium reduces the fibrosis of healing.<sup>5</sup>

Hata et al 1955 developed Mitomycin-C from *Streptomyces ceaspitosus* with half-life 8 to 48 minutes. It is an alkylating and anti-proliferative agent (Liao et al).<sup>6</sup> It reduces fibroblast collagen synthesis by inhibiting DNA dependant RNA synthesis and can suppress cellular proliferation at any stage of cell cycle.<sup>7</sup>

Aim of the study was to study the efficacy of Mitomycin-C in preventing restenosis dacryocystorhinostomy.

## METHODS

This prospective and retrospective study was carried out in Department of Otorhinolaryngology and Ophthalmology at Dayanand Medical College and Hospital, Ludhiana. 24 randomly selected patients having nasolacrimal duct obstruction were included in this study. Radiological evaluation such as Dacrocystogram, x-ray/CT scan of paranasal sinuses was undertaken to detect any sinus pathology.

All patients underwent endoscopic dacryocystorhinostomy in the Department of Otorhinolaryngology and Ophthalmology in a period of 1.5 years (June 2006 to January 2008).

The patients were divided in two groups.

### Group I

12 prospective patients where endoscopic dacryocystorhinostomy with silicone stenting along with usage of mitomycin-C was carried out over fifteen months. Mitomycin-C preparation in the concentration of 0.5mg/ml was applied with a cotton Q tip for 5 minutes and washed with saline.

### Group II

12 retrospective patients over past one and half year where endoscopic dacryocystorhinostomy with silicone stenting had been undertaken.

An endoscopic DCR was performed in all cases. All patients were followed upto a minimum of 6 months. Patency of the stoma was checked by sac syringing and endoscopic inspection of stoma and to find out any local complications.

### Inclusion criteria

Only the patients followed up for at least six months were included in the study.

### Exclusion criteria

Patients lost to follow up; pediatric age group, malignancies; chronic granulomatous diseases of the nose; punctal, canalicular or common canalicular block.

Success criteria were patients who had relief from symptoms and endoscopic visualization of a patent stoma.

In the end, the patients in whom endoscopic dacryocystorhinostomy with silicone stenting had been done were compared with the patients in whom endoscopic dacryocystorhinostomy with silicone stenting with application of Mitomycin-C was used.

## RESULTS

All the patients presented with epiphora (100%). Ten patients presented with swelling at the medial canthus of the eye (41.67%). One patient presented with swelling at the puncta (4.17%). Two patients presented with nasal discharge (8.33%). One presented with visual disturbance, that is, amblyopia (4.17%).

**Table 1: Chief complaints on presentation (N=24).**

Chief complaints	Group I		Group II		Total	
	Cases	%	Cases	%	Cases	%
<b>Epiphora</b>	12	100	12	100	24	100
<b>Swelling at medial canthus</b>	6	50.00	4	33.33	10	41.67
<b>Swelling at puncta</b>	0	00.00	1	8.33	1	4.17
<b>Nasal discharge</b>	0	0.00	2	16.67	2	8.33
<b>Visual disturbance</b>	0	0.00	1	8.33	1	4.17

The chief complaints of the patients were epiphora (100%) followed by swelling at the medial canthus of the eye (41.67%).

**Table 2: Findings on dacrocystogram (N=24).**

DCG Findings	Group I		Group II		Total	
	Cases	%	Cases	%	Cases	%
<b>B SC*</b>	1	8.33	2	16.67	3	12.50
<b>B CC**</b>	7	58.33	6	50.00	13	54.17
<b>B NLD***</b>	4	33.33	3	25.00	7	29.17
<b>Mucocele</b>	0	0.00	1	8.33	1	4.16
<b>Total</b>	12	100.00	12	100.00	24	100.00

B SC\*- Block at superior canaliculus; B CC\*\*- Block at common canaliculus; B NLD\*\*\*- Block at nasolacrimal duct

DCG was done in all the patients.

In group I, common canaliculus was blocked in seven patients (58.33%), nasolacrimal duct was blocked in four patients (33.33%) and superior canaliculus was blocked in one patient (8.33%).

In group II, common canaliculus was blocked in six patients (50.00%), nasolacrimal duct was blocked in 3 patients (25.00%), superior canaliculus was blocked in two patients (16.67%), and one patient had mucocele (8.33%).

In total, thirteen patients had blockage at common canaliculus (54.17%), seven patients had blockage at nasolacrimal duct (29.17%) and three patients had block at superior canaliculus (12.50%), and one patient had mucocele (4.16%).

Success rate in group I was 91.67% as compared to group II where success rate was 75%. There was one failure in group I (8.33%). There were three failures in group II (16.67%).

**Table 3: Success in terms of patent dacryostome (N=24).**

Results	Group I		Group II		Total	
	Cases	%	Cases	%	Cases	%
Success	11	91.67	9	75.00	20	83.33
Failure	1	8.33	3	25.00	4	16.67

**Table 4: Complications or late sequel (N=24).**

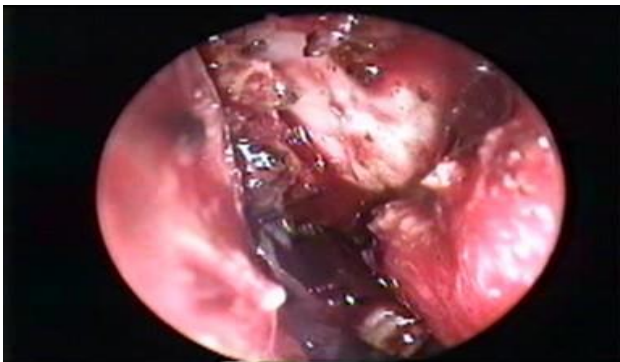
Complications	Group I		Group II		Total	
	Cases	%	Cases	%	Cases	%
Granulations	3	25.00	2	16.67	5	20.83
Synechiae	3	25.00	6	50.00	9	37.50
Orbital	3	25.00	1	8.33	4	16.67
Visual	0	0.00	0	0.00	0	0.00
Epiphora	1	8.33	3	25.00	4	16.67
None	2	16.67	0	0.00	2	8.33

In group I there were three cases who presented with granulations (25.00%), three cases who presented with synechiae formation (25.00%), three cases with orbital complications (25.00%) like emphysema, and one patient presented with persistent epiphora (8.33%).

In group II, six patients presented with synechiae formation (50.00%), three with persistent epiphora with no relief of symptoms, two with granulations (16.67%), and one with orbital complications (8.33%).

In total, nine patients presented with synechiae (37.50%), five with granulations (20.83%), four with orbital complications (16.67%), and four with persistent epiphora (16.67%). None of the patients presented with visual complications.

Symptoms were relieved in eleven patients in group I (91.67%) and in group II in nine patients (75.00%).



**Figure 1: Endoscopic visualization of lacrimal sac after removing lacrimal bone and frontal process of maxilla over the lacrimal sac by the Kerrison punch.**



**Figure 2: Purulent discharge seen after opening of lacrimal sac.**



**Figure 3: Stenting of lacrimal sac.**

## DISCUSSION

The therapeutic modality of choice for nasolacrimal duct obstruction, irrespective of the cause, is dacryocystorhinostomy.

Caldwell 1893 advocated the intranasal and Toti 1904 the external dacryocysto-rhinostomy.<sup>8,9</sup> McDonagh 1989 pioneered in utilizing the nasal endoscope for performing internal DCR.<sup>8</sup>

Both the traditional external approach and the endoscopic approach have high success rates. The external approach suffers the disadvantage of an external scar, which in addition to poor cosmesis, can make revision surgery extremely difficult. The endoscopic approach offers the added advantage of avoiding an external scar, thereby providing for improved cosmesis. It also has the advantage of being a one stage procedure wherein any co-existing nasal pathology can be treated. The stoma can be fashioned more accurately under endoscopic visualization. This scarless surgery, is quick, with minimal trauma to the orbicularis oculi muscle which assists the lacrimal pump.<sup>10</sup> Under direct endoscopic vision, the stoma can be sufficiently enlarged and properly positioned to increase the likelihood of continued patency.

The late untoward sequel is the formation site of granulation tissue or synechiae at the operative and

recurrence of epiphora.<sup>11,12</sup> Wide resection of bone especially in its superior extent, with mucosal flaps are the surgical, and silicone stents or topical application of mitomycin-C are the non-surgical techniques to minimize synechia.

Selig et al found intra operative use of mitomycin-C 0.2 mg/ml, minimizes post-operative granulations, fibrosis and scarring.<sup>13</sup> Apuhan et al study using 0.5 mg/ml application for 2.5 minutes showed a success rate of 91% in endocr.<sup>14</sup> Camara et al found a statistically significant (p=0.007) success with mitomycin-C.<sup>15</sup> Thereby maintaining a bigger post-operative stoma throughout the post-operative observation period and they emphasized that its intra operative use is easy and safe.

Dolmetsch et al noted that non laser endonasal dacryocystorhinostomy with mitomycin-C was a safe and successful procedure for the treatment of congenital nasolacrimal duct obstruction in children. It had the advantage of leaving no scar and of preserving the medial canthal structures. They had a success rate of 94.4%<sup>16</sup>

Yim and Wormald et al emphasized that the use of mitomycin-C at low concentrations (0.4 mg/ml), used as an adjunct for nasolacrimal duct probing can improve both subjective and objective outcomes without imposing significant additional risks.<sup>17</sup>

Ghosh et al and Zilelioglu et al reported no significant difference with or without application of mitomycin-C.<sup>7,18</sup> Prasanna et al concluded that it did not influence occurrence of granulations and synechia nor did it alter the success rates significantly.<sup>19</sup>

In our study success rate in group I (with Mitomycin-C application) was 91.67% as compared to group II where success rate was 75%. There was one failure in group I (8.33%). There were three failures in group II (16.67%). Results of our study have been found nearly comparable to other workers

There were no major intraoperative and postoperative complications in the present study. The most common complication encountered was synechia formation in 37.5%, followed by granulations in 20.83%.

## CONCLUSION

Intra operative use of mitomycin-C in adjunction with lacrimal sac stenting improves both subjective and objective outcomes and its use is easy and safe as a result patency of ostium is maintained without any serious risk of complications as well as cost effective to the patient.

## ACKNOWLEDGEMENTS

Authors would like to thank Dr. Kapil Dua Ex Asst. Prof. ENT for assistance during the study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Singh J, Munjal M, Puri S, Chopra P, Munjal S, Garg A, et al. Role of mitomycin-c in endoscopic dacryocystorhinostomy with lacrimal sac stenting. *Int J Otorhinolaryngol Head Neck Surg* 2020;6:2017-21.