

## ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT INTRAOPERATIVE MITOMYCIN-C: A COMPARATIVE STUDY

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### ABSTRACT

#### AIMS AND OBJECTIVE

The objective of this study is to compare the results of endonasal endoscopic dacryocystorhinostomy with and without local Mitomycin-C application in patients of primary nasolacrimal duct obstruction.

#### DESIGN

Prospective Randomized Case Control Study.

#### MATERIALS AND METHODS

Study included 80 patients (88 eyes) between January 2013 and January 2016, assigned randomly in 2 groups. Group A included 30 patients (46 eyes) in Mitomycin-C group and group B included 30 patients (42 eyes) in non-Mitomycin-C group. Surgical procedures in both groups were same. Followup period regarding condition of tearing improvement was done at 1 week, 3 weeks and at 6 months postoperatively.

#### RESULTS

Success rate with Mitomycin-C was 90% and without Mitomycin-C were 85%. The outcome of two groups was found statistically insignificant. Complications noted were granulations, synechiae, periorbital oedema and punctual trauma with no significant difference in frequency of occurrence as well postop results in two groups.

#### CONCLUSION

Intraoperative use of 0.2 mg/mL at rhinostomy site does not affect the success rates of endoscopic DCR, both functionally and anatomically.

#### KEYWORDS

Nasolacrimal Duct Obstruction (NLD), Mitomycin-C, Endoscopic DCR.

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#### INTRODUCTION

The lacrimal system consists of lacrimal gland, upper and lower canaliculi, a common canaliculi, lacrimal sac and ends with nasolacrimal duct opens in inferior meatus of nasal cavity. Stenosis of nasolacrimal drainage system encountered in clinical practice by ophthalmologists and otorhinolaryngologists. Causes of NLD obstruction can be acute and chronic inflammation, trauma and congenital malformation, iatrogenic and idiopathic. Presenting symptoms can be epiphora, swelling of the lacrimal sac. Our study includes cases with only primary acquired NLD obstruction. Dacryocystorhinostomy has been accepted as a highly successful procedure in dealing with epiphora from nasolacrimal duct obstruction from dates back to 1893, where Caldwell described an intranasal DCR performed by trephination of nasolacrimal duct.

Dacryocystorhinostomy (DCR) is a procedure in which lacrimal flow is made to flow through the nasal cavity by making an opening in the lacrimal sac. It is indicated when obstruction is not relieved by conservative methods. The two most frequent causes of DCR failure are obstruction of the common canaliculus and closure of the osteotomy site.<sup>[1-3]</sup> Thus, if we can inhibit fibrous tissue growth and scarring by applying antiproliferative agents over the anastomosed flaps and osteotomy site, the failure rate may be decreased.

Mitomycin-C, an antiproliferative agent, has been widely used in pterygium excision and trabeculectomy with favourable results.<sup>[4-5]</sup> Mitomycin-C derived from *Streptomyces caespitosus*, has antifibroblastic activity and hence it possibly improves the success rate by reducing post-operative granulation tissue formation. Several previous studies demonstrated that DCR with intraoperative Mitomycin-C application to the rhinostomy opening can maintain larger osteotomy size than that of the conventional procedure.<sup>[6]</sup> The aim of our study is to compare the outcome of endoscopic DCR with and without Mitomycin-C application to the rhinostomy site.

#### MATERIALS AND METHODS

This prospective study including 80 patients are conducted at Sarojini Naidu Medical College Agra and MLB Medical College Jhansi from January 2013 to January 2016.

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Patients under study were followed up at week 1, week 3 and at 6 months postoperatively. Approval of Institutional Ethical Committee was taken and an informed consent was taken from all the patients. Patency tests were done in all patients to know the level of blockage of lacrimal apparatus. The post saccal block was assessed by ophthalmologists with probing and syringing and by otolaryngologist by diagnostic nasal endoscopy to rule out any anatomical abnormality and concomitant sinonasal pathology. All the patients of above the age of 15 years and had primary acquired NLD obstruction are included and treated by endoscopic endonasal DCR.

Followup was done at 1 week, 3 weeks and at 6 months postoperatively. Cases with congenital dacryocystitis, presaccal obstruction, any coexisting nasal pathologies and revision cases are excluded from the study. These patients were assigned into two groups randomly - group A with Mitomycin-C application of 40 patients (46 eyes) and group B without Mitomycin-C application of 40 patients (42 eyes).

**Surgical Technique**

All the procedures were done under local anaesthesia/general anaesthesia using 0 degree and 30 degrees rigid endoscope connected to video system. Patient is laid supine with head slightly in flexed position. The nose is packed with 1 mL adrenaline with 9 mL 4% xylocaine for 20 minutes, followed by local infiltration of 5 mL of 2% lignocaine with 1:200000 adrenaline along the lateral nasal wall and middle meatus. Lacrimal sac can be found beneath the lateral nasal wall anterior to the attachment of middle turbinate. Maxillary line is the key intranasal landmark for endoscopic DCR. It is identified as curvilinear eminence along lateral nasal wall that runs from anterior attachment of middle turbinate to the roof of inferior turbinate. The maxillary line bisects the lacrimal sac such that the frontal process of maxilla covers anterior half of the sac and thin lacrimal bone covers the posterior half. A U shaped incision was made in lateral nasal wall in front of axilla of middle turbinate and 2 mm above it.

A 1-1.5 cm posteriorly based mucosal flap was elevated and removed from the lacrimal bone to expose only that much part of lacrimal bone. Thick bone from the frontal process of maxilla and thin lacrimal bone was removed with Kerrison’s punch forceps. Lacrimal sac identified by pressure at the medial canthus and incised vertically using a sickle knife. Ball probe was used to break adhesions between medial and lateral wall. The medial wall of the sac was removed with the help of thru-cut forceps. The posterior part of sac incision is everted posteriorly and anterior part of sac incision was everted anteriorly like an open book. Punctum was dilated using punctum dilators followed by syringing was done using normal saline to confirm the patency. Free flow of fluid was observed in the nasal cavity.

In group A 0.2 mg/mL Mitomycin-C was applied through a cotton ball and kept at rhinostomy site for 5 minutes. No Mitomycin was applied in group B. In both the groups, ipsilateral soframycin soaked nasal packing was done for 1 day. Antibiotic eye drops started following surgery. Nasal packing was removed followed by syringing of the sac. All the patients were advised nasal douche for 1 week. All the patients were assessed at 1 week, 3 weeks and at 6 months postoperatively for anatomical and functional results. Anatomically, patients were assessed by nasal endoscopy to see the rhinostomy and functional assessment was done by assessing relief of symptoms.

**OBSERVATIONS AND RESULTS**

There were 80 patients recruited in the study, out of them 34 were males and 46 were females with a male-to-female ratio of 1:1.35. All the 80 patients had epiphora as the main complaint and of these, 68 patients had purulent nasal discharge along with epiphora. Patients were assigned randomly in two groups, group A with Mitomycin-C group and group B without Mitomycin-C group. The surgical procedures in both the groups were same except that in group A Mitomycin-C was applied to the rhinostomy site.

Sex Age (yrs.)	Males N1=34	Females N2=46	Total N (N1+N2)
15-25	03	02	05
25-35	05	06	11
35-45	15	24	39
45-55	05	08	13
55-65	04	04	08
>65	02	02	04

**Table 1: Age and Sex Distribution of Cases (N=80)**

In the Table 1, we have seen the age and sex distribution in both the groups. It is shown from the above table that 49% of patients are seen in 35-45 years’ age group; 42.5 % (n= 34) of the total number of cases are males and 57.5% (n=46) of the total number are females.

Group Duration	Group A		Group B	
	Success	Failure	Success	Failure
Week 1	36	01	34	02
Week 3	-	-	-	03
6 Months	-	03	-	01
Total	36	04	34	06
	90%	10%	85%	15%

**Table 2: Comparison of Functional Outcome (Via Relief of symptoms) and Anatomical Outcome (Via Diagnostic Nasal Endoscopy) in Both the Groups**

As shown in Table 2, among 40 patients in group A 36 patients (90%) remained totally asymptomatic after 6 months, while in group B out of 40 patients, 34 patients (85%) remained symptom free after 6 months. Results have been assessed functionally by relief of symptoms and anatomically by patency of ostium seen via nasal endoscopy and syringing simultaneously. Chi square test is used to evaluate outcomes in both the groups, p value >0.05 which is statistically insignificant.

Complications	Group A		Group B	
	N1	%	N2	%
Synechiae	1	2.5%	2	5%
Punctual trauma	4	10%	3	7.5%
Crusting	4	10%	5	12.5%
Granulations	1	2.5%	2	5%
Intraoperative haemorrhage	4	10%	5	12.5%

**Table 3: Complications in Both the Groups**

As shown in Table 3, all patients who underwent endonasal endoscopic DCR experienced one or other complications as shown. Maximum number was seen in intraoperative haemorrhage 10% in group A and 12.5% in group B; haemostasis was achieved, but its occurrence has no effect on the outcome of the procedure; 10% patients in group A had punctual trauma and 7.5% in group B had punctual trauma. It was seen in those patients who had sunken eyes, but

its occurrence is unrelated to the outcome of the procedure. Crusting was seen in 10% patients in group A and in 12.5% patients in group B, which was removed endoscopically; 2.5% patients had experienced granulations and synechiae and 5% patients had granulations and synechiae. All these complications do not affect the outcome of the procedure.

## DISCUSSION

Surgery for dacryocystitis has undergone major changes with the advent of modern endoscopic instruments. Endoscopic DCR is an effective surgery to relieve epiphora from primary acquired NLD obstruction. In prior studies, it was believed that silicon stenting is necessary to maintain long-term ostium patency, but it has been seen that ostium patency can be maintained without stents too using an antifibroblastic agent like Mitomycin-C.

Previous studies show an average failure rate of 9.4%.<sup>[7-9]</sup> Failure is generally defined as having symptoms of excessive tearing with the inability to irrigate. McPherson and Egelston found that three out of seven patients in their study who underwent a second operation were found to have dense scar tissue present at the osteotomy site.<sup>[10]</sup> Pico stated that "In every instance, the cause of failure was found at the secondary surgery to be an obstruction of the new drainage channel by an occluding membrane, which on histologic examination was shown to be composed of organised granulation tissue."<sup>[11]</sup>

Kao et al<sup>[6]</sup>, Liao et al<sup>[12]</sup> evaluated the role of intraoperative Mitomycin-C in external DCR. Liao et al<sup>[12]</sup> and You and Fang<sup>[13]</sup> concluded that intraoperative Mitomycin-C application was effective in increasing the success rate of external DCR surgery, whereas Roozitalb et al<sup>[14]</sup> concluded that Mitomycin-C does not change the success rate of this procedure. Ugurbas et al<sup>[15]</sup> performed endoscopic intranasal DCR and sent the tissue around the ostium for histopathological examination, which revealed attenuated epithelium with intracytoplasmic vacuoles formation in specimens of Mitomycin-C, while there was normal epithelium with no vacuoles in the specimens of control group.

In our study, anatomical and functional outcome is measured as subjective data obtained from the patients. The objective evaluation postoperatively can be made by various methods including dacryocystography, but in our study we used symptomatic and endoscopic assessment in all patients to measure outcome. In the present study, success rate in group with Mitomycin-C was 90% and in the group without Mitomycin-C was 85%. The results obtained were not statistically different ( $p > 0.05$ ) showing that application of Mitomycin-C has no significant effect on the outcome of the procedure and the relief of symptoms.

Zilelioglu G et al (1998) found that in a mean period of 18.2 months, success rate in endoscopic DCR with Mitomycin-C was 77.3% and in without Mitomycin-C success rate was 77.8%.<sup>[16]</sup> There was no significant difference between the two groups. Shu L Liao et al (2000) showed that 95.5% in Mitomycin-C group were totally symptom free after 10 months, while 70.5% patients in non-Mitomycin group were symptom free.<sup>[12]</sup> Farahani et al (2008) showed that patients with nasolacrimal duct obstruction who underwent endoscopic dacryocystorhinostomy did not benefit from intraoperative application of Mitomycin-C.

## CONCLUSION

No significant difference was noted in the success rates of performing endoscopic endonasal DCR with or without Mitomycin-C. Hence, we conclude that Mitomycin-C application in routine endoscopic endonasal DCR is not required.

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