

Study of Efficacy of Intra Operative Mitomycin in Dacryocystorhinostomy (DCR)

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Abstract:

Aims And Objectives: 1. To evaluate the result of intra operative mitomycin in dacryocystorhinostomy compared with the result of conventional dacryocystorhinostomy. 2. To evaluate the efficacy of mitomycin c in maintaining the patency of lacrimal passage after external dacryocystorhinostomy.

Methods: Our study is a prospective comparative case study in which 50 patients of primary acquired nasolacrimal duct obstruction were divided on the basis of random sampling into the conventional dacryocystorhinostomy group and the Mitomycin C group in which Mitomycin C 0.2 mg/ml was used intraoperatively. Patients were followed on 1st postoperative day, 1st week, 1st, month, 3rd and 6th months.. Patency of lacrimal passage was assessed by lacrimal syringing and patient symptoms were recorded on each follow-up.

Results: At the end of 6 months of follow-up, 96% of patients were asymptomatic in the Mitomycin C group whereas 88% patients in the conventional group were asymptomatic. On lacrimal syringing 24 (96%) eyes had patent passage in the Mitomycin C group where as only 1 (4%) patient had complete block with regurgitation of mucopurulent fluid. In the conventional group 22 (88%) eyes had patent passage, 2 (8%) eyes had complete block with regurgitation of mucopurulent fluid and 1 (4%) eye had partially patent passage on lacrimal syringing.. Intraoperative and postoperative complications in both the groups were identical.

Conclusion: Intraoperative mitomycin c application is effective in increasing the success rate of external Dacryocystorhinostomy and usefull adjunct to external Dacryocystorhinostomy in conditions having high risk for scarring and failure like lacrimal fistula

Keywords: Dacryocystitis, Dacryocystorhinostomy, Mitomycin C, Lacrimal syringing

I. Introduction

Epiphora and discharge secondary to nasolacrimal duct obstruction are common and troublesome problems among patients presenting to an ophthalmologist. Primary acquired nasolacrimal duct obstruction is believed to occur secondary to a chronic inflammatory process resulting in fibrosis and obliteration of the duct. Dacryocystorhinostomy is a widely accepted treatment for nasolacrimal duct obstruction in which creating an alternative drainage route between the lacrimal sac and the nasal cavity through a bony ostium addeototi first described DCR in 1904. A failure rate of 11–28% with an average of 9.4% has been reported which necessitates improving the above technique. [1] The two most frequent causes of dacryocystorhinostomy failure are obstruction of common canaliculus and closure of the osteotomy site by fibrosis and scar formation. Thus by inhibiting fibrous growth and subsequent scarring of the osteotomy site by using anti-proliferative agents over the anastomosed flaps and osteotomy site, the failure rate may be decreased. [1] Mitomycin C is an antibiotic alkylating agent which inhibits fibroblast proliferation and alters wound healing response leading to less fibrosis and scarring around the common canaliculus and osteotomy site [1,2]. In this paper we evaluate the effectiveness of intra operative use of mitomycin C as an adjuvant during dacryocystorhinostomy to prevent post operative fibrosis and scarring and hence decrease in the failure rate.

II. Materials And Methods

This prospective comparative study conducted in department of ophthalmology RIMS Hospital Kadapa. After getting approval from ethics committee and informed consent was taken from each patient. Total of 50 patients were included based on below mentioned inclusion and exclusion criteria. Inclusion criteria: -All cases presenting with features of primary acquired NLD obstruction or chronic dacryocystitis.

Exclusion criteria :-Obstruction at common canalicular duct, Acute dacryocystitis, Chronic granulomatous conditions of lacrimal sac like TB and Leprosy, Malignancy of lacrimal sac, Long standing chronic dacryocystitis with fibrosis of lacrimal sac in very old individuals, Dry eye, Post-traumatic bone deformity in nasolacrimal region (ex- Le fort fracture II), Nasal polyps and DNS.

On the basis of simple random sampling these patients were divided into two groups of 25 patients each. 25 cases underwent dacryocystorhinostomy without Mitomycin C and 25 patients of dacryocystorhinostomy with intraoperative application of Mitomycin C.

Patients were followed up for a minimum of 6 months for evaluation of subjective symptoms and objective findings. Patients were followed postoperatively on 1st day, 1st week, 1 month, 3rd and 6th months.

Same technique of external dacryocystorhinostomy was used in patients of both groups. 5 ml of lignocaine 2% with adrenaline 1:200,000 was infiltrated around the lacrimal sac for anesthesia and hemostasis. After anaesthetizing the nasal mucosa by topical 4% xylocaine, packing of ipsilateral nasal cavity was done with roller gauze soaked in 5 ml of 4% xylocaine with adrenaline 1:200,000. A curvilinear incision of 20 mm in length was made along the anterior lacrimal crest starting 3 mm above the level of medial palpable ligament and 3 mm medial to the medial canthus. After separating the orbicularis muscle fibers, the medial canthal ligament was divided and the lacrimal sac was separated from the fossa by blunt dissection. The periosteum was elevated off and the lamina papyracea was fractured. An osteotomy of approximately 10 × 10 mm in size was created.



Lacrimal sac and nasal mucosa were opened in a H fashion to form a large anterior and a small posterior flap. The posterior flap was then excised.

In the Mitomycin C group a piece of sterile cotton soaked in 0.2 mg/ml of Mitomycin C was applied over osteotomy margins, undersurface of anterior flaps for 5 min. The lacrimal sac and nasal mucosal flaps were then sutured with 6/0 vicryl. Sponge was removed and normal saline irrigated through the lower punctum and over the osteotomy site. The two ends of medial palpebral ligament and incision in the orbicularis were closed with 6/0 vicryl interrupted sutures. Skin incision was closed with 6/0

vicrylsubcuticular suture or interrupted sutures. Nasal pack was placed which was removed after 24 h. Postoperatively patients received systemic antibiotics and NSAID drugs for 7 days. Antibiotic eye drops were advised 6 times a day for 7 days. Nasal decongestant drops four times/day for 3 days

To evaluate the results in both groups, both symptoms and objective findings were recorded on follow up. Patient symptoms were noted and classified as asymptomatic (symptom free), improved, and no improvement. Also lacrimal syringing was done. Syringing of the lacrimal passage was done and results were noted as passage patent, partially patent and complete block with regurgitation of fluid. Chi square test was used for comparing the results of the two groups.

III. Results

In our study there were 50 patients who underwent dacryocystorhinostomy surgeries; 25 were in the Mitomycin C group and the remaining 25 in the conventional group. Maximum number of patients belonged to the age group 21–50 years (74%).mean age of conventional group is 33.43 years and in mmc group 33.36 years. There was no significant difference in age between the two groups (Table 1). There was a female preponderance in our study; 36 (72%) being female and 14 (28%) being male (Table 2). However sex distribution is identical in both groups 28 (56%) out of 50 cases had right sided nasolacrimal duct obstruction (Table3). On presentation 90% (45/50) cases had watering with discharge as the chief complaint. On ENT

examination out of 50 cases 5 (10%) cases had mild deviated nasal septum, 2 (8%) cases in the Mitomycin C group and 3 (12%) in the conventional group (Table 4). Presented study shows mild DNS will not affect the outcome of DCR surgery either alone/with mitomycin c .

Table 1:- Age Distribution

Age in years	Conventional group		MMC Group		Total	
	no	%	no	%	no	%
Below 10 years	2	8	2	8	4	8
11 to 20	2	8	2	8	4	8
21 to 30	8	32	8	32	16	32
31 to 40	6	24	6	24	12	24
41 to 50	4	16	5	20	9	18
51 to 60	2	8	1	4	3	6
61 to 70	1	4	1	4	2	4

Table-2: Sex distribution

Sex	Conventional Group		MMC Group		Total	
	No	%	No	%	No	%
Male	6	24	8	32	14	28
Female	19	76	17	68	36	72

Table-3: Laterality of symptoms

Laterality	Conventional Group		MMC Group		Total	
	No	%	No	%	No	%
Right	13	52	15	60	28	56
Left	12	48	10	40	22	44

Table-4: ENT pathology

Nasal pathology	Conventional Group		MMC Group		Total	
	No	%	No	%	No	%
Deviated Nasal septum	2	8	3	12	5	10

Table-5: Symptomatological distribution

Symptoms	Conventional Group		MMC Group		Total	
	No	%	No	%	No	%
watering with out discharge	3	12	2	8	5	10
Watering with discharge	22	88	23	92	45	90

Table-6: Intra operative complications

Complications	Conventional Group		MMC Group	
	No	%	No	%
severe bleeding	3	12	3	12
Injury to nasal mucosa	2	8	1	4
Injury to sac medial wal	-	-	1	4

Table-7: Immediate Postoperative Complications

Complications	Conventional Group		MMC Group	
	No	%	No	%
Epistaxis	2	8	3	12
Wound infection	2	8	0	0

Intraoperative complications occurred in 10 cases. Injury to nasal mucosa occurred in 3 (6%) cases, sac injury in 1 (2%), and severe bleeding in 6 (12%) patients, 3 each in both groups (Table 6). It shows Intraoperative MMC not associated with increase incidence of intra operative haemorrhage .complications in the two groups were comparable. The immediate post operative complications were epistaxis and wound infection. Epistaxis occurred in 5 (10%) patients; 2 in the conventional group and 2 in the Mitomycin C group. Wound infection was seen in 3 patients in the conventional group (Table 7).

Symptomatically 24 (96%) cases in the Mitomycin C group were asymptomatic with no symptoms where as 1 (4%) had no improvement at the end of 6 months. In the conventional group 22 (88%) cases were

symptom free; whereas 3 (12%) cases were symptomatic. Near significant difference exists between two groups ($p > 0.05$) (Table 8)

Table-8: Postoperative follow up.

Time	Group	Syringing			Symptoms		
		Complete block+regurgitation	Partially patent	Patent	Asymptomatic	Improved	No improvement
1 st week	MMC	0(0%)	1(4%)	24(96%)	24(96%)	0(0%)	1(4%)
	Conventional	0(0%)	3(12%)	22(88%)	22(88%)	1(4%)	2(8%)
1st month	MMC	0(0%)	1(4%)	24(96%)	24(96%)	0(0%)	1(4%)
	Conventional	0(0%)	4(16%)	21(84%)	21(84%)	1(4%)	3(12%)
3 rd month	MMC	1(4%)	0(0%)	24(96%)	24(96%)	0(0%)	1(4%)
	Conventional	3(12%)	2(8%)	20(80%)	20(80%)	0(0%)	5(20%)
6 th month	MMC	1(4%)	0(0%)	24(96%)	24(96%)	0(0%)	1(4%)
	Conventional	2(8%)	1(4%)	22(88%)	22(88%)	0(0%)	3(12%)

At the end of 6 months in the conventional group 22 (88%) eyes had patent passage on lacrimal syringing, whereas 1 (4%) eye had a partially patent passage; 2 (8%) eyes had complete block and regurgitation of mucopurulent fluid. In Mitomycin C group 24 (96%) eyes had patent passage on lacrimal syringing while only 1 (4%) eye had complete block with regurgitation of mucopurulent fluid. Near significant difference exists between two groups ($p > 0.05$) (Table 8)

IV. Discussion

Chronic dacryocystitis is preferentially more common in adults over middle life from 5th to 7th decade. In the present study maximum number of patients (37 (74%)) belonged to the middle aged group (31–60 years). In the study conducted by B.J. Goswami et al [7] overall age range was between 21 and 50 years (average 37.2 years) in group 1 and 15–69 (average 38.2 years) in the other group. In the present study age range in the conventional group was 27–64 years (average 47.3 years) and age range in the Mitomycin C group was 27–62 years (average 43.4 years). Thus this is comparable with previous studies with no significant difference in age between the two groups.

In the present study 36 (72%) patients were female and 14 (28%) were male, thus showing female dominance. This is in total agreement with all the previously done studies which demonstrate female predilection of dacryocystitis with male: female ratio 1:3. [3,4] This may be attributed to the presence of narrower lumen of bony lacrimal canal and lower nasolacrimal fossa in females. [3,4,8]

Contrary to previous studies, majority of the cases (28 (56%)) in our study had dacryocystitis on the right side. Dacryocystitis has been noted to occur more frequently on the left side than right. [8] Probably a larger sample would have shown similar results as quoted in the literature. All the patients had uncomplicated chronic dacryocystitis. 5 (10%) cases in our study had mild deviated nasal septum. Failure of surgery cannot be attributed to mild deviated nasal septum. In our study severe intraoperative bleeding was seen in 6 (12%) cases, 2 cases in each group, respectively, and was due to injury to angular vein, during punching of lacrimal bone and during incising the nasal mucosa. The injured angular vessels were clamped and ligated to stop further bleeding. Identification and retraction of angular vessels with the help of retractors can prevent injury to the angular vessels. Bleeding occurring during punching of lacrimal bone was managed by mechanical pressure from swabs soaked with botroc clot solution. Nasal repacking with gauze moistened with 2% lignocaine with adrenaline was also done to stop bleeding. Bleeding from nasal mucosa was controlled in a similar manner.

In our study epistaxis was seen postoperatively in 5 (10%) cases, 3 in the Mitomycin C group and 2 in the conventional group; this was noticed after removal of nasal pack on the 1st post operative day. None of the cases required anterior nasal packing and were managed conservatively on tablet ethamsylate 3 times a day for 3 days. 2 (4%) cases of post operative wound infection were seen in the conventional group. One of these cases also had severe intraoperative bleeding. It was managed conservatively with systemic antibiotics, and topical antibiotics. Response to treatment was good. No case of wound infection was seen in the Mitomycin C group. Goswami and colleagues [7] in their study have reported delayed wound healing in 2 patients and recurrent epistaxis in one patient as complications due to Mitomycin C use. Shu Liao and colleagues [1] have reported only one case of delayed wound healing due to Mitomycin C use however no Mitomycin C induced complications such as severe nasal bleed, mucosal necrosis, wound infection and delayed wound healing were seen in our study.

At the end of 6 months, 22 (88%) cases in the conventional group and 24 (96%) cases in the Mitomycin C group had patent passage on lacrimal syringing. Failed cases showed either clear fluid regurgitation or mucopurulent regurgitation on lacrimal sac syringing. In the study conducted by Seyhmus Ari et

al [10] on lacrimal sac syringing 96% had patent passage in the Mitomycin C group and 84% in the conventional group had patent passage at the end of 1 year. Our results are also comparable to the study conducted by Shu Liao et al [1] where 88.4% of cases in the conventional group and 95.5% of cases in the Mitomycin C group had patent passage on lacrimal sac syringing. This indicates the efficacy of Mitomycin C in increasing the patency rate of the lacrimal drainage system. The statistical difference is significant.

All failed cases in both the groups were subjected to ENT evaluation. All 4 patients showed narrowed ostium and soft tissue scar and membrane across the ostium on anterior rhinoscopy. Medical management with nasal decongestants and probing of lacrimal tract was done in these cases. Repeat dacryocystorhinostomy was done in 1 case in the conventional group and one case in the Mitomycin C group, but resurgery was very difficult because of dense scarring.

V. Conclusions

Utilising antifibroblastic activity of mitomycin c in preventing scarring at osteotomy site in external dacryocystorhinostomy site can go a long way in preventing the reblockage and maintain the post operative patency of passages there by achieving higher success rate. Use of intra operative mitomycin c can thus be considered safe and simple but effective modification of conventional external dacryocystorhinostomy. As our study involved a small sample size and follow-up period of 6 months, studies involving larger sample size and a longer follow-up period would be required for better evaluation of efficacy of intraoperative Mitomycin C during dacryocystorhinostomy.

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