Original Article

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Post Operative Outcome of Conventional Dacryocystorhinostomy with Mitomycin C and Without Mitomycin C

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ABSTRACT

Background: *Dacryocystitis is an inflammatory condition of the lacrimal sac, typically caused by obstruction of the nasolactimal duct. The purpose of the study compare the results of intra operative Mitomycin C application in DCR surgery compared to external DCR without Mitomycin C.*

Materials and methods: *This was randomized control trial. Total 80 patients of primary acquired nasolacrimal duct obstruction were divided into 2 groups on the basis of simple random sampling. Group-1 contained 40 patients who received 0.02% solution of MMC at the osteotomy site during surgery and consider as the study group and group-2 contained another 40 patients who did not get MMC during surgery and considered as the control group. Patients were followed on 1st post-operative day, 1st week, 1, 3, 6 & 12 months interval. Patency of lacrimal passage was assessed by lacrimal syringing and patient's symptoms were recorded on each follow up.*

Results: *Data shows that there was statistically significant difference in the study showed 39 (97.50%) patients with patent lacrimal passage, only 1 (2.50%) patient was found blocked in their lacrimal drainage system in 1, 3, 6 Months and finally 1 year follow up time. On the other hand in control, 34 (85%) patients showed patency of the drainage system after 1 year and 6 (15%) patients showed blockage and this results was maintained up to 1 year follow up after treatment. During the follow up period, no complication such as abnormal nasal bleeding, mucosal necrosis or infection were noted in any patients.*

Conclusion: *Distinctly higher success rates were achieved in patients undergoing DCR with intra operative MMC as compared to those undergoing external DCR.*

Key words: Dacryocystorhinostomy; External DCR; Lacrimal Syringing; Mitomycin C.

Introduction

Chronic dacryocystitis is one of the most common ophthalmic disorder in our hospital settings. Among various surgeries performed each year in any Ophthalmic Departments in Bangladesh, Dacryocystorhinostomy (DCR) accounts a large number. It may be acquired or congenital. Acquired variety presents more commonly in fifth to seventh decade of life, affecting women three times more than men.[1,2,3,4] Addeo Toty first described the technique of external DCR in 1904.[1,2,4,9]

DCR is an acceptable procedure in the management of epiphora. High Success rate of about 90%[1,3-13] but still failure rate is about 10%.[6,7,14,15] Two most common cause of failure are obstruction of common canaliculi and closure of osteotomysite by fibrosis.[6,7,14,15] Sometimes forms an occluding membrane obstructing the new drainage channel.[1,3,4-7,11, 15,16]

Mitomycin-C (MMC) an antiproliferative agent widely used in trabeculectomy and pterygium excision.

The efficacy and safety of peroperative use of MMC 0.02% was observed to inhibit fibrous tissue proliferation at the osteotomy site, so that osteotomy size remained large without producing any harm to patient or surrounding area. So we can get a good quality surgery as well as good result. The purpose of the study is to compare the results of intra operative Mitomycin C application in DCR surgery compared to external DCR without Mitomycin C.

Materials and methods

The Randomized control trial was conducted at the Department of Ophthalmology, Chittagong Medical

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College Hospital (CMCH) from January 2012 to June 2013. The study was approved by the ethical review committee and informed written consent was taken from each patient prior to surgery. Total 80 patients were selected for study who underwent primary DCR surgery for nasolacrimal duct obstruction. They were randomly divided into 2 groups. Group-1 contained 40 patients who received 0.02% solution of MMC at the osteotomy site during surgery and considered as the study group and group-2 contained another 40 patients who did not get MMC during surgery and considered as the control group. Inclusion criteria were patients between age group of 15 to 70 years of either gender with chronic dacryocystitis.

Exclusion criteria included history of previous DCR surgery or trauma, pregnancy, acute dacryocystitis, rhinosporodiosis, atopic rhinitis, nasal polyp, canalicular obstruction, malignant conditions of the eye lids, nasal area and sac area. Standard surgical techniques of an external DCR were used in all patients of both groups. Local infiltrative anesthesia containing 2% lignocaine with 1:100000 adrenaline and 0.5% bupivacaine mixed with 150 IU of hyaluronidase, was administered in the region of medial canthus and lower lid. The nasal mucosa was anaesthetized and vasoconstricted with a surgical gause saturated with lignocaine 2% with 1: 100000 adrenaline and oxybuprocaine 0.04% drops. Skin incision was performed. Blunt dissection was done to reach the periosteum overlying the anterior lacrimal crest. The periosteum was incised and elevated off the lacrimal sac fossa.

The osteotomy was created over the lacrimal fossa about 12-15 mm in diameter and anastomosis of mucosal flaps of lacrimal sac and nasal mucosa was performed. In the MMC group, a piece of surgical cotton soaked in 0.2mg/ml (0.02%) of MMC was applied over osteotomy margin, undersurface of anterior flaps for 5 minutes. After 5 minutes the cottonoid was removed and the area was throughly irrigated by normal saline. The flaps were joined together by 6-0 vicryl sutures. Periosteum and orbicularis muscle were closed by separate layers.

Finally the skin incision was closed by sutures. In the other group, the same procedure were performed except for application of MMC.

Patients were followed post operatively on 1st week, 1st, 3rd, 6th months and finally after 1 year. During each visit special attention was given an important symptoms such as watering, discharge and sign like tear film meniscus height and patients lacrimal sac patency. Syringing of the lacrimal passage was done to each and every patient in each follow up.

Collected data were entered and analyzed by Statistical Package for Social Science (SPSS). Statistical analysis was done by a chi square (χ^2) test to compare the results of surgery between two groups. T-test also for statistial significance calculation.

Results

A total of 80 DCR surgeries were conducted in this study: 40 were in MMC group and remaining 40 cases were in conventional group.

Table I Age distribution (n=80)

	Study Groups	n	MEAN	± SD	MEDIAN	RANGE	SIGN
Age (Years)	Case	40	36.65	14.19	37.50	15 – 70	t =1.134
	Control	40	39.97	11.94	40.00	18 – 70	p = 0.260
	TOTAL	80	38.31	13.14	40.00	15 – 70	*Not Significant.*

Table II Sex distribution (n=80)

SEX	Study Groups: Case n	Case %	Control n	Control %	Total n	Total %
Male	17	42.5	9	22.5	26	32.5
Female	23	57.5	31	77.5	54	67.5
Total	40	100.0	40	100.0	80	100.0

χ^2 value = 3.647 p = 0.056. *Not Significant*

Table III Distribution on symptom types (n=80)

Symptoms	Study Groups: Case n	Case %	Control n	Control %	Total n	Total %
Mild	4	10.0	4	10.0	8	10.0
Moderate	26	65.0	24	60.0	50	62.5
Severe	10	25.0	12	30.0	22	27.5
Total	40	100.0	40	100.0	80	100.0

χ^2 value = 0.262. p = 0.877. *Not Significant.*

Table IV Distribution of signs (Tear film meniscus) (n=80)

Tear Film Meniscus : Before Treatment	Study Groups: Case n	Case %	Control n	Control %	Total n	Total %
Normal	4	10.0	6	15.0	10	12.5
Moderate	32	80.0	30	75.0	62	77.5
High	4	10.0	4	10.0	8	10.0
Total	40	100.0	40	100.0	80	100.0

χ^2 value = 0.465, p = 0.793. *Not Significant*

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Tear Film Meniscus : 12 Months After Treatment	Study Groups					
	Case		Control		Total	
	n	%	n	%	n	%
Normal	28	70.0	28	70.0	56	70.0
Moderate	10	25.0	9	22.5	19	23.7
High	2	5.0	3	7.5	5	6.3
Total	40	100.0	40	100.0	80	100.0

χ^2 value = 0.253. p = 0.881. *Not Significant.*

Table V (Distribution of signs) Syringing list results

Syringing: 12 Months After Treatment	Study Groups					
	Case		Control		Total	
	n	%	n	%	n	%
Patent	39	97.5	34	85.0	73	91.2
Blocked	1	2.5	6	15.0	7	8.8
Total	40	100.0	40	100.0	80	100.0

χ^2 value = 3.914. p = 0.048. *Not Significant.*

Table VI Success rate (At the end of 12 months after surgery)

Group	Success Rate (%)
External DCR with intra operative Mitomycin -C	97.5
External DCR (Conventional)	85.0

Case: DCR with MMC
Control: DCR without MMC

The results of syringing in all patients of the study were found blocked sac prior to treatment in the both groups. But after treatment it was found that there was statistically significant difference in the study showed 39(97.50%) patients with patent lacrimal passage , only one (2.50%) patient was found blocked in their lacrimal drainage system in 1, 3, 6 months and finally 1 year follow up time, On the other hand, in control 34 (85%) patients showed patency of the drainage system after 1 year, 6 (15%) patients showed blockage and this result was maintained up to 1 year follow up after treatment. During the follow up period, no complication such as abnormal nasal bleeding, mucosal necrosis or infection were noted in any patients.

Discussion

From the literature, it is observed that fibrous tissue growth, scarring and granulation tissue formation during the healing process will decrease created surface area of the osteotomy site, leading to surgical failure. The same healing process will also promote adhesion of the osteotomy to the turbinate and septum or induce obstruction of the common canaliculus. Linberg et al. showed that an appropriately large osteotomy made during surgery can narrow down to a final size of approximately 2 mm due to tissue growth and scarring. Thus, if it can reduce fibrous proliferation at the osteotomy site and at the anastomosed flaps, the success rate of DCR may be become much higher. MMC the potent antiproliferative alkylating agent has been utilized in a number of patients in which external and intranasal failed DCR prevent fibrous tissue proliferation at the rhinostomy site with excellent prognosis without any adverse effect on surrounding tissue.

In a study done by kao et al. that the mean actual osteotomy site in MMC group shrank from initial 66.28 mm^2 (100%) to 27.10 mm^2 4(40.89%) 6 months after DCR surgery.[17] On the other hand, the mean actual osteotomy size in control group shrank from initial 65.55 mm^2 (100%) to 10.83 mm^2 (16.52%) 6 months after DCR surgery and the study was concluded by message that application of MMC over osteotomy site is effective in maintaining a large osteotomy site. A study reported 8 cases of failed DCR and used MMC during second surgery and finally found successful result and they recommended that increase success rate of repeat DCR.[17] Shu et al. worked on 88 patients and applied MMC in the DCR stoma on the half of them (44) and found that 95.50% of the patient remained totally symptoms free after 10 months of follow up, the success rate is 95.50% and failure rate is 4.50% while in conventional group (44) 70.50% of patients were symptom free and 18 % showed improved their symptom and 11.50% patients showed no improvement in their symptoms. The success rate was 88.50% and failure rate was 11.50%.[6]

Table VII Comparative studies

Study	Success rate (%)	
	Conventional group	MMC group
Present Study	85.0	97.5
Shu L Liao & Others	70.5	95.5
Kao CS & others	87.5	100.0
B.J Goswami & others	88.8	96.36

Comparing the results it was obtained from the study by Shu L Liao et al. their conventional group showed 70.5 % success against 95.5 % in MMC group.[6] The results of the study in the MMC group was better.

The studies done by kao CS et al. and B.J. Goswami et al. both showed higher rates of success in both groups as compared to present study. But this does not contradict but support this study. From this study, this can concluded that MMC soaking during DCR surgery is a useful modification to improve the success rate of external DCR. Limitations of this study were its small sample size and lack of elderly patients in the study population.

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Conclusion

In a developing country like Bangladesh where chronic dacryocystitis is a common problem in lower and lower middle class where external DCR is still now the most accepted surgical procedure for the disease. Utilising the antifibroblastic activity of MMC in preventing scarring at osteotomy site in external DCR site can go a long way in preventing the reblockage and maintain the post-operative patency of passage that there by achieving higher success rate. So it is recommended this method is relatively easy, less expensive with good satisfaction. The result cannot be generalized for all over the country. It needs further well designed study having adequate sample size to draw any conclusion.

Disclosure

All the authors declared no competing interest.

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