Original Article

Dacryocystorhinostomy with or without Mitomycin C: Experience from North West Pakistan

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ABSTRACT

Purpose: To evaluate the surgical outcomes of Dacryocystorhinostomy with Mitomycin C versus Dacryocystorhinostomy (DCR) without Mitomycin C in patients of chronic dacryocystitis visiting tertiary oculoplastic service.

Study Design: Quasi experimental study.

Place and Duration of Study: Lady Reading Hospital, Medical Teaching Institute (MTI), Peshawar, from January 2015 to December 2017.

Methods: A total of 80 patients with chronic Dacryocystitis were divided into two groups of 40 each. Group-1 included patients who underwent Dacryocystorhinostomy (DCR) with intraoperative Mitomycin-C and group-2 included patients with DCR without Mitomycin-C. Data was entered in SPSS version 22.00. Descriptive statistics were used to calculate Means and Standard deviation of age. For categorical factors such as gender and efficacy, frequency and percentage were determined. The Chi Square test was performed to compare the effectiveness of the two groups, with a P value of less than 0.05 considered significant. Tables were used to represent the findings.

Results: There were 68 female patients (85%) and 12 male patients (15%) among the 80 patients. Male to female ratio was 1:6.27. The average age was 45.34. Six months after surgery, DCR was successful in thirty seven (92.5%) patients of group-I, and thirty six (90%) cases of group II. Overall success rate of DCR in our study was 91.25%. The Paired *t* test was applied and the P value was 0.697.

Conclusion: There was no statistically significant difference in surgical results of DCR with Mitomycin C versus DCR without Mitomycin C. Both the procedures were equally effective in relieving symptoms.

Key Words: Chronic dacryocystitis, External Dacryocystorhinostomy, Nasolacrimal duct obstruction, Mitomycin C.

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INTRODUCTION

One of the many causes of watering of eyes is obstruction of lacrimal passages.[1] Females of reproductive age are much more likely to be affected. One of the predisposing factors being narrower bony conduit for nasolacrimal duct (the commonest site of obstruction) in females.[2] External dacryocystorhinostomy (Ext-DCR) has been recognised as a very effective approach by most Ophthalmic surgeons in managing obstructive epiphora but still DCR failures have been observed.[3,4] The two major reasons for DCR failure are: fibrous closure of osteotomy site and obstruction of the common canaliculus.[5] To reduce such fibrosis, intraoperative use of antifibrinolytic agent like mitomycin-C (MMC) is useful in preventing the fibroblast activity linked to the blockage of the

osteotomy point.[6] Mitomycin-C was utilised intraoperatively by many researchers with success rates ranging from 90 to 100%.[7,8,9]

MMC is an antiproliferative substance derived from Streptomyces caespitosus, a soil bacterium. It prevents the production of DNA, cellular RNA, and proteins, as well as the development and scarring of fibrous tissue.[10] The rationale of this study was to find out whether there is any effect of intraoperative use of Mitomycin-C (MMC) on the success rate of external dacryocystorhinostomy (Ext-DCR) in the North West part of Pakistan. The purpose of this study was to evaluate the treatment outcome of DCR with Mitomycin C MMC versus DCR without MMC in patients who visited a tertiary oculoplastic clinic.

METHODS

This experimental study was conducted at Lady Reading Hospital, Medical Teaching Institute (MTI), which is a key referral centre, from January 2015 to December 2017. Patients were selected by consecutive non-probability method. Patients irrespective of age with chronic dacryocystitis or mucocele of lacrimal sac were included and patients with acute dacryocystitis, failed DCR, history of nasal fracture/nasal surgery and gross nasal pathology were excluded.

Approval was sought from ethical committee of the institution. Patients were recruited after informed consent. They were divided into two groups of forty cases each. Group 1 included patients who underwent DCR with intraoperative Mitomycin-C (experimental group). Group 2 included patients with DCR without intraoperative Mitomycin-C (control group). Detailed ocular and systemic history was taken. Examination included regurgitation test, slit lamp evaluation of puncta, and probing and irrigation (syringing). The only difference between the two treatments was that a cotton dipped with Mitomycin-C (0.2 mg/ml) was used for 10 minutes in patients of group-1. Majority of the cases were done under local anaesthesia. Four anxious young patients and three uncooperative elderly patients were operated under general anaesthesia. Before the start of surgery, injection Mitomycin-C was prepared for cases undergoing DCR with Mitomycin-C. A sterilized 10 cc disposable syringe was taken and filled with 10ml of sterile water for injection. A vial of 2 mg of Mitomycin was taken and its cap was sterilized with cotton soaked in methylated spirit. Water of 10ml was injected and vial was shaked well so 0.2 mg/ml Mitomycin-C injection was prepared.

After the surgery patients were examined on 1st post operative day and discharged. Second follow up was at 3 months after surgery.

Data was entered in SPSS version 22.00. Descriptive statistics were used to calculate mean and standard deviation of age. For categorical data like gender and effectiveness, frequency and percentage were determined. The Chi Square test was performed to compare the effectiveness of the two groups, with a p value of less than 0.05 considered significant. Tables were used to display the findings.

RESULTS

There were 68 female patients (85%) and 12 male patients (15%). Male to female ratio was 1:6.27. Average age of the patients was 45.34 years, with the youngest being 20 years old and the oldest being 60 years old. Table 1 shows the age and gender distribution. Patients were divided into two groups of forty cases each. Success of the procedure was described as symptomatic relief of the patient, negative regurgitation test and patent lacrimal passages on irrigation (syringing). After six months, success rate was 92.5% in group-1 and 90% in group 2. Overall success rate of DCR was 91.25 %. The Paired *t* test was applied and the p value was 0.697. This difference was not statistically significant (Table 3).

Table 1: *Age and Gender distribution of the whole sample.*

Age (Years)	Gender	
	Male n (%)	Female n (%)
10 – 20	0	2 (2.5)
21 – 30	0	8 (10)
31 – 40	4 (5)	15 (18.75)
41 – 50	3 (3.75)	22 (27.5)
51 – 60	5 (6.25)	21 (26.25)
Total	**12 (15)**	**68 (85)**

Table 2: *Group-wise gender distribution.*

Group	Gender	
	Male n (%)	Female n (%)
I. External DCR With MMC	2 (2.5)	38 (47.5)
II. External DCR Without MMC	10 (12.5)	30 (37.5)
Total	12 (15)	68 (85)

Table 3: *Comparison of results between the two groups.*

Group	N	Successful	Mean	SD	P Value
Group-I	40	37	1.08	0.27	0.697*
Group-II	40	36	1.10	0.30	

DISCUSSION

In the current study, we employed the Dutemps and Bourguet procedures for external DCR.[11] Only the anterior flaps were sutured, with a small change to the surgical repair of the bridge with the muscular layer. Lacrimal drainage system blockage may be due to various reasons and it is frequently found in middle aged females more frequently than males.[12] In the current study, the majority of participants in both groups were between the ages of 41 and 60 years. Similar to our results, in another study, 70.8 percent of the patients were between the ages of 31 and 50.[13]

In this particular study, conventional DCR was done in group 2 with a success rate of 90%. This is comparable to the results of other authors like Hussain et al, who reported 93.33% success.[14] These results are well in comparison with the work of Liao et al[7] and You et al.[8] Rahman et al[15] has reported a success rate of 97.77%.

In our current research, the difference in success rates between the two treatments was not statistically significant, and the combined failure rate of DCR was 8.75 percent. On the second operation of a failed DCR, Pico[16] discovered an occluding membrane clogging the new drainage channels. The occluding membrane was discovered to be made up of granulation tissue on histology. In patients who had a second procedure, McPherson and Egelston[17] saw extensive scar tissue at the osteotomy site. This demonstrates that minimising fibrous growth at the osteotomy site of anastomosed flaps may improve success rates. However, the results are not statistically significant.

We used 0.2 mg/ml of MMC. Ugurbas et al[18] used 0.5 mg/ml MMC soaking over the osteotomy site to investigate the clinicopathologic impact of Mitomycin-C on transnasal DCR. On Mitomycin-C soaked tissues, they discovered reduced epithelial and hypocellular subepethelial connective tissue using light and electron microscopes. As a result, it reduced the volume and cellularity of the mucosa, increasing the DCR success rate.

In this particular study, three patients (7.5%) of group 1 complained persistent watering (epiphora) after 6 months of follow up and were labelled as failed DCR. Gonzalvo et al used helical computed tomography to investigate the influence of MMC on osteotomy size.[19] The residual osteotomy size at the end of sixth postoperative month was 93.82+/-4.55 percent in their research, compared to the osteotomy size immediately after surgery. Fang et al found that osteotomy size was maintained with 0.2 mg/ml MMC to the anterior flap applied for 10 minutes.[7] The drug was administered to the anterior flaps without intubation, with a 92.5 percent success rate.

In our study, no significant complication was noted due to Mitomycin-C. There were three patients who developed excessive nasal bleeding on removal of the nasal packing. These patients were kept under observation for another 24 hours. In their work, Kao et al identified a number of potential problems associated with intraoperative Mitomycin-C usage in DCR, including delayed wound healing, unusual nasal haemorrhage, mucosal necrosis, and infection.[20] Mitomycin-C administration in external DCR caused no concerns according to studies.[21,22] In the present study, no such complications reported.

Limitations of the study are small sample size and a single center study. We did not compare different concentrations of MMC, which could have different results from the current outcomes.

CONCLUSION

There is no statistically significant difference in results between DCR with MMC and without MMC. Hence, routine use of MMC is not necessary unless the case with complicated chronic dacryocystitis are encountered.

Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval

The study was approved by the Institutional review board/Ethical review board **(Ref. No. 1297).**

REFERENCES

1. **Ulusoy MO, Kıvanç SA, Atakan M, Akova-Budak B.** How Important Is the Etiology in the Treatment of Epiphora? J Ophthalmol. 2016; **2016:** 1438376. Doi: 10.1155/2016/1438376.
2. **Shen GL, Ng JD, Ma XP.** Etiology, diagnosis, management and outcomes of epiphora referrals to an oculoplastic practice. Int J Ophthalmol. 2016; **9 (12):** 1751-1755. Doi: 10.18240/ijo.2016.12.08.
3. **Meireles MN, Viveiros MM, Meneghin RL, Galindo-Ferreiro A, Marques ME, Schellini SA.** Dacryocystectomy as a treatment of chronic dacryocystitis in the elderly. Orbit. 2017; **36 (6):** 419-421. Doi: 10.1080/01676830.2017.1353111.
4. **Sibley D, Norris JH, Malhotra R.** Management and outcomes of patients with epiphora referred to a specialist ophthalmic plastic unit. Clin Exp Ophthalmol. 2013; **41 (3):** 231-238. Doi: 10.1111/j.1442-9071.2012.02866.x.
5. **Altin Ekin M, Karadeniz Ugurlu S, Aytogan H, Sahin Atik S.** Failure in Revision Dacryocystorhinostomy: A Study of Surgical Technique and Etiology. J Craniofac Surg. 2020; **31 (1):** 193-196. Doi: 10.1097/SCS.0000000000005829.
6. **Majhi S, Sharma A.** Evaluation of Role of Mitomycin C in the Cases of Nasolacrimal Duct Blockage Undergoing Endoscopic Dacryocystorhinostomy. Indian J Otolaryngol Head Neck Surg. 2019; **71 (Suppl. 3):** 1981-1985. Doi: 10.1007/s12070-018-1400-x.
7. **Liao SL, Kao SCS, Tesng JHS.** Results of intraoperative Mitomycin C application in dacryocystorhinostomy. Br J Ophthalmol 2000; 84: 903-906. Doi: 10.1136/bjo.84.8.903.
8. **You YA, Fang CT.** Intraoperative Mitomycin C in dacryocystorhinostomy. Ophthal Plast Recons Surge. 2001; **17:** 115-9. Doi: 10.1097/00002341-200103000-00007.
9. **Kar T, Yildirim Y, Topal T, Çolakoğlu K, Ünal MH, Kar T, et al.** Efficacy of adjunctive mitomycin C in transcanalicular diode laser dacryocystorhinostomy in different age groups. Eur J Ophthalmol. 2016; **26 (1):** 1-5. Doi: 10.5301/ejo.5000632.
10. **Jayantha Kedilaya Y, Chacko A, Poorey VK.** Improving the Results of Endonasal Dacryocystorhinostomy with Mitomycin C Application: A Prospective Case-Control Study. Indian J Otolaryngol Head Neck Surg. 2018; **70 (4):** 477-481. Doi: 10.1007/s12070-018-1498-x.
11. **Dupuy-Dutemps L, Bourguet J.** Procede Plastique de dacryocystorhinostomie et ses resultats. Ann Ocul J 1921; **158:** 241-261.
12. **Islam MR, Wadud SA, Akhanda AH, Rahman MS, Habibullah M, Kabir MS, et al.** Outcome of Transcanalicular Endolaser and External Dacryocystorhinostomy in Chronic Dacryocystitis. Mymensingh Med J. 2018; **27 (4):** 673-678.
13. **Ali A, Ahmed T.** Dacryocystorhinostomy. Pak J Ophthalmol. 2001; **17:** 122-128.
14. **Hassain M, Akhtar S, Awan S.** Dacryocystorhinostomy with or without intubation. Annual KEMU. 1998; **4:** 34-36. Doi: 10.21649/akemu.v4i3.3939
15. **Rahman A, Channa S, Niazi JH, Memon MS.** Dacryocystorhinostomy without Intubation with Intraoperative Mitomycin-C. J Coll Physician Surg Pak. 2006; **16 (7):** 476-478.
16. **Pico G.** A modified technique of external dacryocystorhinostomy. Am J Ophthalmol. 1971; **72:** 679-690.
17. **McPherson SD, Egelston D.** Dacryocystorhinostomy: a review of 106 operations. Am J Ophthalmol. 1959; **47:** 28-31.
18. **Ugurbas SH, Zilelioglu G, Sargon MF.** Histopathological effects of mitomycin C on endoscopic transnasal dacryocystorhinostomy. Ophthalmic Surg Lasers, 1997; **28:** 300-304.
19. **Gonzalvo Ibanez FJ, Fuertes Fernandez I, Fernandez Tirado FJ, Hernandez Delgado G, Rabinal Arbues F, Honrubia Lopez FM.** External dacryocystorhinostomy with Mitomycin-C. Clinical and anatomical evaluation with Helical Computer Tomography. Arch Soc Esp. Oftalmol. 2000; **75:** 611-617.
20. **Kao SCS, Liao CL, Tseng JHS.** Dacryocystorhinostomy with intraoperative mitomycin C. Ophthalmology, 1997; **104:** 86-91. Doi: 10.1016/s0161-6420(97)30357-1.
21. **Masoomian B, Eshraghi B, Latifi G, Esfandiari H, Masoomian B.** Efficacy of probing adjunctive with low-dose mitomycin-C irrigation for the treatment of epiphora in adults with nasolacrimal duct stenosis. Taiwan J Ophthalmol. 2020; **11 (3):** 287-291. Doi: 10.4103/tjo.tjo_25_20.
22. **Saini M, Bajaj MS, Pushker N, Meel R, Saini K, Chaurasia S, et al.** Evaluation of lacrimal duct probing in adults with 0.02% and 0.04% mitomycin-C in primary acquired nasolacrimal duct obstruction: A randomized comparative pilot study. Oman J Ophthalmol. 2022; **15 (1):** 56-60. Doi: 10.4103/ojo.ojo_33_21.

Authors' Designation and Contribution

Zubair Ullah Khan; Assistant Professor: *Concepts, Design, Literature search, Data acquisition, Data analysis, Manuscript preparation, Manuscript editing, Manuscript review.*

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