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Original Research Article

A Hospital-Based Comparative Assessment of the Outcome of Revision External Dacryocystorhinostomy (DCR) With or Without Mitomycin C

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Abstract

Aim: The aim of the present study was to compare the outcome of revision external dacryocystorhinostomy (DCR) with or without mitomycin C.

Methods: This prospective study was conducted on over 50 diagnosed patients with failed external dacryocystorhinostomy who arrived at the Regional Institute of Ophthalmology, IGIMS, Patna, Bihar, India for one year.

Results: In 50 diagnosed patients with failed external dacryocystorhinostomy Group A underwent revision external dacryocystorhinostomy with Mitomycin–C and Group B without mitomycin–C. Maximum 40% of the patients were 41–50 age group in Group A (Mitomycin C) and 40.0% in 41-50 age group in Group B (without Mitomycin C). The mean age was 40.3±9.3 and 41.5±10.3 years in Group A and B, respectively (P = 0.800). The mean age of both groups was comparable. There were 12 (48%) males and 13 (52%) females in Group A, 10 (40%) males and 15 (60%) females in Group B. Out of 50 patients, 15 (60%) had left-sided failed dacryocystorhinostomy, and 10 (40%) had right-sided failed dacryocystorhinostom.

Conclusion: Mitomycin C has a beneficial effect in preventing reclosure of the dacryocystorhinostomy stoma after revision external dacryocystorhinostomy and no significant complications resulting from its use.

Keywords: Failed DCR, Revision DCR surgery, Mitomycin C, Surgical outcome.

Introduction

Nasolacrimal canal (NLC) obstruction results in infection of the lacrimal sac, thereby leading to lacrimation and ocular discharge. Lacrimal sac infection, recurring despite medication, can be surgically treated with external dacryocystorhinostomy (DCR) performed by creating an anastomosis between the lacrimal sac and the nasal mucosa. External DCR is considered the gold standard in primary cases with success rates of 90-100%. [1,2] Despite external DCR, lacrimation and lacrimal sac infection may persist in a small number of patients. This condition called as recurrent dacryocystitis primarily results from the failure to create a bone window at an appropriate localization and size during the DCR operation, inaccurate suturation of the lacrimal sac and the nasal mucosa

flaps, failure to preserve the anatomic structure and inadequate investigation of the nasal cavity abnormalities before the surgery. [3] In cases of recurrent dacryocystitis, success rates were reported as between 50-100% following revision external DCR and bicanalicular nasal intubation by silicone tubing. Performing revision external dacryocystorhinostomy (DCR) and nasal intubation with bicanalicular silicone tubing under endonasal endoscopic guidance increases the rate of success in this patients. [4,5]

Dacryocystorhinostomy has been recommended as a highly successful procedure in dealing with epiphora from nasolacrimal duct obstruction. Surgical failure is frequently related to granulation tissue formation at the osteotomy site, technical error or closure of the anastomosis site. The use of mitomycin C inhibits fibrous tissue growth leading to improve surgical outcome. [6,7] In ex DCR surgery, mitomycin C will use over the osteotomy site and the anastomosed flaps to suppress fibrous proliferation and scar formation. Theoretically, this modification should reduce the fibrous adhesion between the osteotomy site and the nasal septum and inhibit scarring around the opening of the common canaliculus. Thus, mitomycin C should prevent further shrinkage of the final surface area of the osteotomy and prevent the obstruction of the common canaliculus opening. [8,9] External DCR is still a safe and effective surgical procedure in primary acquired nasolacrimal duct obstruction. However, there is always a possibility of failure in all surgical procedures. Many studies have proved that for revision surgeries, usage of silicone tubes and mitomycin C and creating a proper ostium are the most critical factors for a successful surgery.

The aim of the present study was to compare the outcome of revision external dacryocystorhinostomy (DCR) with or without mitomycin C.

Materials and Methods

This prospective study was conducted on over 50 diagnosed patients with failed external dacryocystorhino-stomy who arrived at the Regional Institute of Ophthalmology, IGIMS, Patna, Bihar, India for one year

Patients with facial anomalies, trauma, punctual agenesis, nasal pathology and those below 18 years are excluded from this study.

After enrollment, detailed history was taken from all the study subjects; they underwent thorough ocular and systemic examination and relevant investigations, including SPT with diagnostic probing. Revision external DCR surgery was done in all patients by a single competent oculoplastic surgeon. Mitomycin C was applied on a 1:1 basis with particular intention to younger age groups. They were followed up one month and six months after surgery. Patients were specially asked about epiphora at each visit. The stringency of watering and discharge was observed in each visit. Sac patency test was done during the final follow- up. The absence of watering and the patent lacrimal system was considered a successful surgery. All the relevant data were recorded in a predesigned datasheet.

Statistical analysis was carried out using SPSS (statistical package for social sciences) statistics V 26.0 Software. Data were compiled, checked edited properly before analysis. An appropriate test of significance (chi-square test) was used for the statistical analysis

Results

Table 1: Comparison of age between two groups

Age (in years)	Group A (n=25) No. (%)	Group B (n=25) No. (%)	p value
21-30	4 (16)	4 (16)	0.800
31-40	8 (32)	8 (32)	
41-50	10 (40)	10 (40)	
51-60	3 (12)	3 (12)	
Mean±SD	40.3±9.3	41.5±10.3	
Range	24-57	27-59	

In 50 diagnosed patients with failed external dacryocystorhinostomy Group A underwent revision external dacryocystorhinostomy with Mitomycin–C and Group B without mitomycin–C. Maximum 40% of the patients were 41–50 age group in Group A (Mitomycin C) and 40.0% in 41-50 age group in Group B (without Mitomycin C). The mean age was 40.3±9.3 and 41.5±10.3 years in Group A and B, respectively (P = 0.800). The mean age of both groups was comparable.

Table 2: Gender distribution and side failed dacryocystorhinostom

Gender	Group A	Group B
Male	12	10
Female	13	15
Side failed dacryocystorhinostom N%		
Left-sided	15 (60)	
Right-sided	10 (40)	

There were 12 (48%) males and 13 (52%) females in Group A, 10 (40%) males and 15 (60%) females in Group B. Out of 50 patients, 15 (60%) had left-sided failed dacryocystorhinostomy, and 10 (40%) had right-sided failed dacryocystorhinostom.

Table 3: Distribution of study patients by sac patency test after surgery at 6 month

	Group A (n=25) No. (%)	Group B (n=25) No. (%)	p value
	23 (92)	18 (72)	0.060
SPT-Block	2 (8)	7 (28)	

Most of the patients had no complications in both groups. Only one patient reported with corneal epithelial defect in the mitomycin C group. Postoperative care and follow up were done identically in both groups. After six months of follow up, 92% of patients had success in revision external DCR with mitomycin C group, and 72% of patients had success in revision external DCR without mitomycin C group. (P = 0.060, Chi-square test).

Discussion

Dacryocystorhinostomy (DCR) is the procedure of choice in patients with epiphora due to primary acquired nasolacrimal duct obstruction. Caldwell and Toti were the pioneers who first described endonasal and external DCR, respectively. [10,11] Subsequently, the evolution of surgical tools, the advent of fiber‑optic endoscopes, better anesthesia techniques and the adjunct use of anti‑metabolites intraoperatively and postoperatively by some; namely mitomycin‑C (MMC) have significantly contributed to the advancement of DCR surgery. In experienced hands, DCR is a very successful procedure. The surgery may be performed either externally through a skin incision or endonasally with the help of fiber‑optic endoscope.

Dacryocystorhinostomy is a surgical procedure that creates an alternative route for tear drainage between the lacrimal sac and nasal cavity, bypassing the nasolacrimal duct. Dacryocystorhinostomy can be performed either by an external approach called external dacryocystorhinostomy or through the nasal cavity using an endoscope called endonasal dacryocystorhinostomy. [12] Fibrous tissue and granulation formation are associated with surgical failure because they diminish ostium size and lead to non-patency. Loss is frequently related to granulation formation at the osteotomy site or common canaliculus, technical error, or closure of the anastomosis site. Efforts should focus on inhabiting granulation tissue over the osteotomy site and anastomosed flaps to increase the surgical success rate. [1] Mitomycin-C (MMC) has significantly contributed to the improvement of DCR surgery. MMC is a systemic chemotherapeutic agent derived from Streptomyces caespitosus that inhibits the synthesis of DNA, cellular RNA, and protein by inhibiting collagen synthesis by fibroblasts. The cellular changes in the human nasal mucosal fibroblasts induced by MMC at an ultrastructural level have been documented. Most studies have found that intraoperative MMC application seems to be safe; furthermore, no deleterious effects were noted with MMC application. Mere eyeballing the data suggests that MMC plays a role in reducing the closure rate of the osteotomy site after a DCR surgery. [13]

At the present maximum of 40.0% of the patients were 41–50 age group in both Groups A and B. The mean age was 40.3 9.3 and 41.5 10.3 years in Group A and B, respectively. There were 12 (48%) males and 13 (52%) females in Group A. 10 (40.0%) male and 15 (60.0%) females in Group B. Age and gender-matched within groups. By the present study, Shaikh et al. [14] reported mean age of the patients of external DCR with mitomycin-C Group were 37.77 11.96 years, while the mean age of external DCR with mitomycin-C was 39.96 09.05 years. Among the 100 patients of the mitomycin-C Group, male patients were 32(32%), female patients were 68(68%), and out of 100 patients without mitomycin-C, 24(24%) patients were male, and 76(76%) patients were female. Out of 30 patients, 15 (60.0%) had left-sided failed DCR and 10 (40.0%) had right-sided failed DCR. Previous studies by Qadir et al. reported the majority of the cases 37(74%) had failed DCR on the right side. [15]

After a period of follow up of 6 months, 92% of cases were successfully treated according to the symptoms (watering & discharge). The lacrimal sac syringing (Patency) in Group A and 72% in Group B. Comparing the results we obtained to the study by Liao and others, [12] their conventional Group showed 70.5% success against 95.5% success in the MMC group. Satish et al. [16] showed a success rate in traditional groups (75%), while a higher success rate in the MMC group (90%) compared to their study. The studies done by Kao et al. [17] and Goswami et al. [18] both showed lower success rates in both groups compared to our research.

Postoperative care and follow up were done identically in both groups. After six months of follow up, 93.3% of patients had success in r-Ex DCR with mitomycin-C Group, and 66.7% of patients had success in r-Ex DCR without mitomycin-C Group. No significant difference in success rate between the two groups. A similar study done by Puzari et al. [19] showed a success rate of 80% was achieved in a conventional group, whereas 96.67% success was performed in the MMC group. In the case of scar- prone conditions like lacrimal fistula, mitomycin C use has been efficacious in maintaining the system's patency after surgery. Ahmed et al. [20] conducted a prospective

randomized controlled study taking 44 eyes with primary nasolacrimal duct obstruction to evaluate the long-term result of intraoperative mitomycin C application in DCR surgery. They found that the satisfaction rate in the mitomycin C group was 95.45%, while in the conventional Group, it was 72.72%. Iqbal et al. [21] conducted a prospective randomized controlled study in 60 eyes to compare the results of external DCR with and without intraoperative mitomycin C application. The success rate in DCR with MMC was 96.7% compared to 80% in the conventional Group. We found a 93.3% success rate. That is, patients were symptoms free, and SPT was patent in patients of Group A (r Ex-DCR with MMC). Here MMC has a beneficial effect on revision external dacryocystorhin - ostomy operation. [22]

Conclusion

In the present study, the results of revision external dacryocystorhinostomy with Mitomycin- C were 93.3%, whereas in revision external dacryocystorhinostomy without Mitomycin-C, it was 66.7%. The frequency of postoperative complications was found to be more when Mitomycin C was used; however, this was not found to be statistically significant. Hence, we conclude that Mitomycin-C has a beneficial effect in preventing reclosure of the dacryocystorhinostomy stoma after revision external DCR. Meticulous, atraumatic surgical technique is paramount in achieving a successful surgical result. An adequate bony window, marsupialization of the lacrimal sac, and preservation of nasal and lacrimal sac mucosa help ensure an excellent surgical outcome.

References

1. Tarbet KJ, Custer PL. External dacryocystorhinostomy: surgical success, patient satisfaction, and economic cost. Ophthalmology. 1995 Jul 1;102(7):1065-70.
2. Vanhoucke K, Colla B, Missotten L. Dacryocystorhinostomy: indications, operations, results and some variants. Bulletin de la Société belge d'ophtalmologie. 1990 Jan 1;238:103-10.
3. Serifoglu A, Karakurt A. Can. Secondary dacryocystorhinostomy in cases of unsuccessful lacrimal surgery. Turkish J Ophtalmol. 1988;18:573-9.
4. Welham RA, Wulc AE. Management of unsuccessful lacrimal surgery. British journal of ophthalmology. 1987 Feb 1;71(2):152-7.
5. Sodhi PK, Pandey RM, Malik KP. Experience with bicanalicular intubation of the lacrimal drainage apparatus combined with conventional external dacryocystorhinostomy. Journal of Cranio- Maxillofacial Surgery. 2003 Jun 1;31(3):187-90.
6. Liao SL, Kao SC, Tseng JH, Chen MS, Hou PK. Results of intraoperative mitomycin C application in dacryocystorhinostomy. Br J Ophthalm ol. 2000;84(8):903–6.
7. Tarbet KJ, Custer PL. External dacryocystorhinostomy: surgical success, patient satisfaction, and economic cost. Ophthalmology. 1995; 102(7):1065–70.
8. Ari S, Gun R, Sumeli S, Atay AE, Caca I. Use of adjunctive mitomycin C in external dacryocystorhinostomy surgery compared with surgery alone on patients with nasolacrimal duct obstruction: A prospective, double-masked, randomized, controlled trial. Curr Ther Res Clin Exp. 2009;70(4): 267–73.
9. Kogan S, Zeng Q, Ash N, Greenes RA. Problems and challenges in patient information retrieval: a descriptive study. Proc AMIA Symp. 2001; 329–33.
10. Toti A. Nuovo metodo conservatore dicura radicale delle soppurazioni croniche del sacco lacrimale (dacriocistorinostomia). Clin Moderna. 1904; 10:385-7.

11. Caldwell GW. Two new operations for obstruction of the nasal duct, with preservation of the canaliculi. Am J Ophthalmol. 1893; 10:189-92.
12. Apoorva JS, Wani JS, Riaz R, Nazir O. Evaluation of dacryocystorhinostomy failure with computed tomographic dacryocystography. Int J Res Med Sci. 2017;5(12):5197–5202.
13. Mcpherson SD, Egleston D. Dacryocystorhinostomy: a review of 106 operations. Am J Ophthalmol. 19 59;47(3):328–31.
14. Shaikh RM, Hadrawi MT, Danish EY. Comparison of success rate of external dacryocystorhinostomy with and without mitomycin-c in patients of chronic dacryocystitis. Pak J Med Heal Sci. 2015;9(3):934– 6.
15. Qadir M, Ahangar A, Dar MA, Hamid S, Keng MQ. Comparative study of dacryocystorhinostomy with and without intraoperative application of Mitomycin C. Saudi J Ophthalmol. 2014;28(1):44–8.
16. Satish K, Prakash DN, Tanwar M, Patil S, Gopal M, Acharya AA, Kulkarni A, Setlur M. A comparative study of external dacryocystorhinosotomy with and without the use of Mitomycin C. Journal of Evolution of Medical and Dental Sciences. 2013 Oct 28;2(43): 8259-67.
17. Kao SC, Liao CL, Tseng JH, Chen MS, Hou PK. Dacryocystorhinostomy with intraoperative mitomycin C. Ophthalmology. 1997;104(1):86–91.
18. Goswami BJ, Das CDK. Mitomycin C as useful adjunct in external dacryocystorhinostomy in scar prone condition; 2002.
19. Puzari BS, Kumar HNP. A comparative study on intraoperative mitomycin-C augmented external dacryocystorhinostomy with conventional dacryocystorhinostomy. Int J Res Med Sci. 2016;18(9):3879–83.
20. Ahmed SS, Ahmad R. Results of intraoperative mitomycin C application in dacryocystorhinostomy. J Med Edu Res. 2002;4(1):27– 31.
21. Iqbal A, Khan O. External dacryocystorhinostomy with and without intraoperative mitomycin-C application in adults. Ophthalmology. 2012;10(3):262–5.
22. Rincon V. A. D., Cuello D. R. F., Lora J. F. V, Ayala G. C. A., García, J. S. R., Zabaleta K. M., Estrada D. G., Adames G. A. C., & Quiroga J. P. R. Management of Breast Cancer During Pregnancy. Journal of Medical Research and Health Sciences, 2022; 5(4):1960–1966.