

ORIGINAL ARTICLE

EFFECT OF INTRAOPERATIVE MITOMYCIN-C APPLICATION IN
OUTCOME OF EXTERNAL DACRYOCYSTORHINOSTOMY

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Background: Patients develop postoperative fibrosis at the site of operation after dacryocystorhinostomy (DCR) which results in impairment of the osteum patency. This quasi-experimental study was undertaken to determine the role of intraoperative Mitomycin C (MMC) application in maintaining postoperative patency of the osteum. **Methodology:** The present study was conducted at the Eye department of Ayub Medical College, Abbottabad on patients in whom routine DCR was indicated. Subjects were divided into mitomycin C (Test) and non mitomycin C (Control) groups. In test group, Mitomycin C was applied to the anastomosed flaps and osteotomy site for 30 minutes. Postoperative patients were followed for up to 6 months and outcome of patency was documented. **Results:** A total of 73 patients were included, divided into test (30) and control (43) groups. An overall success rate of 86.3% was obtained for patent ostia; this was based on 96.67% success in test group compared to 79.1% in the control group ($p=0.031$). **Conclusion:** Intraoperative application of Mitomycin-C significantly improves the success rate in external dacryocystorhinostomy.

Keywords: Dacryocystorhinostomy, mitomycin C, dacryocystitis, lacrimal duct obstruction.

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INTRODUCTION

Dacryocystitis is an infection of the lacrimal sac caused by nasolacrimal duct obstruction.¹ The term is derived from Greek words dakryon (tear), cysta (sac) and itis (inflammation).¹ It may be acute or chronic and is most commonly staphylococcal or streptococcal.² Chronic dacryocystitis presents with epiphora which may be associated with a chronic or recurrent unilateral conjunctivitis. Signs consist of a painless swelling at the inner canthus caused by mucocele and a reflux of mucopurulent material through canaliculi resulting from pressure over the sac.¹ The most common complication is corneal ulceration in association with *Streptococcus pneumoniae*.³ The frequency is twice in women as compared to men. The management is by intubation and stenting and dacryocystorhinostomy (DCR). DCR is of two types: external (transcutaneous) or an internal (intranasal) approach. Internal DCR can be performed endoscopically (endoscopic DCR) and under direct visualization (transnasal laser DCR).⁴ The success rate of external DCR is over 90%.² Mitomycin-C (MMC) has been described as having a positive effect in different types of dacryocystorhinostomy (DCR) surgery such as external DCR, endonasal and transcanalicular DCR. MMC, an antineoplastic antibiotic, acts as an alkylating agent by inhibiting DNA, RNA and protein synthesis. Topical use of MMC can modulate the scarring process, which is useful in glaucoma surgery and pterygium excision. In DCR, MMC is also useful because it reduces the scarring process and thus prevents the occlusion of the osteotomy site

related to the fibroblast activity.⁵ To prevent postoperative fibrosis which affect the patency of the osteum leading to failure of external DCR, Mitomycin C is applied to the anastomotic flaps. As there was limited data available about Mitomycin C application and its success rate in Pakistan, so the present study was undertaken to document the role of Mitomycin C.

MATERIAL AND METHODS

This quasi-experimental study was conducted in the Eye Department of Ayub Teaching Hospital Abbottabad. The samples consisted of the patients visiting the Eye OPD for chronic dacryocystitis. These patients complained of excessive tearing from their eyes. The blockage of lacrimal passages was confirmed by regurgitation test and height of tear film meniscus followed by irrigation in these patients. All patients from second decade to seventh decade were included by convenience sampling. Children suffering from congenital obstruction like nasal lacrimal duct obstruction and congenital dacryoceles were excluded, as were adults having dacryoliths, sinus disease, trauma and lacrimal plugs. Patients with diabetes and other chronic conditions (renal, hepatic, cardiovascular, etc.) were excluded due to increase chances of infection and operation failure.

All the patients underwent external dacryocystorhinostomy. The blood vessels in the middle nasal mucosa were vaso constricted with ribbon gauze gotten wet with 1:1000 adrenaline. A straight vertical incision was made 10 mm medial to the inner canthus avoiding the angular vein. The

anterior lacrimal crest was exposed by blunt dissection. The periosteum was divided and the sac was reflected laterally from the lacrimal fossa. The anterior lacrimal crest and the bone from the lacrimal fossa were removed. A probe was introduced through the lower canaliculus and the sac was divided into two flaps. The posterior flap was removed. Similarly a vertical incision was given in nasal mucosa creating the anterior and posterior flaps. The two flaps of the lacrimal sac and nasal mucosa were stitched.

Patients were divided into test (DCR plus MMC) and control (DCR only) groups by nonrandom selection. In mitomycin group, 0.2 mg/ml Mitomycin C was applied to the flap for 30 minutes and then washed after that; in the control group no Mitomycin C was applied. The muscle and the skin were then stitched. Patients were followed for six months with monthly data collection. To evaluate the long term effects of the two groups, the patient were asked about the symptoms that is absence of tearing. In addition objective findings were documented which consisted of height of tear meniscus and irrigation. The height less than 0.2 mm meant successful surgery while the height more than 0.2 mm showed failed surgery. Similarly irrigation showed patency and non-patency of the osteum showed the success and failure of surgery. The data was entered into SPSS-15 for analysis.

RESULTS

A total of 73 patients completed the study. There were 43 patients in the DCR (Control) group and 30 patients in the DCR plus Mitomycin C (Test) group. Gender-wise distribution, mean ages and outcomes of therapy are shown in table-1.

Table-1: Distribution of demographic values and outcome of therapy in Control and Test groups.

| Variables | Control Group (DCR only) (n=43) | Test Group (DCR+Mitomycin C) (n=30) | Total |
|--------------------------|---------------------------------|-------------------------------------|-------------|
| Gender | | | |
| Males | 7 | 14 | 21 |
| Females | 36 | 16 | 52 |
| Mean Age (years) | | | |
| Males | 42.88±18.25 | 38.50±18.30 | 41.08±18.28 |
| Females | 50.57±22.13 | 38.43±21.82 | 42.48±22.15 |
| | 41.39±17.37 | 38.56±15.34 | 40.52±16.67 |
| Outcome | | | |
| Patent | 34 (79.1%) | 29 (96.67%) | 63 |
| Blocked | 9 (20.9%) | 1 (3.33%) | 10 |
| Outcome by gender | | | |
| Patent | | | |
| Males | 7 | 14 | 21 |
| Females | 27 | 15 | 42 |
| Blocked | | | |
| Males | - | - | - |
| Females | 9 | 1 | 10 |

A gender disparity was observed in that there were more females in the control group (27/43) while the genders were more equally distributed (16/30) in the test group. However the age differences within the groups and between the groups were not significantly different.

At six-months follow-up, overall 63 (86.3%) of ostia were patent and 10 (13.7%) were blocked. There were no blocked ostia in males of either group; however 9/43 (21%) females in the control group and 01/30 (3.3%) female in the test group had blocked ostia. Thus an overall success rate of 86.3% (63/73) was achieved when both groups were considered; in the conventional DCR group, the success rate was 79.1% (34/43) compared to 96.67% (29/30) in the Mitomycin C treated group (p=0.031).

DISCUSSION

In the present study, the success rate of DCR plus Mitomycin-C is compared with the results of conventional DCR. The success rate in Mitomycin-C group was higher that is 96.67% as compared to conventional DCR group, where it was 79.1%. Similar results were quoted in Denizli, Turkey⁶ where it was 95% as compared to 85% in control group. Another study in Andana, Turkey⁷ also concluded that intraoperative anti-proliferative agents like Mitomycin C improved the success rate of external DCR.

A study was conducted in Al-Ibrahim eye hospital in Karachi, Pakistan,⁸ which showed that the success rate of DCR plus Mitomycin-C was 97.77%. Similarly a study in China⁹ concluded that intraoperative Mitomycin-C in DCR is safe and effective adjuvant that helps in achieving long term success rate. The result was 94% in Mitomycin-C group and 83% in conventional DCR group. Similar results were also seen in Spain,¹⁰ where success rate in Mitomycin-C group was 93.82% as compared to 64.81% in conventional DCR group.

In our study, a gender difference was observed for the blockage rate in DCR patients, in that significantly more females had patency failure (9 versus nil) as compared to males (Table-1). In group two, the gender differences were nullified, so that it may be that Mitomycin-C therapy is more useful in female patients. However, other studies have not provided any data in this regard and it is too early to conclude this based on the present study.

A recent meta analysis¹¹ on the success or otherwise of Mitomycin-C in Endoscopic DCR surgery concluded that there was a statistically significant difference in the outcomes of patients treated with Mitomycin-C compared to those without. Efforts are afoot to increase the success rates of Endoscopic DCR in comparison to External DCR and

the use of Mitomycin-C in Endoscopic DCR is expected to bring about the desired upward trend in surgical success rates. Some previous original studies done on Endoscopic DCR patients produced inconclusive results, with some studies showing efficacy of Mitomycin-C therapy¹² and others^{13,14} showing no difference from the non-Mitomycin-C treated group.

CONCLUSION

We conclude that intraoperative application of Mitomycin C increases the chances of success of external DCR surgery. Further properly designed large scale randomized trials are to be considered to provide rational guidelines for future evidence based therapy.

AUTHOR'S CONTRIBUTION

MJ, ZA: Conceived the study, collected data, manuscript writing, ST, IQ, HA: Data analysis, literature search, IQ: Proof reading, data analysis.

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