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Original Research Article

Effect of Mitomycin-C in Endoscopic Dacryocystorhinostomy

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Abstract:

Background: Chronic dacryocystitis is the infection of lacrimal apparatus characterised by watering eye (epiphora). Which has a social impact.

Method: This is prospective study involving patients with chronic dacryocystitis. Ten patients were included, all of them were subjected to end-DCR. Group-A (5 patients) were treated with mitomycin-c at osteotomy site. The rest (Group-B) were treated without it.

Main Outcome Measures: Post-operative relief of epiphora and endoscopic documentation of the patency of rhinostome were the main outcome measure.

Results: Patients treated with mitomycin-c (Group-A) do not have synechiae and granulation formation and the osteotome size was well maintained.

Conclusion: Use of mitomycin-c prevents the post-operative complication like granulation and synechiae formation. The result is not statistically significant. A properly and adequately performed surgery is more vital for successful result.

Keywords: Mitomycin-c, Dacryocystitis, Nasolacrimal Duct, Rhinostome, End-DCR.

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Introduction

Chronic dacryocystitis is the infection of lacrimal apparatus, characterised by watering from eye. Epiphora is the essential symptom of dacryocystitis, aggravated by exposure to wind. It is commonly attributed to the effect of stricture of the NLD (nasolacrimal duct) arising from chronic inflammation.

"Rice" in 1988 reported a cadaver study to demonstrate the feasibility of Endoscopic Dacryocystorhinostomy, followed by review of surgery in four patients in 1990.

Intranasal approach to dacryocystorhinostomy, where a part of inferior turbinate was sacrificed and NLD was followed to the lacrimal sac. However, this technique was not successful because difficulty in visualisation of intranasal anatomy. The advent nasal endoscope for various nasal and paranasal procedure has provided otolaryngologists with an unprecedented direct view of intranasal anatomy, even allowing visualisation at different angles which allow more controlled access and manipulation of lacrimal apparatus.

Mitomycin-c is an anti-tumour antimetabolite isolated by Walaki from sterotomycies caespitosus in 1958. It contains an urethrnane and quinone group in its structure. After enzymatic reduction of quinone and loss of methoxy group mitomycin-c become a functional alkylating agent. It links DNA at N6 position of adenine and N2 position of guanine. The initial use of this drug was in treating gastric adenocarcinoma, carcinoma of cervix, colon, lung, pancreas, and bladder.

The use of mitomycin-c in DCR surgery reported by Shine CS Kao et al in 1997. One of the major causes of failure is closure of the osteotomy site by granulation tissues. They inferred that intraoperative mitomycin-c might increase the success rate of DCR by maintaining a larger osteotomy size.

Ugurbas et al studied that the histopathological effect of mitomycin-c on intranasal DCR using 0.5mg/ml mitomycin-c and soaking for 2 ½ minutes over osteotomy site. Specimen from osteomy site were collected during surgery and after 15 days later light microscopy examination showed attenuation of epithelium and intracytoplasmic vacuolations. Subepithilial connective tissue was found to be looser and hypocellular. Electron microscopy confirmed the above findings and also showed swelling of mitochondria, dilatation of endoplasmic reticulum and chromatin dense granules in nuclei of

fibroblast. The light and electron microscopy showed decrease in the density and cellularity of mucosa, and hence enhanced the success rate of DCR surgery. Topical use of mitomycin-c might enhance the success rate of DCR.

Aims & Objectives

The aim of our study was to evaluate the effect of anti-neoplastic antibiotic mitomycin-c (MMC) in preventing the postoperative complication like granulation formation, synechiae formation when applied topically at osteotome site. The patency of rhinostome and relief of epiphora were the main outcome measure.

Material and Method

This is a prospective study involving patients of chronic dacryocystitis. Ten patients were included in our study and all were subjected to endoscopic-DCR and followed up for 6 months.

The average age of incidence was 33.5 years and male: female ratio was 2:3. All the cases were operated under local anaesthesia. The bone on the lateral wall of the nose overlying the lacrimal sac was exposed. Adequate bone was then removed by Karrison's punch (1mm), to expose the whole of the medial wall of the sac.

An incision was then made over the anterior aspect of the sac and whole of the medial wall was removed. At the end of surgery, 5 cases (group-A) were subjected to topical mitomycin-c (0.5mg/ml) with a soaked cotton pledget for 2 ½ min.

The remaining 5 patients (group-B) were treated without mitomycin-c. Local massage, serial syringing of the sac on 3rd, 7th, 14th and 21st post-operative day and nasal douching were performed during the follow up period. The stoma was assessed endoscopically on the 3rd and 6th month after surgery.

Inclusion Criteria:

- Epiphora
- Regurgitation on pressure over sac
- Agreeing for 6 month follow up
- Patient with coexisting nasal pathology like deviated nasal septum were also included.

DNS is a relative contraindication for external DCR.

Exclusion Criteria

- Canalicular or common canalicular blockade ascertained by probing.
- Noticeable lid laxity
- Post traumatic lid and bony deformity
- Not agreeing for 6-8 month follow up

Patients were than assessed for nasolacrimal duct region by:

- H/O watering, discharge -its duration, constant or intermittent.
- Eyelids with special reference to position and condition of punctum.
- Past history of acute attack of dacryocystitis, sac surgery, probing
- Any swelling over sac area, its duration, accompanied with pain.
- Fistulous opening, and nature of discharge
- Regurgitation by pressure over sac area and its nature
- Syringing and probing to assess the exact site of blockage.
- Anterior rhinoscopy to see DNS, atrophic or hypertrophic mucosa, hypertrophic middle turbinate, polyp, foreign body.
- Nasal endoscopy to see high deviation, double middle turbinate, synechiae, any malignancy, foreign body.

Observation and Results

In our study, all the patients (both groups), had no complain of epiphora at the end of follow up and had an adequate rhinostome size when assessed endoscopically.

Table 1: Success Assessment

Group	No. of cases	Successful case
A	5	5
B	5	5

Group-A had no post-operative complication whereas, group-B had higher rate of post-operative complications such as synechiae and granulation formation.

Table 2: Complications

Group	Synechiae	Granulation
A	0	0
B	1	2

During the period of follow up endoscopic examination the size of the rhinostome was 4-5 mm and it was well maintained in the patients treated with mitomycin-c. Rhinostome gradually reduced to 2 mm in patients without mitomycin-c. The rhinostome size of 1.5 mm was found to be sufficient to drain the lacrimal secretion. Hence mitomycin-c prevents granulation formation and well maintains the rhinostome size. Statistically the use of mitomycin-c does not have significant

advantage in this study but surely reduces post-operative complication such as granulation formation and synechiae.

Discussion

Mitomycin-C is an antimetabolite which interferes with cell division but it has also been found to selectively inhibit the proliferation of fibroblasts in tissue culture (Jampel et al 1992, Khaw et al 1992, Cummings et al 1998). Based on these experimental studies, mitomycin-c has been used in ophthalmic procedure to reduce scarring and adhesion following surgery.

Selig et al (2000) reported 87.5% success rate in endoscopic-DCR with application of MMC. But the series was a small one and did not have any control.

Liao et al (2000) found 95.5% success rate with topical MMC as compared to 70.5% without it and have strongly recommended its use. Zilelioglu et al (1998) on the other hand reported 77.3% success in mitomycin-c group and 77.8% in non-mitomycin-c group.

Our study showed better results (100%) in group-A compared to group-B which corroborates to the results of Beloglazov et al (1999), Liu et al (2003) and Keerl et al (2004). The major advantages of endoscopic-DCR are shorter operative time, lower complication rates, reduced patient morbidity and absence of external scar. Meticulous post-operative care is essential to prevent endonasal synechiae and subsequent recurrences which confirm our observation.

Our series being a small one have not shown statistically significant result of topical mitomycin-c as opined by Liao et al (2000).

Conclusion

Intraoperative application of mitomycin-c does not alter the long-term outcome of endoscopic-DCR. An adequately performed surgery, where most or the entire medial wall of the lacrimal is sacrificed, yields excellent slong-term result in endoscopic-DCR surgery. On the other hand, use of intraoperative MMC surely reduces post-operative complications (synechiae and granulation formation) and hence reduces patient's morbidity. A larger sample size would generate more reliable conclusion.

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