Original Article

Role of Mitomycin C in Primary Partial Nasolacrimal Duct Obstruction in A Pakistani Cohort at A Tertiary Care Hospital of Karachi

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ABSTRACT

Purpose: To assess improvement in epiphora after probing and syringing with diluted Mitomycin C in cases of primary partial NLDO at a tertiary care hospital of Karachi.

Study Design: Quasi Experimental study.

Place and Duration of Study: Isra Postgraduate Institute of Ophthalmology from January 2025 to June 2025.

Methods: Fifty patients diagnosed with primary acquired nasolacrimal duct obstruction (PANDO), aged above 18 years and of either gender, were included in the study. Probing was performed under local anesthesia using 0.5% proparacaine topical drops, followed by infiltration of 2% xylocaine with adrenaline around the medial canthus and beneath the periosteum. Patency was confirmed by syringing with normal saline. Subsequently, irrigation was conducted using 1 mL of mitomycin-C (0.2 mg/mL, single application), and nasal packing was maintained for 10 minutes to minimize systemic absorption. Follow-up examinations were conducted at 1 week, and then at 1, 2, and 3 months post-procedure.

Results: Of the 50 patients, 35 (70%) were female and 15 (30%) were male, with a mean age of 34.56 ± 6.88 years. The majority presented with grade 2 obstruction (n = 25, 50%), followed by grade 3 (n = 20, 40%). At the first-week follow-up, 8 (16%) patients showed mild improvement, 12 (24%) demonstrated moderate improvement, and 20 (40%) achieved complete relief of epiphora.

Conclusion: Probing with adjunctive mitomycin-C is a simple, cost-effective, and efficacious procedure for relieving epiphora secondary to nasolacrimal duct obstruction. It may delay the need for dacryocystorhinostomy (DCR)for a considerable period.

Keywords: Dacryocystorhinostomy, Mitomycin C, Nasolacrimal duct obstruction.

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INTRODUCTION

Primary acquired nasolacrimal duct obstruction (PANDO) is known to cause epiphora, conjunctivitis and recurrent episodes of dacryocystitis with development of fibrosis. It is hypothesized that the nasolacrimal duct is initially compressed by inflammatory infiltrate and edema which later leads to dacryocystitis. This vicious cycle keeps the patient in persistent discomfort and sometimes gets severe when it gets acute.[1] PANDO is a disease of unknown origin. Inflammation possibly is the root cause leading to fibrosis of the Nasolacrimal duct.[2]

External Dacryocystorhinostomy (DCR) is still the gold standard but a pervasive procedure and can be reserved for more severe cases with mucoid or mucopurulent discharge.[3] Various other methods have been tried for relief of PANDO. Probing has been recommended as an initial treatment.[4,5] A newer modality is endoluminal duct recanalization (ELDR).[6] Mitomycin C is one modality that has been tried by various researchers and been found to be a safe option for syringing in cases of PANDO. It inhibits fibroblast proliferation and prevents obstruction from fibrosis after probing.[7]

We assessed the role of diluted Mitomycin in relieving epiphora in patients of primary partial NLDO in adults. Local data is deficient and there is a need to know the effects of this strategy in this part of the world.

METHODS

We conducted a-quasi-Experimental research on 50 patients with PANDO who presented to the Oculoplastic clinic at the Isra Postgraduate Institute of Ophthalmology from January 2025 to June 2025. Informed consent was taken from all patients and approval from ethical committee attained**(Reference number: REC/IPIO/2025/097).** Patients older than 18 years of age, of either gender, presenting with epiphora and watery discharge on regurgitation, and diagnosed with nasolacrimal duct obstruction (NLDO) confirmed by syringing with normal saline, were included in the study. Patients with any other lacrimal or ocular disorders were excluded. Patients with congenital NLDO, watering with patent passage, previous trauma, recurrent dacryocystitis, any lacrimal apparatus surgery, with nasal structural abnormalities or pathology were also excluded from the study.

Detailed history was acquired regarding basic demographics including gender and age. They were also asked regarding epiphora. Its duration and severity were recorded and graded according to the Kraft and Crawford grading scale.[8]

The Kraft and Crawford grading scale for epiphora is a subjective scale used to evaluate the functional success of a treatment, categorizing patients based on how often they need to wipe their eyes.

Grade 0: no watering.

Grade 1: Epiphora outdoors or occasional wiping, less than twice a day.

Grade 2: Epiphora indoors with some source of irritation or wiping, 2-4 times a day.

Grade 3: Constant epiphora or wiping more than 10 times a day.

Visual acuity was recorded and slit lamp examination was performed. Regurgitation test was performed. Nasal examination was done to look for anatomical abnormalities and pathology. Syringing with normal saline was done to assess patency of the NLD.A single surgeon performed all the procedures. Probing was done under local anesthesia 0.5% proparacaine and 2% xylocaine with adrenaline was infiltrated around the medial canthus and deep to the periosteum.

The punctum was dilated using punctum dilator. Bowman's probe (0 and 00 probe) was introduced into it and pushed down gently to the point of obstruction. Patency was confirmed by syringing with Normal Saline. Irrigation was done with 1 mL of Mitomycin-C (0.2mg/mL, once) and a nasal packing was maintained for 10 minutes to limit systemic absorption of MMC. We instructed the patient to hold the solution in the throat. He was asked to gargle with clear water to remove any residual MMC. Ocular surface was washed with 10 mL of Normal saline.

A single surgeon performed post procedure evaluation. Follow up was done at1stweek and then 1st,2ndand 3rdmonth. Patients were questioned about improvement in watering. Syringing was done, at each visit to objectively assess the NLD. This was followed by Slit-lamp examination and nasal mucosa examination to evaluate any side effects.

Criteria set for assessing improvement was:

- Complete improvement was defined as no watering.
- Moderate improvement was defined as shifting of patient from grade 3 to grade 1.
- Mild improvement was defined as shifting of patients from grade 3 to grade 2 or from grade 2 to grade 1.

Data was analyzed through SPSS version 25.0 for statistical analysis. Upon checking normality of data through Shapiro wilks test, data was found to be normally distributed. For quantitative variables such as age, mean±SD was calculated. Qualitative variables like gender, grading scale and objective improvement were presented in form of frequencies and percentages.

RESULTS

Out of 50 patients 35 (70%) were females and 15 males. Mean age of the study patients was 34.56±6.88 years (Range: 20-50 years). There were five patients (10%) with grade 1, 25 (50%) with grade 2 and 20 (40%) patients with grade 3. Subjective improvement was seen at each follow-up as depicted in Figure 1. At first week, 8 (16%) patients showed mild improvement while, 12 (24%) indicates moderate improvement and most of the cases, 20 (40%) showed complete improvement. Whereas, at last follow up, majority patients 18 (36%) reported mild improvement (Figure 2).Objective assessment showed 80% improvement in the first week, which declined afterwards(Table 1).

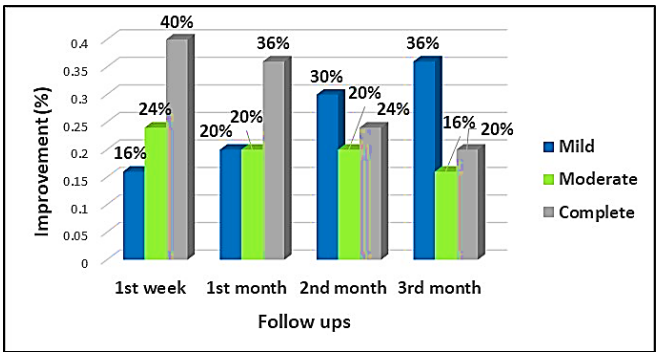

Figure 1: Subjective improvement.

Table 1: *Objective improvement.*

Follow-up	Improvement (%)
1st week	80%
1st month	60%
2nd month	35%
3rd month	30%

DISCUSSION

Probing is an easy, cheap and minimally invasive procedure that serves diagnostic as well as therapeutic needs of epiphora. Its success rate has been reported to be 98% in children.[9]DCR is an invasive procedure with a success rate of 65%, 74.3% and 100% according to numerous studies.[10-12]Other methods have also been employed to treat NLDO. These are endoscopic DCR, endoscopic laser DCR, Dacryocystoplasty and endoscopic radio frequency assisted DCR.[13-15]

Mitomycin C, an alkylating antibiotic which affects the wound healing process and reducesscarring.[16,17] It has anti-proliferative effect on cells showing the highest rate of mitosis, inhibits DNA synthesis and interferes with RNA transcription and protein synthesis.[18]

In our study a success rate of 80% was observed on objective assessment and 40%on subjective assessment in the first week, which declined to 30% and 20% at 3rd month, respectively. Sinha reported 35% subjective and 80% objective improvement at 2nd week which declined to 15% and 30% at 3 months.[19] Masoomian reported 60% objective improvement at 11 months.[20] They reported no significant relationship with age or gender. Saini reported results of syringing with two different concentrations of MMC.[21]This was found to be66.66% vs 73.33% at 1 month with 0.02% MMC versus 0.04% respectively which declined to 46.66% versus 66.66% at 6th month. Subjective improvement of watering was 46.66% versus 73.33% in the two groups at 1 month which improved to 56.66% versus 73.33% at 6-month follow-up, respectively.[21]

Safety of Mitomycin C has been extensively studied. No side effects were reported in any of the other studies published on this subject. Possible side effects that can be looked for include ocular inflammation, abnormal change of nasal mucosa, or systemic side effects.[19-22] Mitomycin C is diluted before giving in Normal Saline and the patients were instantly advised to spit the water received in throat and gargle after the procedure. No complications were observed in our study too, hence making syringing with Mitomycin C an effective procedure for primary partial NLDO.

Our study had a small sample size. Longer studies with bigger sample size and longer follow up can further highlight the role of MMC in Probing for PANDO.

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Patient's Consent: Researchers followed the guidelines set forth in the Declaration of Helsinki.

Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval: The study was approved by the Institutional review board/Ethical review board **(REC/IPIO/2025/097)**.

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