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Mahammad Samy Onsy
Ophthalmology, National Eye Center, Rod El Farag, Cairo, Egypt, mahammad92onsy@gmail.com

Ahmed Salah Abdel Rehim
Ophthalmology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Ahmed Mohammed Madinah Al Kady
Ophthalmology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

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ORIGINAL ARTICLE

Comparison Of Outcomes Of Preservative-Free Dexamethasone Eye Drops And 3-Snip Punctoplasty In Management Of Acquired Punctal Stenosis

Mahammad S. Onsy [a,*], Ahmed S. Abdel Rehim [b], Ahmed M. M. Al Kady [b]

[a] Department of Ophthalmology, National Eye Center, Rod El Farag, Cairo, Egypt
[b] Department of Ophthalmology, Faculty of Medicine for Boys, Al-Azhar University, Cairo, Egypt

Abstract

Background: ***Acquired punctal stenosis causes epiphora, and there are many ways to manage it.***

Aim of the work: ***To contrast non-preserved dexamethasone eye drops' application against 3-snip punctoplasty in treating punctual occlusion.***

Patients and Methods: ***This prospective, comparative, interventional study involved 50 stenotic puncta at El-Hussein University Hospital and Rod El-Farag National Eye Centre. Group A (25) received preservative-free Monodexin 0.01% prepared eye drops, and Group B (25) underwent 3-snip autoplasty. One day, one week, one, three, and six months later, they were re-evaluated ophthalmologically.***

Results: ***The mean age was 49.64±11.18 years; the studied patients were 7 males and 43 females. punctal opening started in group A at one month (68%) versus 100% postoperatively in group B. Restenosis occurred in group B after 1 and 3 months; contrarily, restenosis was not recorded in group A throughout the study. One month after treatment, epiphora grading and fluorescein dye disappearance test results were better in the autoplasty group but incomparable (p-value = 0.173, 0.265). Satisfaction after 6 months was less in group A (68% vs 80%).***

Conclusion: ***3-snip punctoplasty showed better epiphora relief and more satisfaction in patients, but restenosis occurred in contrast to the stable outcome of non-preserved dexamethasone, which can be used as an alternative first line of treatment of acquired external punctual stenosis rather than the traditional surgical 3-snip approach.***

Keywords: Punctal; stenosis; Dexamethasone; 3-snip

1. Introduction

Acquired external punctal stenosis (AEPS) is an ocular condition hindering tear drainage and causes epiphora[1], primarily due to persistent inflammation resulting in fibrosis and stricture.[2]

Prolonged use of topical preserved preparations had been associated with punctal stenosis.[3] Also, abstinence of preserved topical medications and using preservative-free steroids may result in significant punctal opening. [4,5]

3-snip autoplasty is the classic line of treatment for AEPS.[6] However, restenosis may still occur as they are invasive and do not deal with the inflammatory aspect of the disease.[7]

In the current study, we compared topical preservative-free dexamethasone and 3-snip punctoplasty in resolving epiphora and punctual widening to reduce the routine surgical interference in these cases.

2. Patients and methods

This prospective, comparative, interventional study involved the lower 50 stenotic puncta of 28 patients at El-Hussein University Hospital and Rod El-Farag National Eye Centre from July 2022 to July 2023. Among studied puncta, Group (A) was prescribed non-preserved dexamethasone (Monodexin 0.01% prepared eye drops), and Group (B) underwent rectangular 3-snip autoplasty. Both genders were included, aged from 18 to 70 years old, with acquired punctal stenosis and persistent epiphora for more than three months. We excluded pediatric patients with congenital punctal stenosis, lacrimal mucocele, pyocele, and previous lacrimal surgery.

Prior to treatment, all patients underwent medical history taking regarding age, gender, epiphora history and duration, medical conditions, ocular diseases, surgeries, and drug intake.

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* Corresponding author at: Ophthalmology, National Eye Center, Rod El Farag, Cairo, Egypt.
E-mail address: mahammad92onsy@gmail.com (M. S. Onsy).

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Ophthalmological evaluation before treatment and in each follow-up visit included: Slit Lamp examination, evaluation of dry eye and intra-ocular pressure records. Punctum evaluation in terms of opened or closed punctum was considered stenotic if not recognized by the examiner. A 2% Dye clearance test was carried out, and data were classified according to the Ozgur et al. scale.

Group A received topical 0.01% preservative-free dexamethasone prepared from Monodexin 0.1% E.D. after dilution in 9 ml distilled water, which was applied four times daily for two weeks.

Group B underwent rectangular 3-Snip punctoplasty under local anaesthesia by subconjunctival injection of 2% of lignocaine and 1:10000 epinephrine adjacent to the punctum, with topical application of 0.4% Benoxinate hydrochloride (Benox ED), every 5 minutes as needed. A punctum dilator dilates the punctum vertically and horizontally, respecting the natural anatomy of the puncta and canaliculi. A micro-forceps was used to ensure a secure grip of the tissue, and with the help of Vannas scissors, two vertical and one horizontal cuts were made on the sides of micro-forceps, ending in the removal of a rectangular tissue, for hemostasis; compression and cold saline were sufficient in most patients, and in case of persistent bleeding; phenylephrine 2.5 % ED-soaked cotton tips have been used. A combination of steroids and antibiotics (Tobradex 0.3%/0.1% E.D.) was prescribed for subjects of the group (B) postoperatively, 4 times daily for 2 14 days.

Ophthalmological re-evaluation of patients was carried out at 1 day, 1 week, 1,3,6 months following treatment. Data was collected from the five visits and compared to the pre-treatment results in both groups.

Six months after treatment, patients' satisfaction was measured by a mini-questionnaire.

Medical Ethical approval:

Before starting our work, we had approval from the Medical Ethics Committee of Al-Azhar University. We explained the interventions to all participants, and written consent was required.

Statistics of the work:

Statistical analysis has been conducted using Microsoft Excel and processed by IBM SPSS Software Corp. for Windows (Version 23H2) on P.C. Quantitative data has been presented using numerical values and percentages and was described as [means ± standard deviation] for parametric variables.

For comparison among the studied sample, we used the Chi-Squared test, also MCT and FET were used for its correction as needed. Marginal homogeneity was performed to compare data from each review of the pre-treatment findings. The significance has been considered if the P-value < 0.05.

3. Results

In our work, 50 stenotic puncta of 28 patients; among studied puncta; Group (A) was prescribed non-preserved dexamethasone (Monodexin 0.01% prepared eye drops) and Group B underwent rectangular 3-snip punctoplasty to compare between their impact on AEPS.

Table 1. Demographic data of study patients

DATA	ALL (N=50)	GROUP A (N=25)	GROUP B (N=25)	P-VALUE
AGE, YRS	49.64±11.18 52(21-68)	44.64±11.66 44(21-60)	54.64±8.19 56(35-68)	0.001*
MALE FEMALE	7(14%) 43(86%)	2(8%) 23(92%)	5(20%) 20(80%)	0.417 FET
RT EYE LT EYE	28(56%) 22(44%)	15(60%) 10(40%)	13(52%) 12(48%)	0.569

The mean age was (44.64±11.66 versus 54.64±8.19) which was highly comparable. The significance of differences in sex and dexterity among studied patients was nil; females were 92% vs 80%, right eyes were 60% vs 52%.

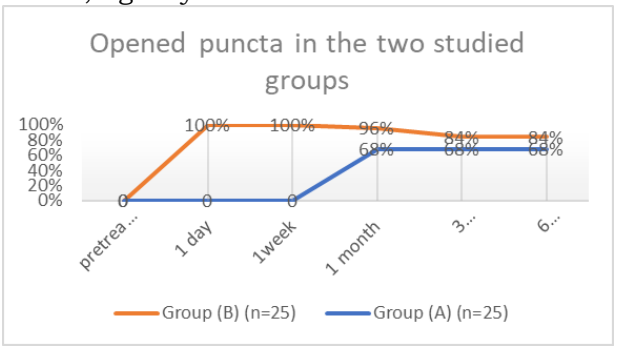

Figure 1. Punctal opening of the studied patients

At 1st day and 1st week review, punctual opening was significantly different between both groups (p value= 0.001, 0.001 respectively). In the next 3 visits; p-value was 0.074 at the 1st month, 0.185 at the 3rd month and 0.059 at the 6th month. There was statistically significant punctal opening in comparison to the pretreatment data (P3, P4, P5 = 0.001, 0.001, 0.001). Punctal restenosis occurred in group B at 1,3 months follow ups, resulting in 84% opened puncta and the same percentage was recorded at six months' visit.

Table 2. Epiphora grades in the studied patients

EPIPHORA GRADES	ALL (N=50)	GROUP (A) (N=25)	GROUP (B) (N=25)	P-VALUE
PRETREATMENT:				
0	0	0	0	0.123
I	0	0	0	
II	15(30%)	10(40%)	5(20%)	
III	35(70%)	15(60%)	20(80%)	
AFTER 1 DAY:				
0	0	0	0	<0.001*
I	25(50%)	0	25(100%)	
II	10(20%)	10(40%)	0	
III	15(30%)	15(60%)	0	
AFTER 1 WEEK:				
0	25(50%)	0	25(100%)	<0.001*
I	2(4%)	2(8%)	0	MCT
II	15(30%)	15(60%)	0	
III	8(16%)	8(32%)	0	
AFTER 1 MO:				
0	39(78%)	17(68%)	22(88%)	0.173
I	5(10%)	3(12%)	2(8%)	MCT
II	6(12%)	5(20%)	1(4%)	
III	0	0	0	
AFTER 3 MOS:				
0	39(78%)	18(72%)	21(84%)	0.619
I	6(12%)	4(16%)	2(8%)	MCT
II	5(10%)	3(12%)	2(8%)	
III	0	0	0	
AFTER 6 MOS:				
0	38(76%)	18(72%)	20(80%)	0.733
I	5(10%)	3(12%)	2(8%)	MCT
II	4(8%)	3(12%)	1(4%)	
III	3(6%)	1(4%)	2(8%)	
COMPARISON OF FU		Pi=1 Pii=0.003* Piii<0.001* Piv<0.001* Pv<0.001*	Pi<0.001* Pii<0.001* Piii<0.001* Piv<0.001* Pv<0.001*	

At 1st day and 1st week visit, relief of epiphora was highly comparable between both groups, in group B (100%). At 1,3,6 months after treatment, both groups showed incomparable results to each other and to pre-treatment records.

Table 3. FDDT grade of the patients

FDDT	ALL (N=50)	GROUP (A) (N=25)	GROUP (B) (N=25)	P-VALUE
PRETREATMENT:				
I	0	0	0	0.742
II	12(24%)	7(28%)	5(20%)	
III	38(76%)	18(72%)	20(80%)	
AFTER 1 DAY:				
I	25(50%)	0	25(100%)	<0.001*
II	7(14%)	7(28%)	0	MCT
III	18(36%)	18(72%)	0	
AFTER 1 WEEK:				
I	25(50%)	0	25(100%)	<0.001*
II	11(22%)	11(44%)	0	
III	14(28%)	14(56%)	0	
AFTER 1 MO:				
I	39(78%)	17(68%)	22(88%)	0.265 MCT
II	4(8%)	3(12%)	1(4%)	
III	7(14%)	5(20%)	2(8%)	
AFTER 3 MOS:				
I	38(76%)	17(68%)	21(84%)	0.449 MCT
II	6(12%)	4(16%)	2(8%)	
III	6(12%)	4(16%)	2(8%)	
AFTER 6 MOS:				
I	38(76%)	17(68%)	21(84%)	0.449 MCT
II	6(12%)	4(16%)	2(8%)	
III	6(12%)	4(16%)	2(8%)	
COMPARISON OF FU		Pi=1 Pii=1 Piii<0.001* Piv<0.001* Pv<0.001*	Pi<0.001* Pii<0.001* Piii<0.001* Piv<0.001* Pv<0.001*	

At 1st day and 1st week follow up, FDDT results were comparable between both groups, all eyes in group B showed reduction in dye clearance time. At 1,3,6 months reviews; there were no significant differences in FDDT grades were recorded. In the first day follow up; FDDT grades in group A were statistically indifferent to pretreatment grades, while significant reduction occurred in the next 4 visits. In group B; there was highly statistically significant improvement in FDDT grade in group B starting from the first day postoperative till the last visit.

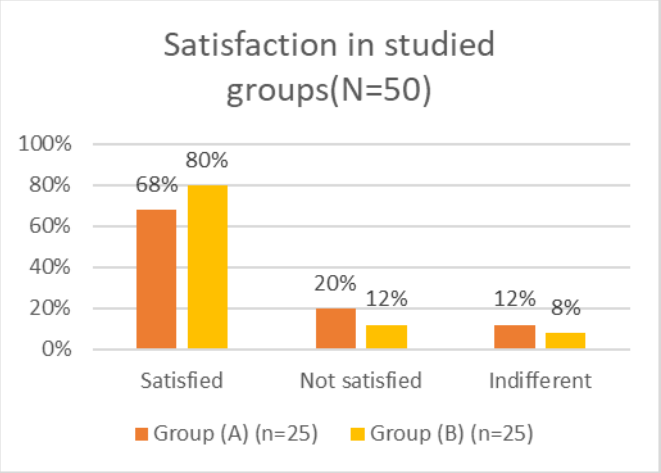

Figure 2. Satisfaction after 6 months of treatment in the studied groups.

As regard satisfaction at 6 months after treatment, it was better in the surgical group (80% vs 68%) but the difference wasn't statistically significant (p-value= 0.648).

4. Discussion

Acquired punctal stenosis is an ocular condition with epiphora1, primarily due to inflammation and prolonged use of preserved drops. [2,3]

Threesnip autoplasty is the classic line of treatment for punctual stenosis.[6] However, it still has the hazard of restenosis as they are invasive and do not deal with the inflammatory aspect of the disease.[7]

In this study, 50 stenotic puncta of 28 patients were included after ruling out pediatric patients and those with congenital punctual obstruction, lacrimal mucocele, pyocele, and previous history of lacrimal surgery because such conditions may need other interventions.

In this study, Dexamethasone sodium phosphate (Monodexin 0.01% prepared eye drops) was used to treat punctal stenosis in group A, targeting the inflammatory nature of the disease and 68% of stenosed puncta were opened at one-month follow-up, and remained throughout the whole period of follow-up. This coincides with other studies that reported punctual widening and epiphora relief with the non-preserved steroids[9,10]; this can be explained by the ability of

dexamethasone to inhibit the synthesis of pro-inflammatory substances and prostaglandins then abort the inflammatory oedema and cicatrization. [11]

In our work, group B underwent 3-snip punctoplasty technique for managing punctal stenosis and followed up for 6 months after surgery. When comparing the overall results of the other authors, there are a few discrepancies to be noted; most of the previous studies which involved 3SP had follow-up periods of 6 months and reported a high success rate in punctal opening. [6,12,13,14]

One of the evident drawbacks of 3-snip punctoplasty observed in the present study is punctual restenosis at the first and third-month reviews, resulting in 16% failure. This may occur due to fibrosis with time. These results are in line with those of Singh and colleagues [14], who reported nine eyes out of 34 with autoplasty had restenosis at the 6-month follow-up.

Epiphora grades in the studied groups were statistically different from the day after beginning treatment until the first month; they became comparable and remained insignificantly different in the following visits. However, epiphora relief was better in eyes undergoing three snip procedure, considering that in dexamethasone group, epiphora improved with time but regressed in group B. Results in the autoplasty group were consistent with many studies. [13,15]

In our work, FDDT results were recorded in grades based on the time required for dye clearance of both studied groups in the pre-treatment stage and at each follow-up visit. In group A, there was a statistically significant improvement in FDDT grades starting from the initial week of follow-up; the most significant improvement was recorded in the first month and maintained throughout six months.

In Group B, all operated cases showed Grade 1 of dye test starting from the next day to intervention; however, at the first-month visit, regression was recorded in 4%. At the 3-month follow-up, one eye of grade 1 regressed to grade 2, and the results were maintained at the 6-month visit to be 84% with grade 1 of the test. This is in line with Ali et al.[15], At 6 months after surgery, 74.7% of the eyes had functional success. Cao et al.[16] reported similar results; they demonstrated a significant reduction in the FDDT grades at the sixth- and twelve-month reviews.

In our study, the anatomical improvement in the 3-snip punctoplasty group was more pronounced in comparison to the functional one; this coincides with the findings of many other studies. [6,15]

In our work, those who were treated with topical preservative-free dexamethasone demonstrated a greater degree of functional improvement than the surgical group.

Regarding subjective satisfaction, in a prospective comparison by Elalfy et al.[9], they reported significantly higher satisfaction in the non-preserved steroid group (70%). These results were similar to our records, as 68% of the medical group in our work were satisfied with the results and the course of treatment.

Shahid et al.[6] examined all patients who underwent the 3-snip procedure over a four-year period and evaluated their subjective satisfaction with symptom relief. The patient satisfaction rate was 71%, less than the satisfaction in the autoplasty group in our work.

4. Conclusion

Our results demonstrate that 3-snip punctoplasty showed better epiphora relief and satisfaction. However, restenosis occurred in contrast to the stable outcome of non-preserved dexamethasone drops with promising results and can be used as an alternative first line of treatment of acquired external punctal stenosis rather than the traditional surgical 3-snip approach.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

There are no conflicts of interest.

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