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Original Article

MULTI-ACTION VERSUS SINGLE ACTION EYE DROPS IN MEDICAL TREATMENT OF ACQUIRED PUNCTAL STENOSIS, MULTI-CENTRE STUDY

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Abstract

Background and Objective: *Epiphora is a common ophthalmological complaint worldwide with a broad differential diagnosis. One of the etiologies of epiphora is punctual stenosis, specially acquired causes**,** which has a variety of therapeutic surgical options. The purpose of this study was to compare the clinical outcomes and tolerances of multi-action eye drops and single-action eye drops for the medical treatment of epiphora in eyes with acquired punctum stenosis.* ***Methodology:*** *This multi-center randomized clinical trial carried out between September to November 2024 at the Suez General Hospital and Port Said University Hospital Ophthalmic outpatient clinics on 100 individuals complaining from epiphora due to acquired punctum stenosis. Patients were assessed based on Munk epiphora, Fluorescein dye disappearance test (FDDT) and kashkouli punctal stenosis scores, 50 patients were managed with multi-action eye drop (containing antibiotic, steroid and decongestant) and another 50 patients were managed by single action eye drop (containing decongestant only), follow ups were every two weeks till two months by clinical examination, IOP measurement, assessing epiphora relief by Munk epiphora grading improvement, assessing functional relief by Fluorescein dye disappearance test (FDDT) improvement and bitter taste of multi-action eye drop in patient throat ,and finally assessing morphological relief by kashkouli punctum stenosis grading improvement.* ***Results:*** *A total of 100 patients were included in the study with a mean age of 55.4 ± 10.2 years. There was a statistically significant difference in the Munk grading and FDDT along the follow-up period compared to the baseline values (P< 0.001). Multi-action eye drops showed 80.0% success after first 2 weeks of treatment and reached to 92.0% after 4 weeks of treatment, while single action eye drops showed only 10.0% success after 2 weeks until the last follow-up after 8 weeks. Subjective assessment of the improvement in both groups using Munk's test, FDDT and the bitter taste.* ***Conclusion:*** *Multi-action eye drops as a medical treatment can control the epiphora in eyes with acquired punctal stenosis and accompanied by both functional and morphological success in the form of improvement of the Munk's test, FDDT score, kashkouli punctal stenosis grading.*

Keywords: *Epiphora, Munk Grading, Acquired Punctal Stenosis, FDDT, Orchadexoline, Visine*

1. Introduction

In ophthalmology clinics, epiphora is among the most prevalent oculoplastic complaints. The quality of life for those patients is seriously impaired. When the

ratio of tear production to absorption becomes off balance, watering occurs [1]. Epiphora is frequently caused by obstruction of the lacrimal drainage system in less than half of patients, while non-obstructive causes are related to a malposition of eyelids or inflammation of lid margins such as blepharitis or dry eye with secondary hypersecretion [2]. Lacrimal syringing, the fluorescein dye disappearance test (FDDT), the Jones dye test, contrast dacryocystography, nuclear lacrimal scintigraphy, CT, MRI, and other techniques can all be used to evaluate epiphora. These tests assist us in locating obstructions and lacrimal pump malfunctions [3]. Punctal stenosis represents an important cause of epiphora affecting about 8% to 54.3% of all cases, but with the least investigated etiology [4]. The external opening of the lacrimal canaliculus becomes constricted or blocked, in acquired stenosis [5]. Infectious or inflammatory eyelid conditions, systemic or topical medication toxicity (as post-cataract or glaucoma surgery or with antiglaucoma therapy), malpositioned lids, ocular surface diseases, various types of traumas, tumors, or aging changes can all cause acquired punctum stenosis. The fundamental ultrastructural reaction to a variety of harmful stimuli seems to be chronic inflammation followed by edema and fibrosis and finally closure of external duct opening [4,5]. Nowadays, punctal stenosis is generally managed with a few techniques, including punctum dilatation, surgical opening, and punctum stenting using canalicular tubes or punctum plugs but all these effective treatments are associated with the risk of restenosis [5,6]. Surgical or non-surgical enlargement of the punctum with or without the insertion of prosthetic material, such as perforated punctual plugs (PPP), mini-monoka canalicular stents (MMC), or self-retaining bi canalicular stents (SRBC), or by one, two or three snip incisions, is the foundation for the current treatment options for acquired punctum stenosis. Additional options include prosthetic insertion, adjuvant 5, or simple repeated dilatation to prevent fibrosis and restenosis but also associated with risk of recurrence and lower duct stenosis [7]. Recent research using Anterior Segment Optical Coherence Tomography (AS-OCT) to monitor changes in punctual parameters has shown that a topical combination of antibiotic and steroid therapy is an effective treatment for inflammatory punctual stenosis [8]. This study aimed to determine how medical treatment as single-action (decongestant only) eye drop or multi-action (decongestant, antibiotic and steroid) eye drop can control the main pathology in acquired punctum stenosis leading to the resolution of epiphora and improvement of punctum size through simple outpatient clinic assessment of both morphological and functional success parameters Furthermore, contrast their effectiveness and safety other than of surgery.

2. Methodology

2.1. *Study design and populations*

The multi-center randomized clinical trial was conducted on 100 patients at the ophthalmic outpatient clinics of Suez General Hospital and Port Said Univ. Hospital between September and Nov. 2024. Participants in this study were randomly selected from patients who came to the ophthalmology outpatient clinic with complaints of epiphora with acquired punctual stenosis, The preliminary clinical ocular evaluation was performed on all patients based on the following:

2.2.1. Inclusion criteria

***)** Epiphora grading according to Munk score [9]: patients with grades 2, 3, and 4.

***)** Morphological punctum assessment grading by slit lamp according to Kas-

hkouli punctum stenosis grading [10]: patients with grades 0, 1, and 2. ***)** Functional punctum assessment according to the fluorescein dye disappearance test FDDT grading [11]: Patients with grades 2 and 3. ***)** Intraocular pressure measurement by applanation tonometer to record the baseline IOP.

2.2.2. Exclusion criteria

***)** Congenital punctal stenosis patients. ***)** Patients with previous lacrimal surgery. ***)** Patients with nasolacrimal duct obstruction, mucocele, or pyocele. ***)** Patients with a previous history of glaucoma.

2.2.3. Ethical considerations

After being given approval by the Suez Faculty of Medicine's institutional review board (approval number IRB: 45/2024) and obtaining informed written consent from the participants, a full history was obtained for all cases.

2.2. *Study procedure*

Following selection, all patients were divided randomly into two groups: fifty patients from Port Said University Hospital and fifty patients from Suez General Hospital. Patients were separated based on the type of eye drops they used. For one month, 25 patients from Suez and 25 from Port Said received a multi-action eye drop called Orchadexoline eye drop from Orchidia Pharmaceutical, which contains 0.5% chloramphenicol, 0.1% dexamethasone sodium phosphate, and 0.025% tetryzoline 2 mg hydroxypropyl methylcellulose, 10 mg α-tocopherol acetate (vitamin E), and 8 mg macrogol 400. They were given it three times a day for two weeks, and then twice a day for another two weeks. Multiaction eye drops were named on the basis that this eye drop had multiple modes of action as antibiotic, steroid, and decongestant, all those actions could treat the pathophysiology of acquired punctal stenosis. Also, chloramphenicol with its characteristic bitter taste in the patient's throat could be a subjective method for assessment of treatment success. Another twenty-five patients from Suez and twenty-five patients from Port Said were given a single-action eye drop called Visine Original Eye Drop, manufactured by Pfizer Pharmaceutical, which contains tetrahydrozoline HCL 0.05%) For one month, two times a day all over the period, this eye drop had a single mode of action as a decongestant that could also alone treat the oedematous nature of pathophysiology of punctal stenosis. Visits were scheduled every two weeks until two months after treatment, with the first one occurring two weeks after the start of the medicine. Patients underwent a comprehensive ophthalmological evaluation at each follow-up visit, and the symptoms of each case were rated using the Munk score, Kashkouli's punctual stenosis severity categories, and the Zappia score for the fluorescein dye disappearance time test (FDDT), tab. (1) [11]. *The full ophthalmological assessment includes*: ***)** Morphological assessment of punctum size by slit lamp and slit width according to Kashkouli grading score [11]. *) Functional assessment of punctum by fluorescein dye disappearance test, according to FDDT grading score [11]. ***)** Bitter taste of chloramphenicol in multi-action eye drops in patient throat as an indicator of patent lacrimal puncti, patent nasolacrimal duct and functional improvement. ***)** Epiphora relieved or not according to Munk score [11]. *) Intraocular pressure measurement to record any rise in IOP due to steroid intake. *After one month from treatment, we evaluated the success parameter as follows*: ***)** No epiphora. ***)** Morphological punctual opening by slit lamp width according to Kashkouli grading: patients with grades 3, 4 and 5. ***)** Functional punctual opening according to FDDT grading: patients with grades 0 and 1. ***)** The bitter taste of multi-action eye drops in the throat is a subjective and functional success.

Table 1: punctum stenosis using Kashkouli's grading system, fluorescein dye disappearance time test, and Munk score for epiphora.

Grade	Clinical findings
FDDT	
0	Minimal or no residual dye
1	Only a thin fluorescein dye line
2	A wide fluorescein dye line, between grade 1 and grade 3
3	No decrease in color intensity of the fluorescein dye
Munk score	
0	No epiphora
1	Epiphora requires dabbing less than twice a day
2	Epiphora requires dabbing 2-4 times a day
3	Epiphora requires dabbing 5-10 times a day
4	Epiphora requiring dabbing more than 10 times a day or constant epiphora
Punctal stenosis	
0	No papilla and punctum (punctal atresia)
1	Papilla is covered by a membrane (exudative or true membrane) or fibrosis and is difficult to recognize
2	Less than normal size but recognizable
3	Normal
4	Small slit (<2 mm)
5	Large slit (≥2 mm)

2.3. *Statistical analysis*

The SPSS program (version 28.0) (SPSS Inc., Chicago, IL, USA) was used to do statistical analysis. The systematic random sampling technique was used to choose all participants from among those attendees who met the criteria for inclusion. Before additional statistical analysis, the data were examined for homogeneity variances and normality using the Kolmogorov-Smirnov test. Categorical data were described using frequencies and percentages (%). Quantitative data (Normal distributed data) were expressed using means and standard deviations (SD). A paired t-test was employed to determine if multi-action and single-action eye drops differed, while the chi-square test, also known as Fisher's exact test was used to compare two groups with categorical data. Significance was considered at $P < 0.05$.

3. Results

There were 100 patients in all, 50 from Suez General Hospital (Group 1) and 50 from PortSaid University Hospital (Group 2), who were matched for both gender and age. With a mean ± SD age of 55.4 ± 10.2 years (31-69 years), there were 35 males and 65 females among all the groups under study. Prior to therapy, the patient groups' clinical and bassline characteristics are shown in tab. (2). *Comparison of single and multi-action eye drops effectiveness*. All grading scores were compared before and after treatment for eight weeks to determine the efficacy of the eye drops under study. Before treatment patients were categorized according to Munk grading and showed that 82.0% were in grade 3 (Drying from 5-10 times/daily) and 18.0% in grade 4 (Drying more than 10 times daily). Table **(**3) represents the grading of all studied patients after treatment with both single and multi-action eye drops. Multi-action eye drops showed 80.0% success after the first 2 weeks of treatment and reached 92.0% after 4 weeks of treatment. On the other hand, single-action eye drops showed only 10.0% success after 2 weeks until the last follow-up after 8 weeks. In the pre-treatment stage, all the cases showed

grade 1, grade 2, and grade 3 cases, respectively, made up of 4 cases (4.0%), 8 cases (8.0%), and 88 cases (88.0%) according to the FDDT test. After 2 weeks of treatment, an improvement in FDDT grading with multi-action eye drops with a success rate of 88.0% vs. 11.0% with single-action eye drops. The success rate of multi-action eye drops reaches 92.0% after 4 weeks of treatment. There was a highly statistically significant improvement in FDDT in the group treated with multi-action eye drops (P<0.001), tab. (4). In our study, the success criteria were defined as having a Munk score below 2, FDDT grade of 0 or 1, no need for dilation, and no requirement for surgery. Following these criteria, in multi-action eye drops success was calculated as 92.0%, while in single-action eye drops success was calculated as 10.0%. Munk's test, FDDT, and the bitter taste of the Multi-action and Single action eye drops were used to subjectively assess the improvement in both groups. The results were presented in tab$_s$. (3, 4 & 5). Also, kash-kouli grading was defined for detecting the success rate of single and multi-action eye drops, tab. (6). At the end of treatment with multi-action eye drops, three patients about 5% of all cases in this group, showed increasing intra ocular pressure to about 25 to 30 mmHg and their intraocular pressure returned to the normal range after about one month from cessation of treatment with multi-action eye drops use.

Table 2: Demographic and clinical data of the patients

Demographic/clinical data	Total atients (n=100)	Group 1 (*n*=50)	Group 2 (*n*=50)	*P*-value
Age (y), mean ± SD	55.2 ± 9.9	56.1±9.7	54.3±10.2	**0.368**
Male/female	35/65	17/33	18/32	**0.834**
Laterality (unilateral/bilateral)	73/27	39/11	34/16	**0.262**
Unilateral OD/OS	29	14	15	**0.879**
Puncta involved (one/both)	64	31	33	**0.838**
Grade of punctual stenosis (Gr0/Gr1)	73	36	37	**0.924**
Munk score (Gr3/Gr4)	54	31	23	**0.374**
FDDT (Gr2/Gr3)	**50**	**24**	**26**	**0.817**

***FDDT**: Fluorescein dye disappearance time test; **SD**: Standard deviation.*

Table 3: Munk's test results of both groups during a follow-up period of eight weeks.

After treatment	Single-action eye drops *n*=50(%)	Multi-action eye drops *n*=50(%)	P-value
Follow-up 2week			
No epiphora	0 (0.0%)	4 (8.0%)	P< 0.0001
Drying less than 2 times daily	4 (8.0%)	36 (72.0%)	
Drying from 2-4 times daily	6 (12.0%)	8 (16.0%)	
Drying from 5-10 times/daily	34 (68.0%)	1 (2.0%)	
Drying more than 10 times daily	6 (12.0%)	1 (2.0%)	
$P_1 < 0.0001$			
Follow-up 4 weeks			
No epiphora	0 (0.0%)	6 (12.0%)	P< 0.0001
Drying less than 2 times daily	4 (8.0%)	40 (80.0%)	
Drying from 2-4 times daily	6 (12.0%)	4 (8.0%)	
Drying from 5-10 times/daily	34 (68.0%)	0 (0.0%)	
Drying more than 10 times daily	6 (12.0%)	0 (0.0%)	
$P_2 < 0.0001$			

Follow-up 6 weeks			
No epiphora	0 (0.0%)	6 (12.0%)	P< 0.0001
Drying less than 2 times daily	4 (8.0%)	40 (80.0%)	
Drying from 2-4 times daily	6 (12.0%)	4 (8.0%)	
Drying from 5-10 times/daily	34 (68.0%)	0 (0.0%)	
Drying more than 10 times daily	6 (12.0%)	0 (0.0%)	
$P_3 < 0.0001$			
Follow-up 8 weeks			
No epiphora	0 (0.0%)	6 (12.0%)	P< 0.0001
Drying less than 2 times daily	4 (8.0%)	40 (80.0%)	
Drying from 2-4 times daily	5 (10.0%)	3 (6.0%)	
Drying from 5-10 times/daily	34 (68.0%)	0 (0.0%)	
Drying more than 10 times daily	7 (14.0%)	1 (2.0%)	
$P_4 < 0.0001$			

Statistically significant (if P < 0.05)

Table 4: Fluorescein dye disappearance test (FDDT) among studied groups

After treatment	Single-action eye drops *n*=50(%)	Multi-action eye drops *n*=50(%)	P-value
Follow-up 2 week			
Grade 0	0 (0.0%)	0 (0.0%)	P< 0.0001
Grade 1	10 (20.0%	40 (80.0%	
Grade 2	1(2.0%)	4 (8.0%)	
Grade 3	39 (78.0%)	6 (12.0%)	
$P_1 < 0.0001$			
Follow-up 4 weeks			
Grade 0	0 (0.0%)	0 (0.0%)	P< 0.0001
Grade 1	10 (20.0%	42 (84.0%	
Grade 2	2 (4.0%)	4 (8.0%)	
Grade 3	38 (76.0%)	4 (8.0%)	
$P_2 < 0.0001$			
Follow-up 6 weeks			
Grade 0	0 (0.0%)	0 (0.0%)	P< 0.0001
Grade 1	10 (20.0%	42 (84.0%	
Grade 2	2 (4.0%)	4 (8.0%)	
Grade 3	38 (76.0%)	4 (8.0%)	
$P_3 < 0.0001$			
Follow-up 8 weeks			
Grade 0	0 (0.0%)	0 (0.0%)	P< 0.0001
Grade 1	8 (16.0%	41 (82.0%	
Grade 2	2 (4.0%)	4 (8.0%)	
Grade 3	40 (80.0%)	5 (10.0%)	
$P_4 < 0.0001$			

Statistically significant (if P < 0.05).

Table 5: Bitter taste in patient throat results of both groups before and after treatment.

Bitter taste in the patient's throat	Single-action eye drops *n*=50(%)	Multi-action eye drops *n*=50(%)	P-value
Before treatment			
No	39(78%)	32 (64.0%)	P< 0.0001
Yes	11 (22%)	18 (36%)	
$P_1 < 0.0001$			

After treatment			
No	33 (66%)	5 (10.0%)	P< 0.0001
Yes	17 (34%)	42 (90.0%)	
$P_2 < 0.0001$			

PP *value was calculated by Pearson chi-square.* ***No****, the patient did not feel a bitter taste.* ***Yes****, the patient felt a bitter taste in his throat. Statistically significant (if P < 0.05).*

Table 6: Kashkouli grading results of both groups during a follow-up period of eight weeks.

After treatment	Single-action eye drops *n*=50(%)	Multi-action eye drops *n*=50(%)	P-value
Follow-up 2week			
Grade 1	0 (0.0%)	4 (8.0%)	P< 0.0001
Grade 2	3 (6.0%)	38 (76.0%)	
Grade 3	6 (12.0%)	6 (12.0%)	
Grade 4	33 (66.0%)	1 (2.0%)	
Grade 5	8 (16.0%)	1 (2.0%)	
$P_1 < 0.0001$			
Follow-up 4 weeks			
Grade 1	0 (0.0%)	4 (8.0%)	P< 0.0001
Grade 2	3 (6.0%)	38 (76.0%)	
Grade 3	7 (14.0%)	7 (14.0%)	
Grade 4	33 (66.0%)	1 (2.0%)	
Grade 5	7 (14.0%)	0 (0.0%)	
$P_2 < 0.0001$			
Follow-up 6 weeks			
Grade 1	0 (0.0%)	4 (8.0%)	P< 0.0001
Grade 2	3 (6.0%)	38 (76.0%)	
Grade 3	7 (14.0%)	7 (14.0%)	
Grade 4	33 (66.0%)	1 (2.0%)	
Grade 5	7 (14.0%)	0 (0.0%)	
$P_3 < 0.0001$			
Follow-up 8 weeks			
Grade 1	0 (0.0%)	4 (8.0%)	P< 0.0001
Grade 2	3 (6.0%)	36 (72.0%)	
Grade 3	4 (8.0%)	7 (14.0%)	
Grade 4	33 (66.0%)	1 (2.0%)	
Grade 5	10 (20.0%)	2 (4.0%)	
$P_4 < 0.0001$			

Statistically significant (if P < 0.05).

4. Discussion

The eyelid, ocular surface, and lacrimal components are frequently combined to cause epiphora in adults. a combination of underlying reasons, such as allergies, meibomian gland dysfunction, and dry eye, along with varying degrees of lacrimal drainage channel obstruction, affects nearly all of the patients. The key to lessening symptomatic epiphora is a healthy ocular surface [1,5]. Problematic findings in ophthalmology include epiphora with acquired punctual stenosis. The fundamental principle of management is still surgical widening, regardless of the cause structural or functional. There has not been sufficient research on how medical intervention can help with inflammatory punctual stenosis. Medical efforts to manage punctual stenosis have mainly focused on the adjuvant effect of mitomycin C in

surgical procedures, which may damage the lacrimal pump and produce canalicular redundancy by reducing the amount of collagen and elastin in its wall [12,13]. They can also cause stenosis itself. Our study aims to determine how well medical treatment succeeds in managing epiphora in patients with acquired punctual stenosis. In addition, comparing the best results of single-action eye drops and multi-action eye drops when treating inflammation and oedema in its early phases to prevent the progression of fibrosis, stenosis, and chronic inflammation. Chloramphenicol is the first broad spectrum antibiotic to be identified; it is mostly bacteriostatic and works by preventing the formation of bacterial proteins. Rickettsia species, Chlamydia, and Gram-positive and Gram-negative bacteria are all included in its range of activity, which is comparable to that of tetracycline and it had a bitter taste that can be felt in the patient's throat if the punctum was opened [14,15]. An inorganic ester of dexamethasone that dissolves in water is called dexamethasone sodium phosphate. The anti-inflammatory medication dexamethasone is an adrenocortical steroid. Through internal cell action that inhibits the release of specific molecules crucial to the immune system and inflammatory mediators, it reduces inflammation in sub conjunctival space and ocular surface. So, allergies and inflammation are lessened in the punctal area which prevents further fibrosis [15]. As an alpha agonist, tetrahydrozoline (Tetryzoline), a derivative of imidazoline, works primarily by constricting the blood vessels of the conjunctiva and could prevent punctal oedema congestion and further fibrosis [16]. The multi-action eye drop comprises an ocular solution that contains 0.5% chloramphenicol, 0.1% dexamethasone sodium phosphate, and 0.025% tetrahydrozoline hydrochloride with multiple modes of action to control inflammation, infection or congestion in punctum area. While the single-action eye drop that contains only tetryzoline with a single mode of action to control oedema and congestion in the punctum area. Both eye drops work on the pathophysiology of the disease, to our knowledge this is the first study comparing the effect of single-action and multi-action eye drops on treating the epiphora with acquired punctal stenosis. The etiology of epiphora is multifaceted, so we predict that the multi-action eye drops might be more effective as they work with different mechanisms. In our multicentred randomized clinical trial study on 100 patients complaining of epiphora with acquired punctal stenosis. Patients were selected and divided into two groups half of the patients had received treatment for one month with multi-action eye drop and another half of patients had received treatment for one month with single action eye drops and followed up to two months after start of treatment to assess their role in medical treatment of acquired punctal stenosis and comparing their efficacy and safety. In our study, we assessed the success of treatment according to success parameters depending on symptoms relief according to Munk score [11], morphological assessment of punctum widening by slit lamp examination through the width of illumination slit according to Kashkouli grading score, and functional assessment of improvement through FDDT grading score and Bitter taste of Mult-action eye drop as a test for lacrimal patency [11]. These methods for diagnosis, classification, and treatment effectiveness are preferred due to it is non-invasive, simple, and priceless techniques. The primary result was the shift in the FDDT and the Munk grade of epiphora at the ending of the follow-up period. Regarding Munk grading, multi-action eye drops showed 80.0% success after the first 2 weeks of treatment reached 92.0% after 4 weeks of treatment, and continued until the last follow-up period after 8 weeks. On the other hand, single-action eye drops showed only 10.0% success after 2 weeks until the end of follow-up

after 8 weeks. Regarding FDDT, after 2 weeks of treatment, an improvement in FDDT grading with multi-action eye drops with a success rate of 88.0% vs. 11.0% with single-action eye drops. The success rate of multi-action eye drops reaches 92.0% after 4 weeks of treatment. As well as improvement of bitter taste sensation in the group treated with multi-action eye drops. Both the subjective and objective grading of the epiphora showed a statistical improvement after two weeks, with the best improvement occurring after four weeks. The effectiveness of multi-action eye drops over single-action eye drops in treating acquired punctal stenosis may indicate that the disease pathology is multifactorial rather than single, and that the goal of treatment should be to target several aspects. Several eye conditions are frequently treated using topical corticosteroids, a family of anti-inflammatory medications. "Steroid responders" are those whose intraocular pressure (IOP) becomes elevated in response to corticosteroids. Steroid-induced ocular hypertension is a condition in which the usage of corticosteroid causes an increase in intraocular pressure [17]. Following a month of using multi-action eye drops, three patients in this study group exhibited an increase in ocular pressure from 25 to 30 mmHg, which then returned to the normal range after stopping the treatment for one month. One of the multi-action components, dexamethasone, was the cause of this rise in IOP. A higher prevalence of punctal stenosis has been observed in patients aged 40 to 70 years, making advanced age a risk factor for the disease. Our study's mean age was 55.4 ± 10.2 years (31–69 years), which is consistent with findings from other studies [18]. This association may be the result of aging-related changes that make the punctum's dense fibrous structure less robust. Additionally, the orbicularis fibers may be impacted, becoming more atonic and resulting in punctal stenosis [18]. Due to postmenopausal hormonal changes, punctal stenosis is more common in females, according to some studies [6,18]. In a different study by Elalfy et al. [5], they examined the role of medical treatment in acquired stenosis using eye drops containing preservative-free hydrocortisone sodium phosphate 3.35 mg/mL and artificial tears based on sodium hyaluronate, polyethylene, and propylene glycol. They also used the anterior segment OCT to measure punctal opening and came to the conclusion that a combination of preservative-free steroid and artificial tear eye drops could control punctal stenosis and epiphora, their results coincide with results of our study that also compared multi-action eye drop (steroid, antibiotic and decongestant) versus single action eye drops (decongestant) both eye drops tried to manage different aspects of inflammation and the main pathology behind the punctal stenosis also our study assessed the success of treatment through simple outpatient clinic procedure to assure the success of treatment through symptoms relief, morphological assessment by slit lamp exam and slit width and functional assessment through FDDT test and Bitter taste of Multi-action eye drop in patient throat rather than AS-OCT with its limitations as high cost. In the study of Awny et al. [8], they evaluated the role of medical treatment in managing epiphora with acquired punctal stenosis and they monitored the changes in lacrimal puncta by anterior segment OCT while comparing both Multi-action eye drop versus preservative-free artificial tears eye drop, their study concluded that there were marked improvements in epiphora and AS-OCT findings with Multi-action eye drop group, which is coincident with our results also but our study was conducted in a larger number of participants 100 patients while Awny et al. [8] study conducted in 44 patients, also our study compared two modes of action of eye drops both to target the pathogenesis of punctual stenosis while Awny et al. [8] they used a preservative-free artificial tear eye drop eye drop which may not target all aspect of

inflammations associated with punctal stenosis, beside limitations in AS-OCT as high cost and unavailability in our region.

5. Conclusion

To the best of our knowledge, this is the first clinical trial to treat epiphora in eyes with acquired punctal stenosis using multi-action and single-action eye drops. The small number of cases and brief follow-up period in this study are among its shortcomings, as they may not accurately represent the long-term effects of these eye drops on the lacrimal system. It is necessary to establish the exact mechanism of action and any potential long-term consequences. However, the multi-action eye drop showed a high short term success rate in management of epiphora.

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