Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 04, 2021

Efficay of Minimonoka stents versus bicanalicular annular stents for Treatment of Lacrimal Canalicular Stenosis

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Abstract

Purpose: To compare efficacy and safety of Minimonoka stents and bicanalicular annular stents in the management of epiphora due to lacrimal canalicular stenosis.

Patient and Methods: In this retrospective study, the medical records of 30 patients who had undergone lacrimal canalicular intubation for treatment of lacrimal canalicular stenosis were retrospectively received. The patients were divided into two groups: Group I: included patients who had undergone monocanalicular intubation, and group II: included patients who had undergone bicanalicular intubation. Patients were followed regularly on 1st day, one week, and every month up to six months after the procedure and two months after stent removal. Subjective improvement of symptoms of epiphora, Fluorescein dye disappearance test (FDDT), and lacrimal irrigation were our outcome measures.

Results: Complete anatomic success was achieved in 13 patients (86.7%) in group I and 12 patients (80%) in group II. Partial anatomic success was achieved in one patient (6.7%) in group I and two patients (13.3%) in group II. Anatomic failure was achieved in one patient (6.7%) in each group. There was no significant difference between studied groups regarding anatomic success (P=0.8). Complete functional success was achieved in 12 patients (80%) in group I and 11 patients (73.3%) in group II. Partial functional success was achieved in two patients (13.3%) in group I and three patients (20%) in group II. Functional failure was achieved in one patient (6.7%) in each group. There was no significant difference between studied groups regarding functional success (P=0.89).

Conclusions: Minimonoka stents and bicanalicular annular stents are safe and effective surgical interventions in patients with lacrimal canalicular stenosis.

Keywords:
Monocanalicular intubation; Bicanalicular Intubation; Lacrimal canalicular stenosis; Mini-Monoka stent.

1. Introduction

The incidence of canalicular obstruction is from 16% to 25% 1. The main objectives of treatment of canalicular stenosis are relieving symptoms and preservation of canalicular patency 2.

Bicanalicular intubation was first reported in 1968 with a 73% success rate 3. Bicanalicular stents increase the risk of intact canaliculus damage, punctal splitting, loop dislocation, nasal irritation and

granuloma formation 4. Monocanalicular silicon stent was first used in 1990 5. The main advantages of monocanalicular intubation are easy insertion, removal and preserving the healthy canaliculus 6.

The aim of this study was to compare efficacy and safety of Minimonoka stents and bicanalicular annular stents in the management of epiphora due to lacrimal canalicular stenosis.

2. Patient and Methods

This retrospective comparative study was carried out in accordance with the tenets of the Declaration of Helsinki with approval from the Ethical Committee of Zagazig Faculty of Medicine, and an Institutional Review Board (IRB) was obtained. Informed consent was obtained from all the patients. The following data were extracted from records of 30 patients who had undergone lacrimal canalicular intubation to treat lacrimal canalicular stenosis. All the patients were operated on in the Ophthalmology Department, Faculty of Medicine, Zagazig University. According to the surgical procedures, the patients were divided into two groups: Group I: included patients who had undergone monocanalicular intubation, and group II: included patients who had undergone bicanalicular intubation.

Patients aged one to sixty years old who presented with lacrimal canalicular stenosis. Patients presented with complete canalicular obstruction, bicanalicular problems, isolated punctal problems, and nasolacrimal duct obstruction were excluded from our study.

Full ophthalmic examinations were performed on all patients included in our study.

History (lacrimal history): onset of watering of the eye and its duration, intermittency, seasonal or diurnal variation, history of probing or nasal operations.

Lacrimal outflow evaluation included Fluorescein dye disappearance test and lacrimal probing and irrigation.

In group I, all cases was operated under general anesthesia. The punctum was dilated according to the site of the problem using a Nettle ship dilator. Therefore, the probe was gently advanced down the canalicular system, till a hard halt in the lacrimal sac was reached. The Mini- Monoka® silicone stent was then trimmed to the desired length and inserted into the punctum and canalicular system till the bulb reached the ampulla.

ISSN: 0975-3583, 0976-2833 VOL 12, ISSUE 04, 2021

In group II, all cases were performed under general anesthesia. The upper and lower puncta were both dilated. The pigtail probe was inserted into the dilated punctum of the uninvolved canaliculus and rotated to exit from the other punctum. A 25 mm piece of a silicone tube was then cut, and a 5-0 Prolene suture was threaded through the silicone tube. Next, the 5-0 Prolene suture was threaded through the eye hole of the probe and the probe was reverse rotated. The tube was united end to end to form an annular stent with Prolene suture inside it and rotated to the common canaliculus

The prophylactic systemic antibiotic and a topical combination of antibiotic and steroids were prescribed to prevent infection and fibrosis. In All patients, lacrimal stents were removed six months after the operation. Anatomical success was defined as complete anatomic success (no reflux in syringing), partial anatomic success (partial reflux in syringing), and anatomic failure (complete reflux in syringing). Functional success was defined as complete success (patients had grade 2 or better on Munke grading system of epiphora and FDDT showed complete disappearance of dye within 3 minutes of installation.), partial functional success (patients had grade 3 or 4 on Munke grading system of epiphora and FDDT showed complete disappearance of dye within 5 minutes of installation) and functional failure (no improvement of symptoms, patients had grade 5 on Munke grading system of epiphora and dye persisted in the tear film after 5 minutes).

3. Results

Preoperative clinical and demographic data were summarized in (Table 1). There were no significant differences between the studied groups.

There was no significant difference between studied groups regarding anatomic success (P=0.8) (Table 2) and functional success (P=0.89) (Figure 1).

Regarding postoperative complications, premature stent extrusion was reported in 2 patients (13.3%) in group I and was reported in one patient (6.7%) in group II. There was no significant difference between studied groups regarding Premature stent extrusion (P=0.5). No patients reported punctum granuloma or punctum slitting in group I, and only two patients (13.3%) reported punctum granuloma, and one patient (6.7%) reported punctum slitting in group II. However, no significant difference was found between the studied groups (P=0.18).

Table (1): Preoperative clinical and demographic data of patients had lacrimal canalicular stenosis:

	Group I	**Group II**	**P**
Mean age	42.9± 17.3	44.7± 15.3	0.75
Sex: -Male -Female	 7 (46.7%) 8 (53.3%)	 9 (60%) 6 (40%)	0.46
Canaliculus involvement: -Lower -Upper	 13 (86.7%) 2 (13.3%)	 11 (73.3%) 4 (26. 7%)	0.36
Etiology of stenosis: -Idiopathic -Systemic chemotherapy -Congenital -Chronic blepharitis -Previous canalicular trauma	 7 (46.7%) 2 (13.3%) 2 (13.3%) 3 (20%) 1(6.7%)	 6 (40%) 2 (13.3) 2 (13.3%) 4 (26.7%) 1 (6.7%)	0.99

Table (2) : Comparison of surgical time and anatomic success in both groups.

	Group I	**Group II**	P
Anatomic success:			
-Complete success	13 (86.7%)	12 (80%)	0.83
-Partial success	1 (6.7%)	2 (13.3%)	
-Failure	1 (6.7%)	1 (6.7%)	

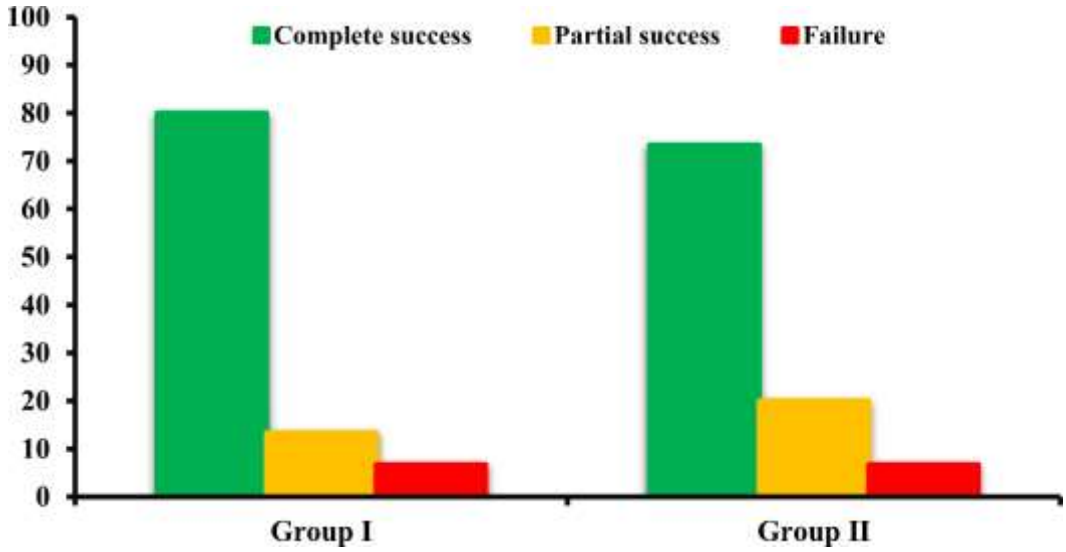

Figure (1): bar chart shows comparison of functional success in both groups

4. Discussion

Canalicular stenosis is usually treated by finding and treating the original causes. A stent must be placed to prevent development of complete canalicular occlusion [7].

An improper diagnosis of complete obstruction could result in unnecessary surgical intervention [8].

Mini-Monoka® monocanalicular intubation was used to manage proximal canalicular stenosis after dilatation, according to Hussain et al and achieved an anatomical success rate of 90%, a functional success rate of 88%. [9].

This study compared the efficacy and safety of Minimonoka stents and bicanalicular annular stents in the management of epiphora due to lacrimal canalicular stenosis.

After eight months of follow-up, there was no significant difference between these two techniques regarding anatomic and functional success.

Singh et al. studied the outcome of monocanalicular lacrimal stenting in canalicular stenosis and reported complete success of 79.25% [10].

Alsulaiman and Alsuhaibani studied the efficacy of bicanalicular silicone intubation to manage post allergic punctal stenosis reported an anatomical success and functional success rates of 100% [11].

Jeganathan et al. studied results of mini- Monoka lacrimal stent insertion in managing epiphora due to canalicular obstruction. They reported a functional success rate of 83.7% and a functional failure rate of 16.3% [12].

Our success rates are comparable with the previously mentioned studies proving the efficacy of lacrimal canalicular intubation as a primary procedure for patients presenting with lacrimal canalicular stenosis with equal efficacy either with monocanalicular intubation or with bicanalicular intubation.

Premature stent extrusion was recorded in 2 patients (13.3%) in group I. The first extrusion occurred in a sixty-year-old patient one month after the operation due to self-removal of the stent. Diagnostic probing and lacrimal irrigation were done, and they revealed persistent canalicular stenosis. The second extrusion case was a forty-year-old patient with stent extrusion two weeks after the operation. It was due to excessive punctal dilatation during operation. Reposition of the stent was done, and after six months, the stent was removed. In group II, we reported premature stent extrusion in 1 patient (6.7%). It occurred in a twenty-four-year-old patient 1.5 months after the operation due to self-removal of the stent. Diagnostic probing and lacrimal irrigation were done, and they revealed persistent canalicular stenosis. Zadeng et al. reported premature stent extrusion in 8.69 % [13].

Alsulaiman and Alsuhaibani reported premature stent extrusion in 4.08 % of cases [11]. Jeganathan et al. reported premature stent extrusion in 5% of cases [12]. Kashkouli et al. reported premature stent extrusion in 9.4% of cases [1]. Our results regarding are premature stent extrusion comparable with the previously mentioned studies.

In our study, all stents were removed after six months. Mandour et al. left the stent in place for six months [14]. Koh and La left the stent in place for four months [15]. Or et al. and Mathew et al. reported that the first stent removal was at three months after the surgery [16 17].

Punctum granuloma was recorded only in 2 patients (13.3%) in group II, and they were treated successfully with topical steroids. Punctum/ canalicular slitting (cheese wiring) was detected only in one patient (6.7%) group II. Singh et al. reported localized punctum granuloma in two eyes [10].

Conclusions

In conclusion, Minimonoka stents and bicanalicular annular stents are safe and effective surgical interventions in patients with lacrimal canalicular stenosis.

Author Contributions

All authors contributed significantly to work reported, whether in the conception, study design, execution, data acquisition, analysis, and interpretation, or in all of these areas; participated in the drafting, revising, or critically reviewing of the article; gave final approval of the version to be published; agreed on the journal to which the article was submitted; and agreed to be accountable.

Informed Consent Statement:

Written informed consent for publication was obtained all from participating patients.

Data Availability Statement:

Available upon request from the corresponding author.

Conflicts of Interest:

The authors declare no conflicts of interest

Funding

None

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