

ORIGINAL RESEARCH

Comparative Study of Mini-MONOKA Stenting and 24 G Intravenous Cannula Stenting in Cases of Canalicular Laceration: A Retrospective Study

¹Dr. Preetam Raj Kurrey, ²Dr. Vandana Sharma, ³Dr. Vinamrata Shukla, ⁴Dr. Ranu Manhar, ⁵Dr. Ratna Agrawal

^{1,3}Assistant Professor, Department of Ophthalmology, Chandulal Chandrakar Memorial Government Medical College, Durg, Chhattisgarh, India

²Assistant Professor, Department of Ophthalmology, All India Institute of Medical Sciences, Bhatinda, Punjab, India

⁴Senior Resident, Department of Obstetrics and Gynaecology, University College of Medical Sciences, Delhi, India

⁵Assistant Professor, Department of Pharmacology, Chandulal Chandrakar Memorial Government Medical College, Durg, Chhattisgarh, India

Corresponding Author

Dr. Ratna Agrawal

Assistant Professor, Department of Pharmacology, Chandulal Chandrakar Memorial Government Medical College, Durg, Chhattisgarh, India

Email: ratna.arang@gmail.com

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ABSTRACT

Introduction: Canalicular lacerations are common periorbital injuries encountered either due to blunt or penetrating trauma. Early and meticulous repair of the same is required to maintain the ductal patency and cosmesis. Different surgical methods are available for its repair like mini MONOKA stenting, Freda silicone tube, Masterka tube etc. But all these are comparatively costlier one. The use of easily available 24 G intravenous cannula is also one of the options to repair the canalicular lacerations. **Aim:** The present study aimed to compare the mini MONOKA stenting with 24 gauge (24 G) intravenous (IV) cannula stenting in canalicular lacerations repair. **Materials and methods:** The present retrospective study was conducted on patients with canalicular lacerations repaired by two different methods and attended by a single surgeon at a tertiary care centre. The patients were randomly divided into two interventional groups: group I undergone mini MONOKA stenting and group II were operated using 24 G IV cannula by following standard operating procedures and taking all aseptic precautions. The outcomes measured in terms of absence of epiphora and cosmetic compliance. **Results:** Total 36 patients were included in the study and divided into two groups. Both the groups showed similar results in terms of absence of epiphora and cosmetic compliance. **Conclusion:** Use of 24 G IV cannula might be proven an economical and easily available alternative interventional method for canalicular lacerations repair at Government sectors where standard methods (mini MONOKA stents, Freda silicone tube etc) are not readily available.

Key words: Canalicular laceration, Comparative study, 24 G Intravenous cannula, Mini monoka stenting.

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INTRODUCTION

Orbital adnexal injuries are most common injuries encountered either during blunt or penetrating trauma to head and face, of which canalicular lacerations occur in 16% of eyelid lacerations.^{1, 2} Bicanalicular lacerations have been reported in 6% to 24% of all canalicular injuries while 72% of lower canalicular lacerations are mono-canalicular.^{3, 4} As lower canaliculus has more important role in tear drainage, proper and early repair of its lacerations are important

to maintain the functional and anatomical integrity of lacrimal system and to avoid post surgical complication of epiphora and for maintenance of proper ductal patency.⁵⁻⁸

Different surgical treatment techniques have been described for managing the canalicular lacerations such as Crawford (bicanalicular) and Ritleng (bicanalicular) intubation system, mini-MONOKA stents (monocanalicular), Freda silicone tube and Masterka tube.^{4, 9} The surgical techniques for different

canalicular lacerations repair differ depending on various surgeons. Usually medical grade silicone tubes are preferred for stenting and repair of canalicular lacerations because of its inert nature, flexibility and easy availability.¹⁰ Using 24 gauge (24G) intravenous (IV) cannula for monocanalicular laceration stenting is relatively economical option as compared to silicone stenting at government health care centres of India as it is readily available at hospital settings.

So, the present study has been conducted to compare the outcome of monocanalicular laceration repair by mini-MONOKA stenting and 24G intravenous cannula stenting at a tertiary care centre of India.

METHODS

This retrospective study has been conducted on the patients of monocanalicular laceration who attended OPD and Emergency Department of Ophthalmology of a tertiary care health centre from June 2018 to May 2021 after taking informed consent from patients. The monocanalicular laceration repair attended by single surgeon has been included in the study.

The canalicular lacerations were repaired by two methods; by using mini MONOKA stent and by using 24 G IV cannula after taking consent from patients. Usually the canalicular lacerations are associated with other periorbital injuries like medial eyelid lacerations, conjunctival, corneal and globe injuries etc. The detailed history taking and slit lamp examination of all the associated injuries were done of all the patients. The general condition of all the patients were stabilised and other associated periorbital injuries were managed using tetanus toxoid, suitable antibiotics, cleaning of debris and anti-rabies vaccination in cases of dog bite.

Careful slit lamp examination was done for evaluation of laceration. Taking all aseptic precaution syringing with normal saline/distilled water was done from punctum to check the patency under microscope. In case of patent canaliculus, the fluid was felt through nasopharynx by patient while if the patient haven't felt the fluid, it was considered either blocked or lacerated canaliculi. For confirmation dye was instilled through punctum and oozing of same has been seen. If still in doubt, probing with Bowman's probe was done to identify as well as locate the nasal cut end.

Once the canalicular laceration was confirmed, the punctual end is easily identified but the nasal cut end is difficult to localize. For localizing the same, the area was seen under operating microscope carefully to identify whitish onion ring like structure, if still in doubt; pigtail probing was done to confirm the nasal cut end of canaliculus. Once the nasal cut end identified, the involved punctum was dilated using Nettleship punctum dilator. Then distal end of mini MONOKA stent was cut to create bevelled edge for its easy and smooth insertion through punctum by using an atraumatic forcep. It was pulled through

punctum and inserted into identified nasal cut end of canaliculus and guided in till the tip of stent reaches in lacrimal sac completely. Then 6-0 vicryl was used to secure the stent with subcutaneous tissue. At last skin and subcutaneous tissue were repaired using 6-0 silk and 6-0 vicryl respectively. Topical and oral antibiotic and topical lubricants with NSAIDs were prescribed and patients were instructed to not to rub their eye to prevent premature extrusion of stent. The wounds were assessed postoperatively on day 1 under slit lamp with fluorescent staining for corneal abrasions or any other iatrogenic injuries and patients were called for follow up at 1, 2, 4, 8 and 12 week postoperatively. Skin sutures were removed on 2nd week and the stent was removed at 8th weeks with patency check of canaliculus by syringing and presence or absence of epiphora. Again patient was called on 12th week for patency check.

In other procedure, 24 G IV cannula (with injection port and wings, 0.7 mm diameter, 19 mm length) which is readily available at any hospital was used to repair the canalicular laceration (Image 1). The IV cannula was inserted from punctum to canaliculus and extended on to nasal cut end of canaliculus which appears as whitish onion ring like structure under operating microscope and extended up to lacrimal sac to initial part of nasolacrimal duct carefully with slightly inward pulled stellate to avoid any injury to canaliculus. The added advantage of 24 G cannula over mini MONOKA stent is that it is comparatively hard so easy to insert and can also be used instead of Bowman's probe (which is used to localize nasal cut end of canaliculus). The another advantage of 24 G cannula over mini MONOKA stent is that its wings are helpful for easy grip and stellate with in cannula help in proper positioning, guiding and advancing the whole length of cannula in to sac area. But handing with inexperienced hand may lead to formation of false passage or sinus.

Once the cannula was inserted up to lacrimal sac, the stellate was withdrawn and proper positioning of cannula was checked by syringing it with normal saline/distilled water, which is usually not done in mini MONOKA stenting due to its delicacy. After checking for proper positioning, the excess cannula length was cut short leaving 1-1.5 mm length at punctual end. A 6-0 vicryl was used to anchor the IV cannula on the conjunctival side and 6-0 silk suture was used to fix the tube to the skin below lid margin. The cannula was left in situ for 8 weeks and the patient was called for follow up at 1, 2, 4, 8 and 12 weeks postoperatively. The patients were instructed to not to rub eyes to prevent extrusion of cannula. Antibiotics, steroid and lubricants were prescribed according to need and to manage associated injuries. Postoperatively same procedure was followed as mini MONOKA stenting. Functional and anatomical success was evaluated at 8 and 12 weeks by syringing and presence or absence of epiphora.

Statistical analysis

Data has been collected in Microsoft Excel sheet and results have been presented in counts and percentage using descriptive statistics.

RESULTS

A total of 36 patients with mono-canalicular lacerations who attended the OPD/Emergency with different modes of injury and operated by a single surgeon were included in the study. The surgeon used two different methods of canalicular laceration repair. Those underwent mini MONOKA stenting were kept in Group I while stenting with 24 G IV cannula patients were kept under Group II. The demographic

profile of patients along with mode of injury, involvement of eye and duration of intervention in both the groups has been presented in Table I.

The common modes of injury noted were road traffic accidents (RTA), dog bite and assault. The data of same has been presented in Figure 1. The other associated ocular injuries noted were lid tear, corneal tear and conjunctival tear as presented in Figure 2.

The post op follow up period was for 12 weeks; the patients were followed up at 1, 2, 4, 8 and 12 weeks postoperatively and outcome looked for were presence or absence of epiphora, premature stent loss, corneal abrasions and cosmetic compliance. The result of the same has been presented in Table II.

Image 1: Canalicular laceration repair using 24 G IV cannula



Table I: Demographic profile of patients with description of monocanalicular laceration (n=36)

Parameters	Group I (n = 18)	Group II (n = 18)
Age (in years) (Mean±SEM)	30.9±2.4	28.7±1.8
Gender		
Male	15 (83.3%)	13 (72.2%)
Female	3 (16.7%)	5 (27.8%)
Eye involvement		
Right	12 (66.7%)	11 (61.1%)
Left	6 (33.3%)	7 (38.9%)
Duration of intervention		
Within 24 hours	11 (61.1%)	9 (50%)
After 24 hours	7 (38.9%)	9 (50%)

Table II: Outcome of the intervention (n = 36)

Parameters	Group I (n = 18)	Group II (n = 18)
Epiphora	2 (11.1%)	2 (11.1%)
Premature stent loss	1 (5.6%)	1 (5.6%)
Corneal abrasions	-	-
Cosmetic compliance	Good	Good

Figure 1: Modes of injury in patients with monocanalicular lacerations (n = 36)

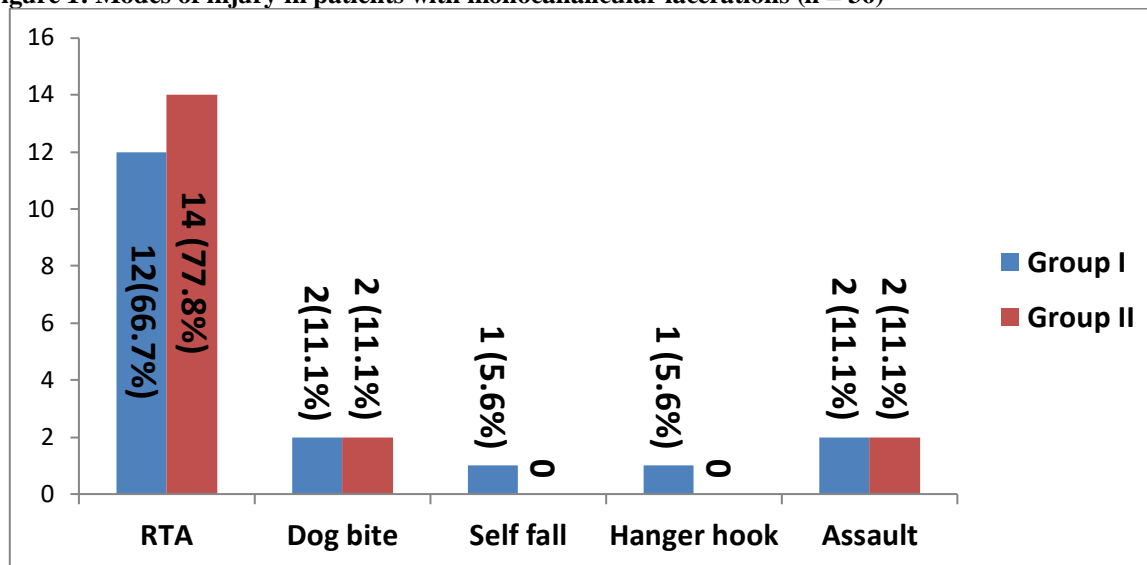
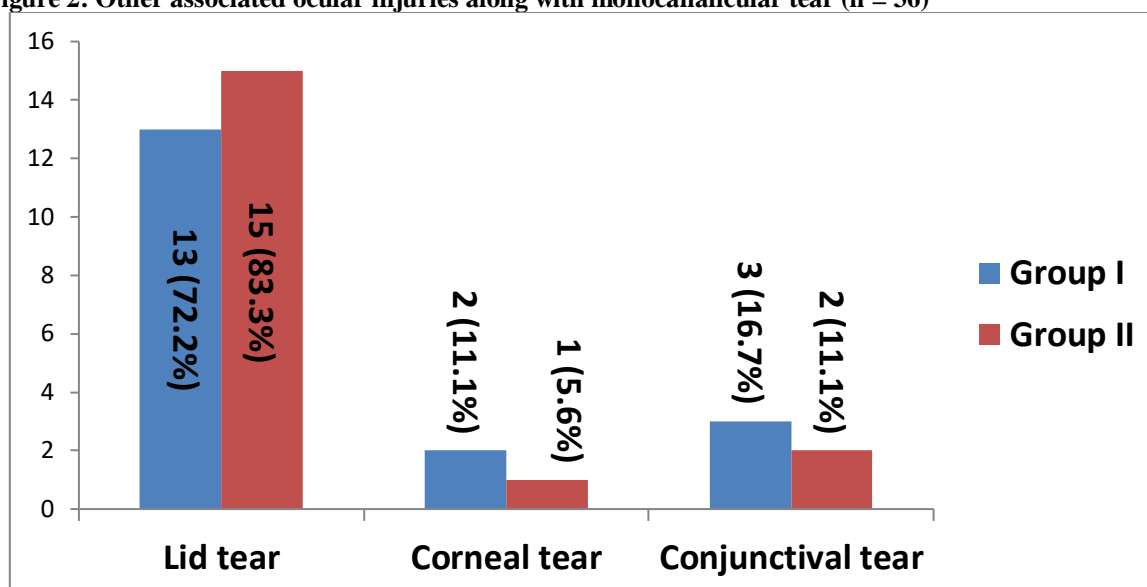


Figure 2: Other associated ocular injuries along with monocanalicular tear (n = 36)



DISCUSSION

The present retrospective study was conducted on 36 patients of monocanalicular lacerations repaired by a single surgeon at a tertiary care centre of Ophthalmology Department. The mean age of the patients in two groups in present study was 30 ± 2.4 and 28.7 ± 1.8 years respectively. The results of the same corroborates with the study conducted by Raj A et al who also reported the involvement of similar age group.¹¹ Majority of the patients in present study were male, the same has been reported by study conducted by Anuradha A et al, Alam MS et al and Raj A et al.^{9, 11}

The most common mode of injury reported was road traffic accident in present study which is similar to the study conducted by Anuradha A et al and Raj A et al.^{9, 11} Increased involvement of lower canaliculus has been reported in the present study as similar to the

study conducted by other authors.¹⁰⁻¹² The common complications reported in the present study were epiphora and premature stent extrusion which was similar to the studies conducted by Anuradha A et al and Raj A et al.^{9, 11}

Most of the lacerations in present study were repaired within 24 hours of injury, the complications of premature stent loss was reported in the cases repaired after 24 hours. The same has been concluded by Raj A et al.¹¹ Chu et al also found that early repair of laceration is associated with better functional and cosmetic outcomes due to better alignment of lacerated tissue.^{13, 14} Early repair also results in faster healing with fewer chances of infection and other complications like obstruction of duct or scarring.^{13, 14} Absence of epiphora was considered as success of intervention and same has been achieved in 88.9% cases by both the methods in present study which

corroborates with the study conducted by Anuradha A et al who also reported the success rate of 93.75% by using 24 G IV cannula and Liang et al and Chowdhury et al who reported success rate of more than 90% by using bicanalicular stent and mini MONOKA stent for canalicular laceration repair.^{9, 15, 16}

Limitations to the study

There are some limitations of the study like small sample size and retrospective nature of the study.

CONCLUSION

The present retrospective study has been conducted to compare the outcomes of two different methods used for monocanalicular laceration repair. Of which use of 24 G IV cannula has been found relatively economical and readily available interventional method at health care centres of resource poor countries with similar functional success rate as compared to other costlier interventional method used (mini MONOKA stenting). The inimitability of the present study is that none of the reviewed studies had compared the outcomes of these two different interventions in canalicular laceration repair. Thus the results of the study may provide evidence in support of use of 24 G IV cannula as easier, economical and readily available option for canalicular laceration repairs where standard interventional options are not usually available.

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