

One-stitch anastomosis through the skin with bicanalicular intubation: a modified approach for repair of bicanalicular laceration

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Abstract

• **AIM:** To evaluate the efficacy and safety of one-stitch anastomosis through the skin with bicanalicular silicone tube intubation in repairing of bicanalicular laceration.

• **METHODS:** The clinical data of 15 consecutive patients with both superior and inferior canalicular laceration in one eye who underwent surgical repair using one-stitch anastomosis through the skin and bicanalicular stent were retrospective studied. All the operations were performed under surgical microscope, 5-0 silk sutures were used and were with bicanalicular silicone tube (diameter was 8mm) intubation, for one lacerated canaliculi one-stitch anastomosis through the skin. The stents were left in place for 3 months postoperatively and then removed. The follow-up period was 3-36 months (average 14 months).

• **RESULTS:** In 15 patients, 13 patients were cured entirely, 1 patient was meliorated, 1 patient with no effects. All patients had got good recovery of eyelid laceration with no traumatic deformity in eyelid and canthus. Complication was seen in one case, for not followed the doctor's guidance to come back to hospital to had the suture removed on the 7th day after operation, when he came at the 15th day, the inferior canalicular wall and eyelid skin were corroded by the suture caused 2mm wound, and the inside silicone tube was exposed, a promptly repair with 10-0 nylon suture was done, the wound healed in a week. There were no early tube protrusions and punctal slits in the patients.

• **CONCLUSION:** One-stitch anastomosis through the skin with bicanalicular silicone tube intubation is a good method in repair of bicanalicular laceration in one eye, the cut ends can be anastomosed directly, and with excellent cosmetic results, it is acceptable for the patients. For there is no suture remained in the wound

permanently, so there is no suture-related granuloma which may cause obstruction or stenosis of canaliculi. It is simple, economical, effective and safe.

• **KEYWORDS:** both superior and inferior canalicular laceration; repair; one-stitch anastomosis through the skin; bicanalicular intubation

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INTRODUCTION

Mechanical injury of eyelid and orbit often causes canalicular laceration, and it is difficult to deal with when both superior and inferior canaliculi were lacerated in one eye [1-3]. How to repair the two lacerated canaliculi in one time, simplify the anastomosis procedure and reduce postoperative stenosis or obstruction of canaliculi is important. Kersten and Kulwin [4] reported "one-stitch" canalicular repair, a simplified approach for repair canalicular lacerations in 1996 (Figure 1). The method is anastomosing the two cut end by single 7-horizontal mattress sutures, which was passed in the plane immediately anterior to the canaliculus. Yet, the two underlying canalicular edge might not be anastomosed together accurately, and there is still probability of inflammation granuloma caused by remained suture near the canaliculus, which might bring out a bigger scar in the anastomosis site, and might lead to lacrimal canalicular obstruction. During August 2007 to April 2012, we modified this procedure, and used "one-stitch anastomosis through the skin with bicanalicular intubation" approach for repair 15 cases (15 eyes) of both superior and inferior canalicular lacerations. This procedure was simple and safe, the good outcomes were achieved.

SUBJECTS AND METHODS

Subjects Fifteen cases (15 eyes) of both superior and inferior canalicular laceration in one eye admitted in our hospital from August 2007 to April 2012, including 12 males, 3 females, 20-82 years (mean age 38 years), right eyes (8), left eyes (7). Eleven cases (11 eyes) operation time was

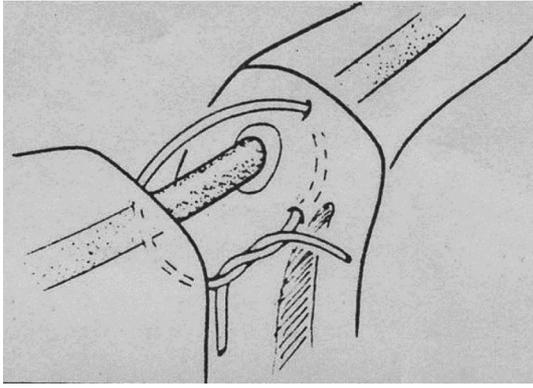


Figure 1 Kersten's "one-stitch" repair^[4].

within 24h after being wounded, 4 cases (4 eyes) for 48h after being wounded; The sharp device cuts of wound 9 cases (9 eyes), split of wound bluntly 6 cases (6 eyes). The patient admission criteria were: 1) both superior and inferior canalicular laceration in one eye, proximal (medial) cut end of canaliculi could be found, 2) the distance between the lacrimal punctum and lacerated spot was more than 3mm, 3) not too much tissue was lost, and a good anastomosis could be performed.

Methods The clinical data of the 15 consecutive patients were retrospectively studied. All lacerated canaliculi were repaired under local anesthesia with 2% lidocaine injection. The operating microscope was available in all cases to identify the proximal (medial) cut ends of both the superior and inferior canaliculus, once the proximal cut end was identified, a silicone tube (Crawford tube, diameter was 0.8mm) was passed through the punctum to the lateral end, proximal end, common canaliculus, lacrimal sac, and then through the nasolacrimal duct to the nose cavity where it was retrieved (Figure 2). The superior and inferior lacerated canaliculi were intubated with silicone tubes, and the two ends of tube were fixed by a suture knot. The two cut ends were then anastomosed, a 5-0 silk suture was passed in a horizontal mattress fashion through the skin (Figures 3, 4). Anastomosis procedure: firstly make a suture through the skin of eyelid on the gray line 2.5mm apart from the cut end, as the needle meeting the silicone tube, go along it, prick the needle out from the distal cut end lumen, then advanced into the proximal (medial) cut end lumen 1.5mm, then prick the needle out to the skin of eyelid 2.5mm apart from the cut end, and make a knot after a horizontal mattress stitch. Similar anastomosis was performed in superior canalicular laceration. Continue suturing the wound of skin and conjunctiva, and repair the lid-margin, cover the wound eye with gauze. Change dressings everyday postoperatively, remove stitches 7d later, the stents were left in place for 3 months and then removed. At the time of silicone stent removal, probing and irrigation were carried out to determine canalicular patency. The patients were scheduled for return to

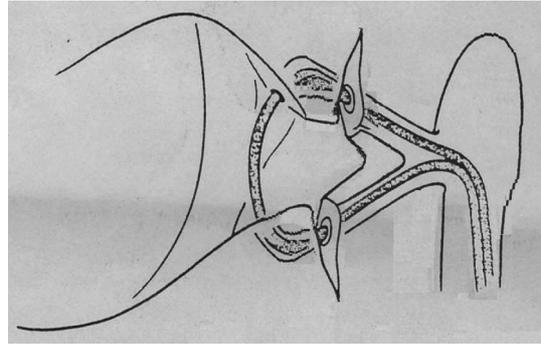


Figure 2 Both superior and inferior canalicular laceration in one eye with bicanalicular silicone tube intubation.

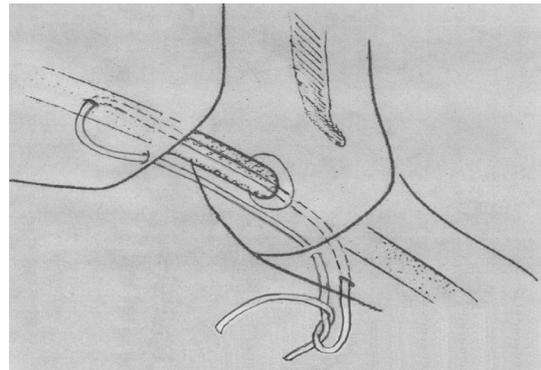


Figure 3 One-stitch anastomosis through the skin repair superior canalicular laceration.

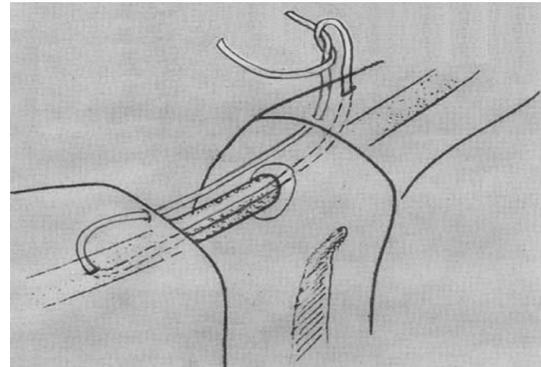


Figure 4 One-stitch anastomosis through the skin repair inferior canalicular laceration.

the office 3-6 months after stent removal, during which time they underwent fluorescein disappearance test. The patients were followed-up for 3-36 months (average 14 months) after stent removal.

RESULTS

Treatment effects were defined at outcome visit one month after stent removal and were defined three levels: cured entirely, meliorated and no effects. Cured entirely was defined as no epiphora, no canalicular obstruction or stenosis when probing, and fluorescein test was normal. Meliorated: mild epiphora or canalicular stenosis when probing, and fluorescein disappearance test was normal. No effects: epiphora, canalicular obstruction when probing, and fluorescein disappearance test was delayed.

In 15 patients (15 eyes), 13 patients (13 eyes) were cured

entirely, 1 patient (1 eye) was meliorated, 1 patient (1 eye) with no effects. Fifteen patients (15 eyes) complied with scheduled follow up for 3-36 months after stent removal. All the patients had got good recovery of eyelid laceration with no traumatic deformity in eyelid and canthus. Complication was seen in one case, for not followed the doctor's guidance to come back to the hospital to had the suture removed on the 7th day after operation, when he came at the 15th day, the inferior canalicular wall and eyelid skin were corroded by the suture and caused 2mm wound, and the inside silicone tube was exposed, a promptly repair with 10-0 nylon suture was done, the wound healed in a week. There were no early tube protrusions and punctal slits in the patients.

DISCUSSION

It is difficult to deal with when both superior and inferior canaliculi were lacerated in one eye that complicated with serious injury of medial canthal and eyelids^[5]. Monocanalicular intubation was only facilitated to repair the one lacerated canaliculus in one eye, and if confront with the condition that both superior and inferior canaliculi were lacerated in one eye, only inferior lacerated canaliculus could be repaired, and had to give up repairing the superior one^[6]. Bicanalicular intubation was available for both superior and inferior canaliculi lacerated in one eye^[7].

Kersten and Kulwin^[4] reported firstly the method of one-stitch canaliculi repair which had proven successful in 1996. The method is that anastomosing the two cut end by single 7-horizontal mattress sutures, which were passed in the plane immediately anterior to the canaliculus. It reduced iatrogenic injury to lacrimal canaliculus epithelium and probability of canalicular obstruction, and simplify the operation. Yet, the two underlying canalicular edge might not be anastomosed together accurately, and there is still probability of inflammation granuloma caused by remained suture near the canaliculus, which might bring out a bigger scar in the anastomosis site, and might lead to lacrimal canalicular obstruction. Some scholars suggest that remain 3 or 4 sutures (7-0 to 10-0 nylon sutures) in connective tissue surround the lacrimal canaliculus with the merit of accurate anastomosis, but there is still probability of inflammation granuloma and lacrimal canalicular obstruction^[8].

In 1998 we reported a modified dacryocystorhinostomy suspending anterior flap through skin, in treatment of chronic dacryocystitis in which only the anterior flap underlying lumens was anastomosed^[9]. The method had the merit of avoiding collapse of anterior flap, prevention of the inflammation granuloma and the lumen obstruction. In this paper, two kinds of techniques were combined, the method of repair canalicular laceration was modified. We used the method of "one-stitch anastomosis through the skin with

bicanalicular intubation" for purpose of simplifying the operation and prevention of lacrimal canalicular obstruction. The sutures were made through the lumen in anastomosis to confirm same layer appositions of cut ends. Both superior and inferior lacerated canaliculi were repaired. Furthermore, 5-0 silk suture could bear more stress, be more economical and be easier to be handled than that of 7-0 to 10-0 nylon sutures. There were no severe complications in our research.

Cautions for of the operation are as follow: 1) If there was much stress traction in wound, 1 or 2 more stitch should be made in the soft tissue surround the cut ends through the skin in addition to the suture of grey line, aside the canalicular lumen; 2) Make sure the silicone tube in intubation was not induce too much traction to the lacrimal punctum; 3) Make more practice and be careful when anastomosing; 4) The suture should be removed in 7d after operation, and no more delay longer than 9d for preventing the erosion by suture.

We can draw such a conclusion by this research: one-stitch anastomosis through the skin with bicanalicular silicone tube intubation was a good method in repairing of bicanalicular laceration in one eye, the cut ends could be anastomosed directly, and with excellent cosmetic results, it was acceptable for the patients. For there was no suture remained in the wound permanently, so there was no suture-related granuloma which might cause obstruction or stenosis of canaliculi. It was simple, economical, effective and safe. However, we hope to confirm these treatment effects in a greater number of cases and in longer term.

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