Conjunctivodacryocystorhinostomy - Experience of a Tertiary Hospital

Original Article

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Abstract

Introduction: Conjunctivodacryocystorhinostomy (CDCR) is primarily indicated for proximal lacrimal obstruction, as well as in trauma or persistent epiphora after DCR.
Objective: To review the clinical indications for CDCR, describe the surgical technique, and outline the challenges encountered.
Materials and Methods: Retrospective series of patients undergoing CDCR with Jones Stop Loss Jones Tubes (SLJT) tubes. Anatomical success was defined by tube patency on irrigation, and functional success by resolution of epiphora.
Results: Five CDCR procedures were performed. Etiologies included congenital lacrimal system agenesis, failed DCR, and iatrogenic lacrimal canal stenosis.
Conclusion: CDCR with SLJT tubes is a surgical option to consider in cases of proximal obstruction and failed conventional DCR, with endoscopic technique being essential for accurate tube placement. Complications such as inferior tube migration and conjunctival overgrowth remain challenging, requiring long-term follow-up.

Keywords: lacrimal drainage obstruction, epiphora, conjunctivodacryocystorhinostomy, Jones Stop Loss tube

Introduction

Epiphora results from either excessive tear secretion by the lacrimal gland or insufficient tear drainage through the lacrimal system, which may occur due to functional or anatomical obstruction. Distal obstruction of the lacrimal system can occur at the level of the lacrimal sac, nasolacrimal duct, or the valve of Hasner, and is treated by dacryocystorhinostomy (DCR). Proximal obstruction occurs at the level of the lacrimal puncta or canaliculi. In cases of punctal agenesis or resection of the proximal lacrimal pathway, conjunctivodacryocystorhinostomy (CDCR) is the only available therapeutic option.

In clinical practice, DCR is the initial approach for both functional and anatomical proximal obstruction, although its success rate is lower than that for distal obstruction. [1] CDCR was first described by Von Hoffman in 1904 and later modified by Lester Jones in 1962. [2]

The principle behind CDCR is to create a fistula between the medial canthus and nasal cavity. A hollow Pyrex tube, known as the Lester Jones or Jones tube, is inserted into the lumen of this fistula to allow tears to drain into the nasal cavity via ciliary action. [1, 2, 3] The primary indication for CDCR is canalicular obstruction with less than 8 mm of patent canaliculus remaining from the lacrimal punctum. However, it is also indicated in conditions such as traumatic epiphora, canalicular agenesis, lacrimal pump disfunction, and persistent symptomatic epiphora despite a functionally patent drainage system following DCR. [3, 4]

Several approaches have been described for this procedure, including external, endoscopic, and laser-assisted techniques, and multiple modifications of the technique have been proposed. Nevertheless, the rate of complications has remained unchanged. [2]

The extrusion of the Jones tube through the caruncle was the most common complication of CDCR until the introduction of the StopLoss Jones Tube (SLJT), which features a distal silicone membrane that prevents extrusion through the caruncle. [2, 3]

Endonasal endoscopic control during placement of the Jones tube is critical as anatomical factors that may affect the tube patency, such as septal deviation or ipsilateral concha bullosa, can be identified and corrected. Moreover, endoscopic visualization allows for more precise tube insertion. [3]

Objective

This study aimed to review the clinical indications for CDCR, describe the surgical technique and associated challenges, and describe the characteristics of a case series of patients who underwent this procedure at a tertiary hospital.

Materials and methods

This retrospective case series included all patients who underwent CDCR with SLJT insertion between 2020 and 2024 at a tertiary hospital. The minimum postoperative follow-up period was six months, and the maximum was four years The analyzed variables included demographic data, clinical presentation, prior DCR surgery, clinical indication for CDCR, length of the SLJT, tube drainage class, complications, and anatomical and functional success. Anatomical success was defined as a patent tube on irrigation, and functional success as resolution of epiphora.

The Jones tube drainage class was assessed for each patient:[2]

- Class I: Spontaneous drainage of fluid through the tube.
- Class II: No spontaneous drainage, but fluid drains with forced respiration.
- Class III: No drainage with respiration, but irrigation is possible.
- Class IV: The tube cannot be irrigated.

Surgical technique

All surgery was performed under general anesthesia with orotracheal intubation.

Prior to creating the fistulous tract between the conjunctiva and nasal cavity, endoscopic visualization was used to remove the ascending process of the maxilla and lacrimal bone with a Kerrison rongeur and a diamond burr This enabled full exposure of the lacrimal sac and assessment or correction of any anatomical variations that could impair SLJT drainage. A carunculectomy (figure (fig.) 1.A) was then performed with preservation of the plica semilunaris and visualization of the medial canthal ligament (fig. 1.B). A tract was created between the conjunctiva and nasal cavity using the guidewire from the StopLoss kit (fig. 1.C), and this tract was subsequently dilated (fig. 1.D). Next, a dummy tube was used to determine the appropriate size of the SLJT (fi. 1.E), following the manufacturer's recommendations. The selected tube was inserted into the CDCR tract (fi. 1.F). The tube collar was sutured to the lower eyelid by

circumferential 5-0 nylon suturing to prevent distal migration (fig. 1.G). Under endonasal endoscopic visualization, the correct position of the tube within the nasal cavity was confirmed. Middle turbinoplasty was performed whenever contact was observed between the tube and middle turbinate. Nasal packing was performed with Nasopore®. Patients received postoperative oral antibiotics, corticosteroid eye drops, and nasal corticosteroids. Patients were instructed to begin nasal irrigation on postoperative day 3. The fixation suture of the tube collar to the caruncle was removed in postoperative week 4.

Results

The study included four patients who underwent CDCR (three women and one man; age 19–84 years).The etiologies were congenital agenesis of the lacrimal pathway (two cases), proximal obstruction with recurrent chronic dacryocystitis following multiple prior DCRs (one case), and lacrimal duct stenosis secondary to previous oncologic resection of the lacrimal pathway (one case). All patients presented with significant epiphora refractory to conventional treatment approaches, which constituted the indication for CDCR. The clinical and surgical details of each case are described below.

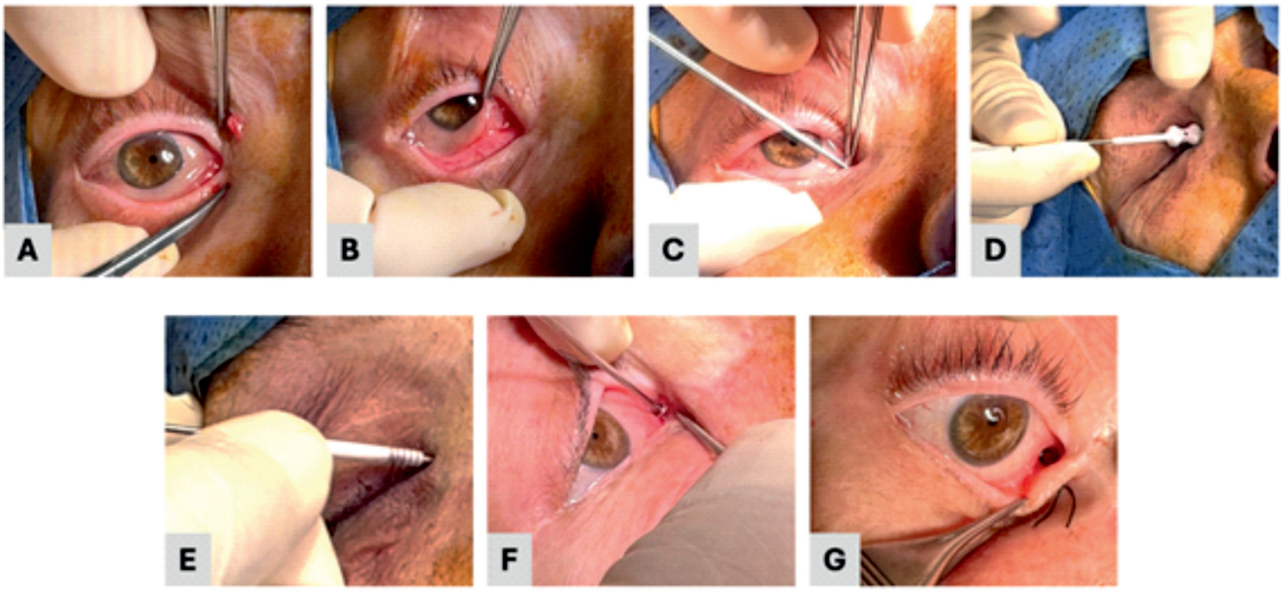
Case 1:

A 19-year-old woman presented with persistent left-sided epiphora and nasal obstruction associated with septal deviation and nasal pyramid deformity. Physical examination revealed agenesis of the left lacrimal punctum, precluding the use of conventional reconstructive techniques such as DCR. Given the absence of a functional residual canaliculus, CDCR was performed with placement of a SLJT measuring 3.5 mm × 15 mm. The procedure was uneventful, and endoscopic assessment confirmed correct intranasal positioning of the SLJT. At four years postoperatively, the patient remains asymptomatic with both anatomical and functional success, corresponding to class II tube drainage.

Case 2:

A 28-year-old man presented with right-sided epiphora associated with a complex congenital malformation of the lacrimal

Figure 1
A - Carunculectomy. B - Preserved plica semilunaris. C - Introduction of the guidewire through the medial canthus toward the nasal cavity. D - Dilation of the created tract. E - Insertion of a dummy tube to determine the appropriate size of the Jones tube. F - Placement of the SLJT at the medial canthus. G - Fixation of the proximal end of the Jones tube to the lower eyelid.



system. Intraoperative exploration revealed agenesis of the superior lacrimal punctum and severe atrophy of the inferior canaliculus, which was superficial and non-patent beyond 1 cm on initial probing, resulting in a soft stop. Given the extent of the anatomical abnormality and impossibility of temporary stenting, CDCR with insertion of a 3.5 mm × 14 mm SLJT was indicated. The surgery was performed under endoscopic endonasal control.

Conjunctival overgrowth over the proximal end of the tube was observed six months postoperatively (Figure 2). Attempted removal of the conjunctival tissue and application of mitomycin C in the ophthalmology clinic were unsuccessful. Revision surgery was performed at 12 months postoperatively, with excision of the excessive conjunctival tissue and replacement of the SLJT. To optimize the nasal anatomy, total ethmoidectomy and middle turbinoplasty were performed. A new 3.5 mm x 17 mm SLJT was inserted, and mitomycin C was applied to the inner corner of the eye. The patient was instructed to apply fluorometholone 0.1% eye drops (2 drops) daily during the first postoperative year. The frequency was subsequently reduced to one drop every three days.

At two years postoperatively, the patient remains asymptomatic, with anatomical and functional success corresponding to class I tube drainage (Figure 3).

Case 3:

An 84-year-old woman with a history of chronic left-sided dacryocystitis experienced recurrence despite three prior DCR surgeries with O'Donoghue stent placement, all of which failed to alleviate epiphora or resolve inflammation of the lacrimal sac.

She underwent CDCR with placement of a 3.5 mm × 19 mm SLJT, combined with middle turbinoplasty. Initial postoperative follow-up showed functional and anatomical success (Figure 4). However, one year after the surgery, the patient presented with epiphora due to tube obstruction caused by conjunctival overgrowth at the proximal end and inferior migration of the SLJT (Figures 5 and 6). In-office debridement of the proximal tube opening was attempted but was unsuccessful. Revision surgery was planned for removal of the granulation tissue and tube replacement, underscoring the importance of close follow-up in cases with excessive granulation. The patient currently has class IV tube drainage.

Figure 2
Conjunctival overgrowth over the proximal end of the StopLoss Jones Tube (SLJT) with inferior migration of the tube at 6 months postoperatively.

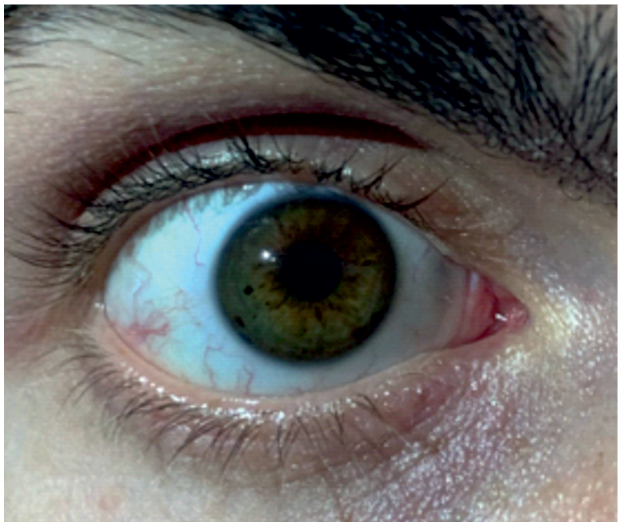


Figure 3
StopLoss Jones Tube (SLJT) two years after the revision surgery

Figure 4
Patent StopLoss Jones Tube (SLJT) in situ one month postoperatively.

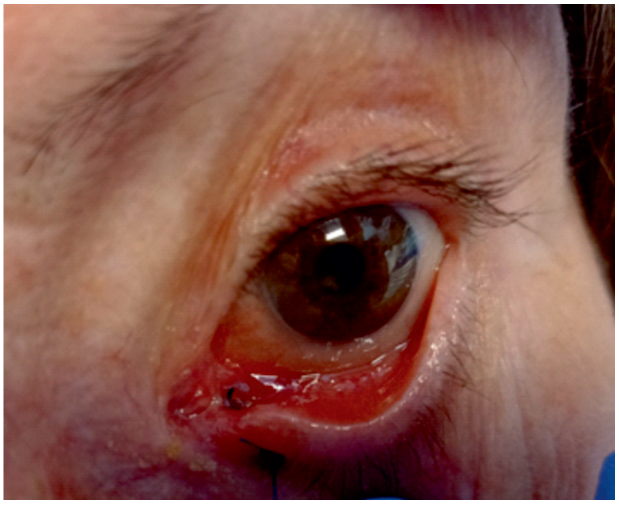
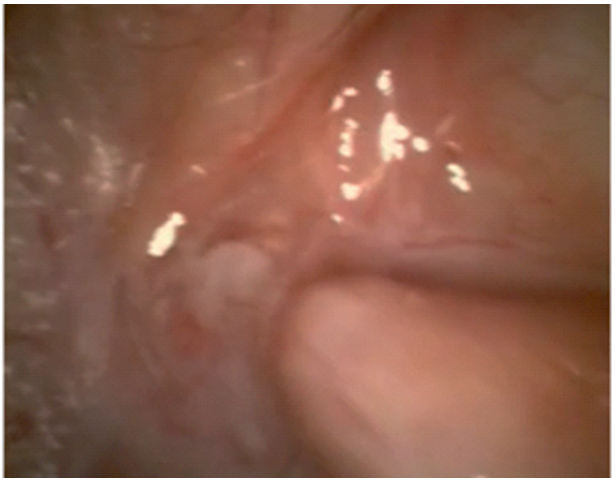


Figure 5
Granulation tissue at the medial canthus hiding the StopLoss Jones Tube (SLJT) 12 months postoperatively



Case 4:
A 63-year-old woman presented with a history of right lacrimal duct stenosis secondary to oncologic resection of a basal cell carcinoma involving the right medial canthus in 2020. Although she underwent external DCR during the same procedure, she continued to experience persistent and significant epiphora. After thorough evaluation, CDCR was indicated to re-establish a functional drainage pathway. The surgery was performed endoscopically, with concomitant middle turbinoplasty, and a 3.5 mm × 15 mm SLJT was placed, adjusted to the patient's residual nasal anatomy to ensure optimal placement. At one month postoperatively, the SLJT was patent, and both functional and anatomical outcomes were achieved, corresponding to class I drainage (Figure 7).

Figure 6
Inferior migration of the StopLoss Jones Tube (SLJT).

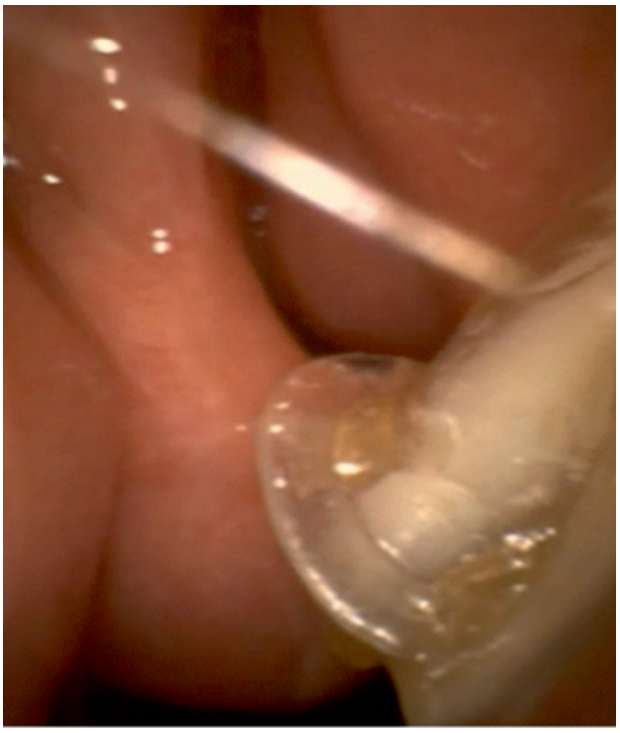


Figure 7
StopLoss Jones Tube (SLJT) at one month postoperatively.

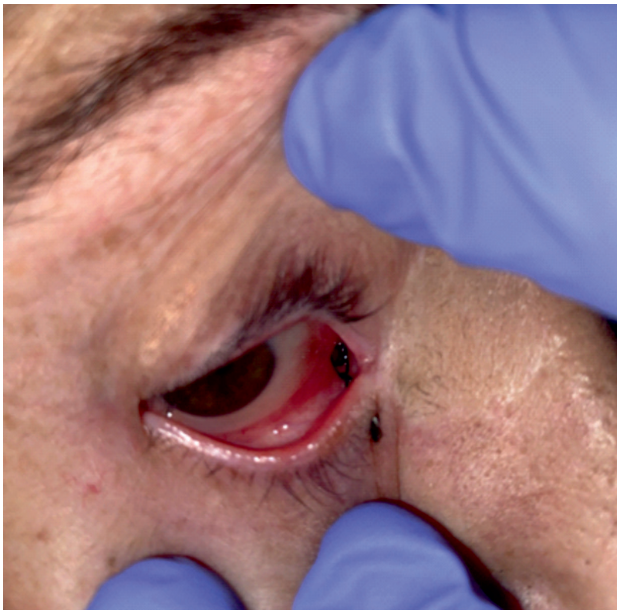
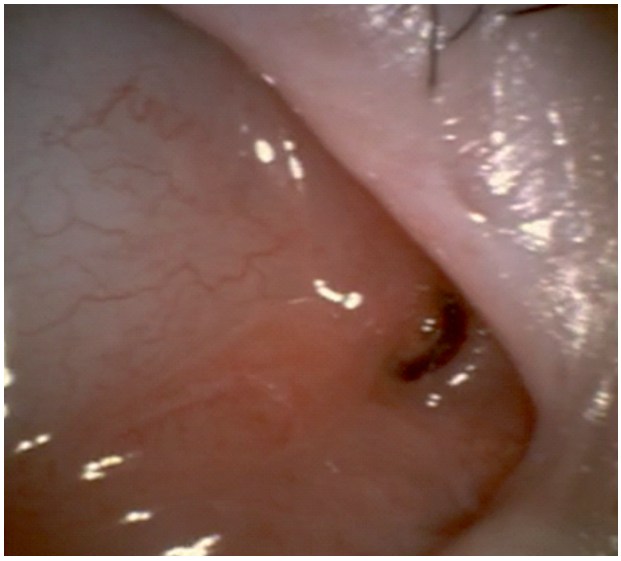


Figure 8
Conjunctival overgrowth over the StopLoss Jones Tube (SLJT).



At six months postoperatively, conjunctival tissue overgrowth was noted over the proximal tube end, accompanied by inferior tube migration and recurrent epiphora, corresponding to class III drainage (Figure 8). The patient is currently awaiting revision surgery for debridement of the medial canthus and replacement of the SLJT.

Discussion

Although our experience with this surgical procedure is limited, the cases analyzed in this study illustrate several clinical scenarios in which this technique may be indicated, including congenital agenesis of the lacrimal puncta (Cases 1 and 2), complex congenital or anatomical alterations causing repeated DCR failures (Case 3), and complications secondary to oncologic treatments (Case 4). These findings emphasize the clinical relevance of CDCR in the management of complex proximal lacrimal obstruction.

In a systematic review that included 1,845 patients undergoing CDCR, the causes of nasolacrimal obstruction were distributed as follows: traumatic (25.5%); congenital (16.7%); secondary to cancer treatment, including surgical procedures, radiotherapy, or chemotherapy (7.5%); idiopathic (6.5%); and secondary to failed DCR (9.1%). The remaining 35% were primarily attributed to infection and inflammation.[1] CDCR success rates vary between 57% and 98.5% across studies. Factors influencing these outcomes include the duration of follow-up, definition of surgical success, underlying etiology of canalicular obstruction, and surgical variables such as Jones tube placement and use of endoscopic approach.[5] In this study, success was categorized as anatomical (tube patency) and functional (absence of epiphora). Two of the four patients (Cases 1 and 2) achieved both functional and anatomical success, although Case 2 required revision surgery. Anatomical and functional success varied over time. Initially, all patients demonstrated successful outcomes within the first six months, with drainage classes ranging from I to II. Beyond this period, complications such as proximal obstruction and inferior migration of the SLJT led to decreased success rates. Cases 3 and 4 are currently awaiting revision surgery for debridement of the medial canthus and placement of a new SLJT. Endonasal endoscopic guidance is critical for accurate tube placement and preventing complications related to patient-specific nasal anatomy, such as septal deviation or SLJT contact with the middle turbinate. The endoscopic approach facilitates optimal adaptation of the tube to the patient's anatomy, allowing for preemptive middle turbinoplasty when required. This ensures sufficient space for the distal tube end and prevents postoperative complications such as SLJT obstruction.[6,7]

The most frequent complications of CDCR are tube-related, with extrusion being the most common, followed by obstruction, malposition, and proximal or distal migration.[2,5,7] Tube migration occurs more frequently when the procedure is performed without nasal endoscopy assistance. Previous studies have reported a migration rate of 26.7% in non-endoscopic cases compared with 20.8% in endoscopically guided procedures.[2] Minor complications, such as transient mucus plug obstruction, are common and easily managed

with irrigation, and such episodes were occasionally observed during follow-up visits in this study. More complex obstructions, such as conjunctival overgrowth or granulation tissue around the tube, pose significant management challenges.[8]

In this study, Cases 3 and 4 developed proximal obstruction of the SLJT due to granulation tissue, requiring revision surgery and tube replacement. In Case 2, anatomical and functional failure after the first operation was attributed to two factors: excessive conjunctival tissue proliferation over the proximal tube end and partial distal obstruction caused by the middle turbinate. During revision surgery under endoscopic control, partial distal obstruction was identified and corrected with middle turbinoplasty, optimizing SLJT positioning. Future studies should focus on strategies to minimize conjunctival complications, such as reducing the conjunctival incision size or using anti-scarring agents. [3]

Additional complications associated with CDCR include persistent epiphora and local infection, often resulting from fibrotic closure of the rhinostomy, nasal synechiae, or an inadequately sized ostium. Insufficient opening of the lacrimal sac may lead to accumulation of debris and continuous discharge from the medial canthus. Acute sinusitis and epistaxis are also potential CDCR complications, though they are less common.[2,7] In this case series, the use of SLJT prevented proximal tube extrusion, one of the most frequently reported complications in earlier studies that used traditional Jones tubes. SLJTs have significantly reduced or even eliminated the risk of proximal extrusion.[9]

The SLJT, a permanent Pyrex prosthesis, requires ongoing long-term care by both the patient and physician to ensure patency and proper anatomical positioning. [7,10]

Regarding the quality of life, multiple studies have shown that patients undergoing CDCR with SLJT report greater dissatisfaction between three and six months postoperatively, the period during which the most tube-related complications occur. However, the quality of life tends to improve significantly after this period, particularly with adequate follow-up.[11]

Limitations

The main limitations of this study include its retrospective and non-comparative design, limited follow-up duration, and small sample size, reflecting the low incidence of proximal lacrimal obstruction. Prospective studies with larger cohorts and longer follow-up are required to validate these findings and better assess the long-term outcomes. Despite its small sample size, this case series provides valuable data on the technical aspects, indications, and limitations of CDCR with SLJT placement.

Conclusion

CDCR with SLJT placement represents a viable surgical option for proximal lacrimal pathway obstruction and cases of failed conventional DCR. In this study, the endoscopic approach proved effective for accurate SLJT placement, enabling identification of patients requiring middle turbinoplasty or other adjunctive procedures to maintain distal tube patency and prevent postoperative obstruction.

Although the introduction of SLJTs has significantly reduced the rate of proximal tube extrusion, complications such as obstruction by granulation tissue, observed in three of the four cases in this study, remain challenging and emphasize the need for meticulous long-term follow-up.

Despite the limitations, our findings suggest that CDCR with SLJT placement is a viable, safe, and effective option for managing refractory proximal lacrimal obstruction.

Conflict of Interests

The authors declare that they have no conflict of interest regarding this article.

Data Confidentiality

The authors declare that they followed the protocols of their work in publishing patient data.

Human and animal protection

The authors declare that the procedures followed are in accordance with the regulations established by the directors of the Commission for Clinical Research and Ethics and in accordance with the Declaration of Helsinki of the World Medical Association.

Privacy policy, informed consent and Ethics committee authorization

The authors declare that they have obtained signed consent from the participants and that they have local ethical approval to carry out this work.

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Scientific data availability

There are no publicly available datasets related to this work.

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