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Long-term outcomes of endoscopic endonasal conjunctivodacryocystorhinostomy with Jones tube placement: A thirteen-year experience

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ABSTRACT

Purpose: To report thirteen years of experience with endoscopic-assisted endonasal primary conjunctivodacryocystorhinostomy (CDCR) and revision with Jones tube placement in Korean patients.
Methods: Thirty-three patients who underwent primary endoscopic endonasal CDCR with a Jones tube and were followed for over 6 months and 22 patients who underwent revision CDCR were retrospectively reviewed. We evaluated the cause of obstruction, operation time, tube length, success rate (at 6, 12 and 24 months), and the cause of failure for primary and revision procedures.
Results: The most common cause for operation in primary CDCR was trauma. The mean operation time was 26 min and 24 min in the primary and revision groups. The initial success rate was 87.9% vs. 74.3% at 6 months postoperative and 63.6% vs. 60% at two years after surgery in the primary and revision group. The most common reason for failure in both groups was medial migration of the tube, and the mean onset of these complications was about 10 months postoperative. Other major reasons for failure were inappropriate length of tube insertion in the primary group and inflammation in the revision group.
Conclusion: Fatal complications which lead to failure may develop many months into the procedure, so long-term follow-up is necessary. The most common cause of failure was medial migration of the Jones tube; however, inappropriate tube insertion in primary surgery and severe inflammation in revision may also be concerns.

1. Introduction

Conjunctivodacryocystorhinostomy (CDCR) with Jones tube placement is the gold standard for complete or severe canalicular obstruction, and is performed as an additional procedure for failed canalicular surgery, unsuccessful dacryocystorhinostomy (DCR) and refractory lacrimal pump failure (Jones, 1965; Busse, 1982; Lamping and Levine, 1983; Zapala et al., 1992). There have been many reports on the long-term outcomes of CDCR. Aakalu et al. reported their sixteen-year experience using the Putterman-Gladstone (PG) tube during CDCR (Aakalu et al., 2012). However, most previous reports have investigated an external approach to CDCR. Trotter and Meyer reported that endoscopic CDCR appears to be more beneficial and reasonable even though the success rates of external and endoscopic CDCR were not significantly different (Trotter and Meyer, 2000). Lee et al. reported a 5-year study of 120 endoscopic endonasal CDCRs using medpor-coated tear drains (MCTD) in an Asian country (Seo and Lee, 2009).

Most of reports on CDCR have focused on primary surgery and the initial success rate. Park et al. first reported revision CDCR using endoscopy (Park et al., 2007). To the best of our knowledge, there are no studies on the long-term results of endoscopic endonasal CDCR for both primary and revision procedures. Therefore, the purpose of this study was to evaluate the efficacy of endoscopic endonasal CDCR in both primary and revision procedures by reporting our experience from the past 13 years.

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2. Patients and methods

This retrospective, cross-sectional, non-comparative study was conducted from March 2000 to February 2013 in the oculoplastic clinic at Korea University Hospital. The study was approved by the Institutional Review Board of Korea University Guro Hospital.

All study patients with tearing secondary to severe canalicular obstruction underwent endoscopic CDCR using the PG tube performed by a single surgeon (S.B.) and were followed for more than 6 months. The preoperative examination included lacrimal irrigation, probing of canaliculi, general ophthalmic evaluation and nasal cavity examination by endoscopy. Patients with lacrimal duct obstruction due to a tumor, bone deformity or sinusitis were excluded in this study.

Endoscopic CDCR was performed under general or local anesthesia based on the condition and age of the patient. The surgical technique of both the primary and revision procedure has been described in Park's report (Park et al., 2007).

Each patient visited the clinic every week for the first month postoperative, fortnightly during the second month, and at monthly intervals after that. Jones tube irrigation and endoscopic examination of the nasal cavity were performed at each visit to evaluate the patency of the lacrimal pathway and to detect possible postoperative complications.

When the patients had no epiphora and good patency of the tube throughout the postoperative period, the surgery was defined as a success. Occasional epiphora due to mucus plugging of the tube or reversible tube malfunction were also considered compatible with a successful operation.

Data were collected and patient characteristics including sex, age, diagnosis, operation time, success rate, cause of failure and postoperative complications were analyzed.

3. Results

In the primary group, 24 patients were male and 9 patients were female. In the revision group, 16 patients were male and 6 were female. The mean age of the primary and revision groups were 48.6 (range 23–77) and 46.6 (range 25–75) years, respectively. The most common cause of surgery was trauma (22 patients). In the revision cases, medial migration of the Jones tube was the most common reason for operation. The mean operation time was 26 (range 15–38) minutes in primary surgery and 24 (range 15–38) minutes in revision CDCR. The mean tube length inserted was 18.7 (range 15–24) mm in primary surgery and 19.2 (range 15–24) mm in revision procedures. Tubes 18 mm and 20 mm in length were most commonly used in primary CDCR. In revision procedures, the tube was changed in 20 cases (56%) and, among these, replaced with a longer one in 14 cases (70%). The success rate of primary CDCR was 87.9% at 6 months, 78.8% at one year and 63.6% two years after surgery. On the other hand, in revision CDCR, the success rate was 74.3% at 6 months, 71.4% at one year, and 60% two years after surgery. The mean follow-up period was 31 (range 6–93) months in primary surgery and 30 (range 6–73) months in revision cases.

In revision CDCR cases, 36 cases involving 22 patients were included. The mean number of revisions was 1.6 (range 1–5) and the average period to onset of failure after primary surgery was 10.1 months (range 3–40 months). The most common cause of failure in revision surgery was medial migration of the tube (5 cases) and severe inflammation, which resulted in obstruction of the conjunctival side of tube due to granuloma (4 cases) or conjunctival synechiae (3 cases) among other etiologies (Table 1).

Table 1
Patient demographics and characteristics.

	Primary CDCR	Revision CDCR
Patient (male/female)	33 (24/9)	22 (16/6)
Age (range) (years)	48.6 (23–77)	46.6 (25–75)
Cause of surgery	1st medial migration 2nd extrusion	1st medial migration 2nd severe inflammation (obstruction of the conjunctival side of the tube, such as a granuloma)
	3rd loss of tube 4th severe inflammation	3rd conjunctival synechiae 4th extrusion
Onset of failure (months)	Mean: 9.8; median: 13	Mean: 10.1; median: 6
Mean operation time (minutes)	26 (15–38)	24 (15–38)
Mean tube length (range) (mm)	18.7 (15–24)	19.2 (15–24)
Male (cases)	18.5 (18 mm: 5; 20 mm: 5)	Longer: 12; shorter: 4
Female (cases)	19.3 (18 mm: 3; 19 mm: 4)	Longer: 1; shorter: 3
Success rate (6/12/24 months) (%)	87.9/78.8/63.6	74.3/71.4/60.0
Male	87.5/79.2/62.5	73.1/69.2/61.5
Female	88.9/77.8/66.7	77.7/66.7/55.6
Follow up (range) (months)	21 (6–93)	20 (6–73)

CDCR: conjunctivodacryocystorhinostomy.

4. Discussion

In the present study, we evaluated the long-term outcomes of both primary and revision endoscopic CDCR. There were several notable patient characteristics. First, on the contrary to most previous reports, wherein the majority of the patients included were women (Trotter and Meyer, 2000; Lim et al., 2004; Wojno, 2010; Aakalu et al., 2012), men were predominant in our study, comprising 24 of 33 patients. We believe that this may reflect differences in the cause of canalicular obstruction. In western reports, the most common cause of disease was iatrogenic or infection. On the other hand, the most common cause in our study was trauma. Therefore, our study showed a distinct sex ratio, which may contribute to the differences in the results in our study, such as the success rate.

Although we did not compare the outcomes of external and endonasal approaches to CDCR, there are several advantages to endoscopic endonasal CDCR, as suggested by our previous experiences with external CDCR. Some reports have demonstrated the effectiveness of endonasal CDCR. Boboridis and Downes reported a 75% success rate for 16 cases (Boboridis and Downes, 2005); Park et al. reported a 78.6% success rate for 14 cases (Park et al., 2007) and Trotter and Mayer reported a 100% success rate for 7 cases (Trotter and Meyer, 2000). To the best of our knowledge, there is only one report that has compared the two techniques, which demonstrated some advantages of endonasal CDCR (Trotter and Meyer, 2000). First, the operation time was relatively short (endonasal vs. external: 59 vs. 74 min). Second, endonasal CDCR resulted in less bleeding in (endo vs. external: 3.5 vs. 4.4 ml) (Trotter and Meyer, 2000). However, the authors reported no significant difference in success between the two techniques. While this study was limited by a relatively small sample size and varying follow-up duration, it demonstrated the advantages of endonasal CDCR. In a previous report from 2007, the primary success rate of endonasal CDCR was 78.6% at 6 months postoperative and the mean operation time was 24 min (Park et al., 2007). In the present study, the primary success rate was 87.9% and the mean operation time was 26 min. The advantages of endonasal CDCR include a shorter operation times, less bleeding, more precise and direct