International Journal of Pediatric Otorhinolaryngology 74 (2010) 661–664

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: www.elsevier.com/locate/ijporl

Primary pediatric endonasal dacryocystorhinostomy—A review of 58 procedures

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ARTICLE INFO

Article history:
Received 4 January 2010
Received in revised form 3 March 2010
Accepted 8 March 2010
Available online 3 April 2010

Keywords:
Dacryocystorhinostomy
Lacrimal obstruction
Endoscopic
Pediatric surgery
Endoscopic

ABSTRACT

Objectives: The objectives of this study are to report the outcomes of pediatric patients with lacrimal system obstruction who underwent primary endoscopic dacryocystorhinostomy (EDCR).
Study design: The authors conducted a retrospective noncomparative case series.
Methods: The operative and postoperative data have been collected in 58 children aged between 3 months and 13 years (mean 4.1 years). The total of 58 primary EDCRs has been performed by two surgeons using a standardized surgical technique. The EDCRs were performed 52 times on one eye, 6 times on both eyes (3 times simultaneously, 3 times at the separate sitting with an interval of 4–6 months). The follow-up evaluations include taking history, clinical examinations including a fluorescein disappearance test.
Results: The follow-up interval ranged from 12 to 36 months (mean 17 months, median 15 months). The success rate was 51/58 (87.9%) in all 58 EDCRs. The success rate was 47/51 (92.2%) in the group of postsaccal obstructions, 3/5 (60.0%) in the group of postsaccal and suprasaccal obstrutions and 1/2 (50.0%) in presaccal obstructions. The procedures were successful in all eight children aged under 1 year old (100%) and in 14 of 15 children between 1 and 2 years old (93.3%). The silicone intubation was used in 54 EDCRs.
Conclusions: The endoscopic DCR is a safe and effective procedure for most children with the success rate comparable to that achieved in the external DCR and in adults. The success rate of the postsaccal obstructions is significantly higher than in presaccal or combined pre- and postsaccal obstructions.
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1. Introduction

Epiphora and recurrent dacryocystitis are characteristic symptoms of lacrimal outflow obstruction. The therapeutic approach in children differs from that used in adults. While the dacryocystorhinostomy (DCR) is the most common procedure in adults, the DCR is carried out less frequently in children [1]. It is because epiphora is usually cured with a conservative therapy in children.

There is a high rate of spontaneous relief of epiphora caused by the congenital nasolacrimal duct obstruction (CNDLO) within first 9–12 months of life [17]. A debate continues on the proper timing and procedures for treatment of CNDLO. The DCR is seldom needed in recalcitrant cases of a CNDLO resistant to massages, irrigation, imposibility to probe the nasolacrimalt duct and/or in some traumatic injuries of the lacrimal system and history of relapsing dacryocystitis in children under 1 year of age [1,3–11].

Refractory cases have been historically managed by external dacryocystorhinostomy (EXT-DCR). However, the endonasal approach has become a widely used procedure in the DCR in the last 30 years with the advent of microscope, rigid fiberoptic endoscope and the techniques for endonasal sinus surgery [1–4].

There are only limited reviews with respect to the external approach as well as the endonasal approach and these reviews mostly report on small series of endonasal endoscopic dacryocystorhinostomies (EDCRs) in children [4,5,9,10,12]. The success rate in endoscopic DCRs in adults is approximately 90%, and the success rate in the two largest series of pediatric patients is similar at 88% [6,11]. We report our experience with the pediatric EDCRs in 58 procedures.

2. Materials and methods

2.1. Study design

The aim of our study is to evaluate the success rate in the treatment of children with the primary endonasal endoscopic dacryocystorhinostomy (EDCR) that was performed due to the lacrimal system obstruction.

The children between 4 months and 13 years of age (mean 4.1 years) with the epiphora caused by a congenital nasolacrimal duct obstruction (CNDLO) were included in the study. Most children were treated unsuccessfully with probing and/or silicone intubation

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doi:10.1016/j.ijporl.2010.03.015

prior EDCRs. The EDCR was performed as the first surgical procedure in recalcitrant cases of CNDLO only if the probe could not be inserted inside the lacrimal system. Nevertheless, the procedure was also individually performed in presaccal obstructions (medial part of common canaliculus, obliteration of one canaliculus) and/or combined postsaccal and suprasaccal obstructions.

The study was carried out from 1996 to 2008 including a total 58 EDCRs (in 52 children).

2.2. Operative technique

The procedure is performed under general anaesthesia and under the direct visualization of the rigid fiberoptic endoscope coupled to a video camera and a display unit. The 4.0 mm endoscopic telescopes 30^0 with viewing angles are preferred because of their better illumination to the 2.7 mm endoscopes.

The child is positioned in the standard sinus surgical fashion. The vasoconstriction of nasal mucosa is achieved by applying pledges soaked with epinephrin 1:10 000 at least 10 min before the surgery, followed by a submucosal injection of 1% trimecaine containing epinephrine 1:100 000.

The procedure started with the excision of the mucosal flap. The mucous membrane lying in front of the head of the middle turbinate is incised, elevated and removed with the endonasal sinus surgery forceps. The bone medially and anteriorly to the sac is mostly removed with the help of a drill and/or chisel. After the lacrimal sac has been exposed, the Bowman probe is placed through the canaliculus into the sac. A vertical incision is then made with a sickle knife and the medial wall of the sac is removed or the mucosal flap of the lacrimal sac is placed posteriorly. The intranasal incision of scare tissues is performed with a sickle knife and/or a probe is passed transcanalicularly through this obstruction prior the tubing in children with the common canaliculus obstructions.

At the end of the procedure the silicone bicanalicular intubation is performed. The monocanalicular intubation is performed only if the bicanalicular intubation cannot be placed due to a canalicular obstruction. The nasal packing soaked with steroid ointment is used at the end of the procedure.

The nasal packing is removed 1 day after the surgery and the children are usually discharged from hospital. The nasal endoscopy under local anaesthesia with the debridement of the ostium had been performed till 2000, the results did not show any improvement and since 2001 no debridement has been postoperatively performed in children.

2.3. Follow-up

The patients were examined 1 week, 4 and 8 weeks after the surgery; thereafter, the children were examined 3–5 months and 1 year afterwards. The parents were recommended to keep the nose of their children wet with saline nasal sprays for 2 months. In the nasolacrimal duct obstruction, the silicone tubes were removed 3–5 months and in the suprasaccal obstructions in 6–8 months following the surgery. The tubes were remowed under local anaesthesia and the nasal examination with a flexible endoscopy was performed as well. The children were minimally followed-up for additional 12 months after the surgery.

The drainage function of the lacrimal system was assessed by a combination of the fluorescein dye disappearance test (FDT), taking history and clinical examination. However, the evaluation of the duct drainage function with the FDT was considered to be a major endpoint (FDT 0–1 = none or a thin fluorescing marginal tear strip persists in the conjunctival sac and the lacrimal drainage function is normal; FDT 2–3 = fluorescein persists in the conjunctival sac and the lacrimal drainage system is obstructed). FDT 0–1 was assessed as a good functional success and had to correspond with a complete resolution of previous symptoms leaving only the retention of occasional tears in the presence of a noxious or environmental stimuli such as wind.

For the statistical analysis of the primary EDCR success rates distributions in the groups, Fisher's exact test was used at the 5% level of significance.

3. Results

Six hundred and ninety primary EDCRs and 140 conjunctivo-dacryocystorhinostomies (CDCRs) were performed in adults and children for the relief of the lacrimal obstructions at our clinic from 1996 to 2008.

The primary EDCRs were performed 58 times in 52 children (27 boys and 25 girls) at the age ranging from 3 months to 13 years (mean 4.1 years). The EDCRs were performed 52 times on one eye (24 right, 28 left), 6 times on both eyes (3 times simultaneously, 3 times at the separate sitting with the interval of 4–6 months). The probing and/or silicone intubation was performed before undergoing EDCRs in 57 children.

The most common causes of the nasolacrimal obstructions were tenacious forms of CNDLO (Table 1). The history of the facial trauma was found in four children, two of whom had been bitten by a dog. Two children were with canalicular obstructions and five with the combined nasolacrimal duct and canalicular obstructions. The youngest child had a history of congenigal epiphora with the recurrent acute dacryocystitis and the EDCR was performed because we had not succeeded in inserting a probe into the nasolacrimal duct.

The length of the operative time ranged from 10 to 30 min. No serious complications were observed during the procedures and afterwards. The orbita opening and fat herniation were observed in 5 (8.6%) procedures without any postoperative clinical trouble. Small synechia between the lateral nasal wall and septum was postoperatively found out in three cases (5.2%).

The silicone intubations were carried out in 54 cases and they were not carried out only in four children in 1996 and 1997. Fifty-one intubations were bicanalicular and three monocanalicular ones. The tubes were retained for the intended period of 3–8 months in 49 patients (average 4.2 months), whereas the premature loss of the silicone tube occured in five patients (10 days after the surgery in one case and 4–6 weeks after the surgery in four cases).

The follow-up interval ranged from 12 to 36 months (mean follow-up 17 months, median 15 months). The success rate was 51/58 (87.9%) in all 58 pediatric EDCRs. The success rate was 47/51 (92.2%) in the group of postsaccal obstructions, 3/5 (60.0%) in the group of postsaccal and presaccal obstrutions and 1/2 (50.0%) in presaccal obstructions (Table 2). The procedures were successful in four children with the postsacccal obstructions treated without

Table 1
Primary pediatric EDCRs (1996–2008). Distribution of patients according to the location and etiology of the obstruction.

Procedure	Number	Obstruction localisation		
		POST	POST + PRE	PRE
Primary EDCR	58	51	5	2
Etiology				
Congenital (CNDLO)	48	48	–	–
Trauma	4	–	2	2
Iatrogenic	2	1	1	–
Idiopathic	3	2	1	–
Herpetic infection	1	–	1	–

POST: postsaccal (subsaccal) obstructions; POST + PRE: combined postsaccal and presaccal obstructions; PRE: presaccal (canalicular) obstructions.

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