Endoscopic DCR: How To Improve The Results

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Abstract Since Toti described the initial dacryocystorhinostomy (DCR) operation in 1904 many technical modifications have evolved (Becker in *Ophthalmic Surg* 19:419–427, 1988). Overall, three groups of procedures are currently practised; external DCR, endoscopic DCR with contact laser, and surgical endoscopic DCR without laser (Woog et al. in *Am J Ophthalmol* 116:1–10, 1993; Jokinen and Karja in *Arch Otolaryngol* 100:41–44, 1974). Many factors influence the outcome of these different approaches. The purpose of this study was to improve the long term surgical outcome in endonasal DCR. A retrospective analysis of more than 1,500 patients, who underwent primary endoscopic DCR, was done and specific small modifications were identified and applied in the next 108 cases showing an improvement in the results.

Keywords DCR · Endonasal · NLD

Introduction

Endoscopic DCR has gained a lot of attention among otolaryngologists since the outcomes are comparable to the external approach. Advances in surgical technique and a better understanding of the anatomy have resulted in improvement of outcomes.

Dacryocystorhinostomy (DCR) is a procedure performed to drain the lacrimal sac in cases of nasolacrimal duct obstruction or in chronic dacryocystitis [4]. It can be performed externally or endoscopically. Caldwell was the first to describe an endonasal approach to treat nasolacrimal duct obstruction (NLDO). The popularity of intranasal dacryocystorhinostomy (DCR) was limited throughout the twentieth century due to poor visualization of the surgical site [5]. With the advent of fibre optic endoscopes and rigid endoscopic techniques in the late 1980s and early 1990s, there has been renewed interest over the past decade in endoscopic DCR [6, 7]. Endoscopic DCR has many advantages over external DCR. The main advantages are avoidance of facial scarring, no division of the medial canthal ligament and the preservation of the pump action of the lacrimal sac of the orbicularis oculi muscle [8, 9]. Over the past 3 decades it has become common practice for surgeons to place stents or intubation tubes at the time of DCR.

Both otolaryngologist and ophthalmologist assess patients at a combined clinic and endoscopic technique for DCR was carried out. Assessment of the results made us analyse the main reasons in the cases which failed and changes were made in the technique. Owing to the encouraging results of the operation, it was decided that all symptomatic patients with lacrimal drainage obstruction would be treated by these modifications. Having adopted this approach for 6 years, we now present the results of surgical endoscopic DCR.

Materials and Methods

A prospective study of 109 consecutive patients who underwent primary endoscopic DCR at our hospital between March 2008 and May 2013 was done.

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Preoperatively, a thorough examination of the lacrimal system that included probing and sac syringing to establish patency of the lacrimal system was done by the ophthalmology department in all patients. Nasolacrimal duct obstruction was confirmed by syringing where resistance to saline flow and regurgitation from opposite punctum was seen. Besides a detailed clinical examination and routine blood investigations, all patients underwent a standard rigid nasal endoscopy. This procedure allowed septal deviation and any additional nasal or sinus pathologic conditions to be evaluated and corrected if required. We excluded any patient with evidence of canalicular obstruction, a lacrimal sac tumor, dacryolith, or traumatic obstruction. The procedure was performed in patients of chronic dacryocystitis or after resolution of acute inflammation. Informed consent was obtained after explaining the surgical procedure and its consequences to all patients. Retrospective data collected included the patient's age, sex, affected side, symptoms, operative experience, and follow-up results.

Majority of the patients were operated under local anesthesia. Only young patients mainly below 18 years were operated under general anesthesia. The surgical technique used in this study has been extensively described by Wormald [10].

Surgery was carried out by 0° endoscope, (unless the sac was very laterally placed, when we used a 30° scope). Mucosal flap was raised over the frontal process of maxilla after local infiltration with 2 % lidocaine and 1:200,000 adrenaline. Bone was removed with Kerrisons straight and curved punches to expose the lacrimal sac. Bigger sized punch was used and after taking the first bite realise to confirm that there is no sac in the bite. Adequate bone was removed till we were able to see the opening of common canaliculi. In the presence of prominent agar nasi cell, it is essential to remove them.

Medial wall of the sac was incised with keratome, which was easy of manoeuvre. The initial incision was above the attachment of uncinat process. The medial wall of the sac was partially removed and marsupialised or completely removed. If the sac could not be opened completely then removal of the uncinat process was very helpful.

Syringing confirmed the patency of the rhinostomy. The use of endo-illuminator was useful in location the sac in revision cases and we used Mitomycin C in such cases for syringing and also intranasal packing was done with gel foam soaked with Mitomycin C for 24 h.

Stents were put in cases with canalicular obstruction specially in cases which were not successful. Pre-packaged sets consisting of sialastic stents were passed through the upper and lower punctum and pulled through the rhinostome opening and syringed with Mitomycin C.

The nasal cavity was packed with ointment gauze or with gel foam. All patients were discharged the following

day on oral decongestants, oral antibiotics and antibiotic eye drops.

In cases of atrophic rhinitis we used placentex around the wound and care should be taken that Mitomycin C is never used. Also alkaline nasal douche should be done for 6 months.

Follow-up examinations were scheduled for 1 week, 1 month, 3 months, 6 months and 1 year after surgery. At each visit we asked the patients to grade their complaints according to the following scale: grade 0, no epiphora and complete resolution of tearing; grade 1, minimal epiphora but not troublesome to the patient; grade 2, moderate epiphora but still troublesome to the patient; and grade 3, severe epiphora and no improvement. Size of the ostium was assessed by endoscopic visualization. The procedure was considered successful if the patient had grade 0 or grade 1 epiphora and complete patency of the lacrimal drainage system confirmed by irrigation at the final visit.

Results

This is a study comparing the outcome of our cases with the outcome of our cases done earlier. Of the 108 operated patients majority were females 74.07 % (80/108) as against 25.93 % male patients (28/108). The mean age was 47.66 (Age range was 16–78 years). Both eyes were almost equally affected. Left eye was affected in 56 patients compared to 52 of the right eye. Eleven patient had bilateral symptoms of which one eye was operated at a time. Out of all the patients, 101 (93.52 %) showed complete recovery of symptoms (epiphora grading 0–1) at minimum six months follow up. Patency was assessed by syringing showing higher rate of success as compared to patients done earlier (93.52:82.30 %).

Intraoperative complications were seen in 14 patients in the form of excessive hemorrhage during surgery in 7 patients and orbital fat exposure in 2 patients respectively. Failure was most commonly due to synache formation or stoma closure. All patients were followed up at least up to 6 months.

Discussion

Dacryocystorhinostomy (DCR) is a procedure performed to drain the lacrimal sac in cases of nasolacrimal duct obstruction or in chronic dacryocystitis [1]. The main purpose of treatment is to eliminate the obstruction and to accomplish normal tear flow. Overall three groups of procedures are currently practiced, external DCR, endonasal DCR with stents and endonasal DCR without stents. Controversies exist regarding the gold standard method of

treatment for chronic dacryocystitis. Techniques such as probing, silicone intubation, and balloon dacryocystoplasty have also been used to recanalize the occluded nasolacrimal duct. The success rate of these methods at long-term follow-up was approximately 50 % or less [11–15].

Endonasal DCR is a commonly performed operation in which a fistulous tract is created between the lacrimal tract and the nasal cavity [9]. It has been assumed and propagated that various modifications increase the success rate of the procedure by maintaining the patency of the fistula during the post operative healing period. Silicone intubation simultaneous with DCR was first described by Gibbs [16].

Our criteria for success did not include qualified or partial success, as described in previous studies 1. We did not consider mild improvement in tearing as success, because patients were still bothered by tearing. Comparing published success rates of lacrimal surgery is a difficult task because different studies use different criteria [16]. Guidelines published by the Royal College of Ophthalmologists suggest that lack of tearing 3 months after surgery is a good indicator of successful surgery [16]. Therefore, we have used these guidelines for patients with at least 4 months' follow-up time postoperatively. These reasons show similar to previously reported studies (up to 95 %) [17–19]. Many investigators advocate monitoring the rhinostomy using postoperative endoscopy [20–22]. Dye application to the conjunctival fornix during endoscopy and visualization of the dye at the osteotomy (functional endoscopic dye test) site have been shown to be useful in assessing rhinostomy patency [23].

In our study chronic dacryocystitis was found to be significantly more common in women than men. Sing et al. [24] and Naik et al. [25] also reported similar higher incidences of dacryocystitis in females. Chronic dacryocystitis has been reported to be more common in females of lower socioeconomic group due to bad personal habits, long duration of exposure to smoke in kitchen and dust exposure. Congenital and anatomical narrowing of the NLDO in females may also contribute to the higher incidence among women [25].

Conclusion

In conclusion we would like to suggest few points to all the surgeons doing endoscopic DCR to improve their results. These include:

- a) Adequate bone removal using a bigger punch.
- b) Doing an uncinectomy if exposure is not complete.
- c) Prominent agar nasi should be removed.

- d) Incision should be above the attachment of uncinat process and using a keratome is very useful.
- e) In revision cases Mitomycin C should be used to irrigate and pack the nose. Resistant cases may need stenting of the cannaliculi.
- f) Placentrex to be used around the wound in cases of Atrophic rhinitis. Mitomycin should never be used in these cases.
- g) Meticulous follow up for at least 6 months is mandatory.

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