Analysis of 104 Cases of Endonasal Dacryocystorhinostomy in a Tertiary Care Hospital: A Prospective Study

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Abstract To evaluate the results of endoscopic endonasal dacryocystorhinostomy performed in a tertiary care hospital. Prospective, nonrandomized, interventional clinical study. A prospective interventional study was performed on 104 patients presenting with epiphora between January 2006 and January 2010. All patients were operated by one surgeon. Out of 104 cases, 08 cases were of revision endonasal dacryocystorhinostomy (DCR). Bicanalicular silicon intubation was performed in all cases of revision endonasal DCR. Twelve patients had concomitant sinonasal disease for which septoplasty or FESS was done. The patency of nasolacrimal duct was assessed by doing syringing of lacrimal passage weekly for 1 month, monthly for 3 month, then at 6 month and 1 year. Out of 104 patients 10 patients lost follow up after surgery. Ninety four patients were followed for 1 year. On syringing, rhinostomy site was found patent in 80 patients (85.10 %), therefore they were fully satisfied. In 6 cases (6.38 %) minimal block was seen with clear fluid regurgitation, were to some extent symptomatically relieved and were found to be satisfied, whereas in 08 cases (8.51 %) syringing showed complete block. They required further management. Success rate of our study is comparable to other studies on endonasal DCR as well as external DCR, with advantages of less intra-operative bleeding, shorter operative time, better cosmesis, preservation of lacrimal pump mechanism. Other nasal pathology can be treated at the

same time. Our results are clinically as well as statistically highly significant (P value < 0.0001).

Keywords Endonasal dacryocystorhinostomy · Epiphora · Nasolacrimal duct obstruction · Silicon intubation

Introduction

The nasolacrimal duct obstruction is the commonest cause of epiphora. It commonly arises from proximal obstruction in the drainage system at the punctum, upper or lower canaliculi, common canaliculus or nasolacrimal duct. In majority of cases the cause of obstruction is unknown. Such idiopathic obstruction becomes more common with increasing age and shows a female preponderance. Other less common causes include surgical trauma, midface fractures, malignancy and granulomatous conditions such as Wegener's granulomatosis and sarcoidosis [1].

Many surgeries have been advocated for this melody starting from dacryocystectomy to dacryocystorhinostomy (DCR). Still the DCR is most accepted procedure today. It can be done with external as well as endonasal route. In India the endonasal endoscopic DCR is mainly done by ENT surgeons because they are well versed with the technique of endoscopic sinus surgery so they can apply the same technique for lacrimal sac surgery. The intranasal technique for endoscopic DCR was described by West in 1910 but could not gain popularity because of limited visualization and poor exposure of the sac in narrow nasal cavity. The advent of newer endoscopes with camera and monitor unit has revolutionised the technique of endoscopic DCR. In 1989 MC Donogh and Meiring did first endoscopic endonasal DCR.

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Materials and Methods

The present prospective study was done on 104 patients with acquired nasolacrimal duct obstruction treated between January 2006 and January 2010 by conventional endoscopic endonasal DCR. Patients presenting with epiphora were assessed carefully. Diagnosis of dacryocystitis was made by doing regurgitation test and lacrimal sac syringing. Preoperative nasal endoscopy was done in all cases to see the accessibility of site of operation and to know any other coexisting nasal pathology which can be treated simultaneously.

Dacryocystography was done in all cases and those having good lacrimal sac outline with obstruction in nasolacrimal duct were selected for the study.

Most of cases were operated under local anesthesia. In children and uncooperative patients general anesthesia was used. The nasal cavity was packed with the ribbon gauge soaked in xylocaine 4 % with 1:100,000 adrenaline, 15 min before the procedure. With the help of 0° nasal endoscope, mucosa of lateral wall of nose, anterior to uncinat process and anterior part of middle turbinate was infiltrated with 2 % xylocaine with 1:200,000 adrenaline.

A semilunar incision was made in lateral wall with the sickle knife starting from upper attachment of middle turbinate, extended downwards and inferiorly up to insertion of inferior turbinate. The mucosal flap was raised and reflected backward with freer septal elevator. Frontal process of maxilla and lacrimal crest were identified. With the help of 2 mm Kerrison punch thick bone of lacrimal crest was removed. In few cases 1.2 mm cutting burr was used to remove thick bone. Lacrimal sac was exposed completely. Thin lacrimal bone was removed with Freer's elevator. Syringing was done to inflate the sac.

A half rectangle □ shaped incision was made in medial wall of sac using keratome. A flap of medial wall of sac created and reflected posteriorly and cut with thru-cut forceps or scissors and an opening of about 15 × 10 mm made in medial wall of sac. Upper part of nasal mucosal flap was trimmed for exposure of sac while lower part was repositioned back on raw bone. Syringing with normal saline solution was done 3–4 times after incision in sac for full lacrimal wash. The average time taken for surgery was 25–30 min, it tooks slightly longer when septoplasty or FESS was done simultaneously.

Bicanalicular silicone intubation was performed in 08 cases of revision surgery. 24–26 gauge probe along with 30 cm long silicon tube was used. The probes were passed through the upper and lower canaliculi and through lacrimal window into nasal cavity. The two ends of the tube were then tied together and sutured with 6–0 prolene suture. The stent was removed 6–8 weeks after the surgery depending upon the patients comfort level.

Postoperatively oral antibiotic was given for 1 week along with nasal decongestant and saline nasal spray four to five times a day to prevent crusting. Antibiotic eye drops were advised four times a day for 3–4 weeks. Patient were followed for endoscopic removal of crusts and to check the patency of new stoma by syringing weekly for 1 month then monthly for 3 months and then at 6 months and 1 year (see Fig. 1).

Observation and Results

Most of patients were in 20–40 years of age group (Bar Chart), female (72) were more commonly affected than male (32) (Pie Chart), 44 patients were presented with persistent watering from affected eye, 34 patients with mucopurulent regurgitation from sac, 18 with mucocele and 8 patients with pyocle and fistula formation (Table 1).

Endoscopic septoplasty was performed in 06 cases for high anterior deviated nasal septum. In 04 cases turbinoplasty was done for concha bullosa. Excessive enlarged agger nasi cells were found in 02 cases which cleared endoscopically (see Fig. 2).

Patients were followed for 12 months after surgery by sac syringing and symptomatology of the patients. The patients having patent sac were found to be fully satisfied (85.10 %), while patients having partial block and clear fluid regurgitation were symptomatically relieved and were also found to be satisfied (06.38 %). Patients with mucoid regurgitation or complete block were not relieved of their symptoms and needed further intervention (8.51 %) (Table 2). No fistulectomy was performed for lacrimal

Fig. 1 Age distribution

Table 1 Clinical features of chronic dacryocystitis

S. no.	Clinical features	No. of cases
01	Persistent watering	44
02	Mucopurulent regurgitation from sac	34
03	Swelling in sac area (mucocele)	18
04	Pyocele with lacrimal fistula	08
	Total	104

Fig. 2 Sex distribution

fistula. All lacrimal fistulas except one were closed spontaneously after endonasal DCR.

Scarring and fibrosis of osteum was noted in 08 cases. Synechia formation occurred in 07 cases, tackled endoscopically in OPD during follow up visit. Granulation formation at the osteum with narrowing occurred in 06 cases, which removed endoscopically. In one case common canalicular duct block was found. Patient was referred for canaliculoplasty. In one case orbital fat prolapse occurs when excessive enlarged agger nasi cells cleared but case was managed without complications.

Silicon stents were used only in 08 revision cases, the stent removed 6–8 weeks after the surgery, syringing was done. It was free in all cases.

Discussion

The aim of our study was to evaluate the results of endoscopic dacryocystorhinostomy performed to treat nasolacrimal duct obstruction. Refinement in technique and instrumentation coupled with an improved understanding of the endoscopic surgical anatomy are largely responsible for the excellent success rate now reported, paralleling those reported with conventional external techniques. Successful endoscopic DCR appears to be dependent on several important factors, (1) a thorough understanding of the endoscopic anatomy and location of the lacrimal sac, (2) complete removal of the frontal process of the maxilla to expose the medial wall of lacrimal sac and (3) precise opening of the lacrimal sac to achieve adequate exposure of the common internal punctum [2].

The endoscopic approach not only avoids an external incision but also enhances the surgeon's ability to identify and correct common intranasal causes of DCR failure, including adhesions, an enlarged middle turbinate and ethmoid sinus diseases [3].

The Tsirbas and Wormald [4] technique emphasizes the creation and preservation of mucosal flaps with primary juxtaposition of mucosal edges, the goal being healing by primary intention. Conventionally in endonasal DCR, the lateral nasal wall mucosa is removed completely to expose the underlying lacrimal fossa, then medial lacrimal sac is either incised alone or excised completely to create a rhinostomy site. In our study we preserved the nasal mucosal flap, excise its upper part only to expose the sac while lower small part is repositioned back to cover raw bone. Healing occurred by primary intension.

The benefits of stenting of the rhinostomy site in endonasal DCR remain unclear [5]. We did stenting only in revision cases. No stenting was done in new cases as this add additional cast of stent as well as it also increase the chance of surgical failure by inducing the formation of granulation tissue at rhinostomy site [6, 7].

External lacrimal fistula were present in eight patients, we did not performed fistulectomy in these patients. Fistula were closed spontaneously in all patients after endonasal DCR surgery except one who had traumatic fistula.

Concomitant septoplasty was performed in patients with anterior deviated nasal septum for proper exposure of

Table 2 Results of endonasal DCR after 1 Year (N = 94)

S. no.	No. of patients	Percentage (%)	Syringing	Symptomatic outcome
1	80	85.10	Patent	Completely satisfied
2	6	6.38	Partial block with clear fluid regurgitation	Symptomatically relieved therefore satisfied
3	8	8.51	Complete block	Not satisfied

(χ^2 value 169)
(P value < 0.0001)

operative site. Excessive enlarged agger nasi cells five were found in 02 cases which removed before the procedure. Concha bullosa was found in 04 cases which were treated by turbinoplasty. Tsirbas and Wormald [4] performed 13 septoplasty and 10 FESS surgery for 44 endonasal DCR.

Endoscopy dacryocystorhinostomy has many advantages over external approach. The reported success rates of endonasal DCR vary from 54 to 96 % [8, 9] and in general are lower than that of external approach performed by many ophthalmologists [10]. The differences in the rate may be related to lack of sutured apposition of the nasal and lacrimal sac mucosa, and the smaller bony ostium as compared with external dacryocystorhinostomy [11].

In our study success rate of endonasal DCR was 85.10 % after 1 year follow up which is comparable to those Tsirbas and Wormald [4] with functional success rate of 89 %.

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