Primary Endonasal DCR Without Stent: Our Experience and Case Series Analysis

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Abstract Endonasal dacryocystorhinostomy is widely accepted and effective treatment option for nasolacrimal duct obstruction. It can be done with or without the use of stents. This study was carried out to evaluate the results of endonasal DCR surgery and to access efficacy of this procedure without stenting. This is a prospective clinical study conducted in Departments of ENT and Ophthalmology, L.N. Medical College and J.K. Hospital, Bhopal from October 2008 to April 2012. A total of 90 patients with epiphora as evidenced by nasolacrimal duct blockage on syringing were included in the study. These patients underwent endoscopic DCR without stenting. The cases were followed up to 18 months postoperative. Surgical success was defined as anatomical patency and symptomatic relief at the end of the follow up period. Failure was defined as no symptomatic relief, and/or acute dacryocystitis, and/or non patent lacrimal drainage system. Surgical success was observed in 80 of 90 (88.89 %) patients. Incidence of complication was low as only 6 patients had minor complication of bleeding, synechie and granulation tissue formation. It was concluded that high success rates could be achieved in case of nasolacrimal duct obstruction by endoscopic DCR. Thus, we can minimize complications, discomfort, the cost of stenting and follow up visits after endonasal DCR surgery.

Keywords Endonasal DCR · Nasolacrimal duct obstruction · Silicon stent

Abbreviations

DCR Dacrocystorhinostomy,
NLD Nasolacrimal duct
NLDO Nasolacrimal duct obstruction

Introduction

Dacryocystorhinostomy (DCR) is considered the standard treatment due to chronic nasolacrimal duct obstruction. External DCR was first as described long back by Toti [1, 2] more than a century ago. The endonasal approach was first introduced in 1983 by Caldwell [3]. However, it did not gain much interest due to poor access to nasal cavity those days owing to non-availability of nasal endoscopes. But with the advent of nasal endoscopes [4] and functional endoscopic sinus surgery [5], endonasal DCR gained popularity in early 1990s. Mc Donough et al. [6] introduced endonasal DCR in its present form and during the last two decades results have been similar to external approach with reduce morbidity.

Though endoscopic dacryocystorhinostomy (endoDCR) has many merits over the conventional external dacryocystorhinostomy like less operative time and minimal bleeding, the major advantages are maintenance of lachrymal pump mechanism, absence of scar on skin and possibility to correct associated intranasal pathology during the same procedure [7, 8].

Some surgeon advocate the use of a silicone stent (sometimes referred as “intubation”), which is placed as a

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loop in the inferior and superior canaliculi and lacrimal sac which ends tied together in the middle meatus [9]. The stent is left in situ from 2 week to 3 months to maintain the patency of ostium between lacrimal sac and middle meatus and also sometimes, to correct pre-saccal or canaliculi stenosis. However many have questioned about use of stent. Allen and Berlin [10], reported a higher failure rate using silicone tubing and suggested the presence of granulations in associated with silicon intubation as the reason for it. Other possible complication of stenting includes punctual/corneal erosion and slitting of the canaliculi. Purpose of the current study was to evaluate the functional and anatomic success of primary endonasal DCR without stenting.

Materials and Methods

We performed a clinical prospective study of 90 patients with diagnosis of nasolacrimal duct obstruction admitted at J.K. Hospital and L.N. Medical College, Bhopal, India from October, 2008 to April, 2012. All patients underwent a complete intranasal examination by an ENT specialist and detailed ophthalmic examination by ophthalmologist along with syringing of nasolacrimal passage. Patient was excluded if epiphora was due to ectropion or canalicular obstruction. Also, children less than 6 years, revision cases, gross systemic problems were excluded.

Local anaesthesia with sedation was preferred for performing the procedure except in children and uncooperative/anxious adult patients. Topical xylocaine 4 % with adrenaline (1:30,000) in form of neurosurgical patties was kept in the nose/middle meatus area for 10 min. This was followed by injecting local anesthesia (2 % xylocaine in 1:200,000 adrenaline) in the nasal mucosa around the area of the lacrimal sac on the lateral nasal wall. C-shaped incision was made with an insulated sickle knife 1–1.5 cms anterior to the middle turbinate using the monopolar diathermy. C shaped mucosal flap, based posteriorly, was elevated gently using a suction elevator. Kerrison's punch forceps [11] was used to nibble the frontal process of maxilla in thin lacrimal bone when it could be engaged or by diamond drill burr for complete bone removal, if needed, in remaining cases leading to exposure of the medial sac wall. The entire lacrimal sac must be exposed completely and care must be taken not to remove excess bone especially superiorly. After lacrimal probing to tent the medial wall of sac, posterior vertical incision of the sac wall was performed with keratome followed by the removal of medial wall of sac with endoscopic DCR scissors. The free flow and patency was confirmed by syringing on table. Stents were not used in the procedure and a light nasal packing was left for next 24 h.

Postoperative Care

Oral antibiotics, topical anti-inflammatory eye drops and regular isotonic saline douching three times a day were administered in the post-operative week followed by nasal saline spray for 6 weeks to reduce crusting around the surgical site. Patients were hospitalized for only 1 day. Patients were followed on OPD basis at 1 week for debridement of fibrinous exudates from around the operative site, and then at 1, 3, 6, 12 and 18 months.

Although complete epithelization of the rhinostomy wound occurs within 2 month of DCR surgery, still the final diameter of the rhinostomy is considered stable only at 8–12 months. Success was defined as subsidence of any post-operative epiphora episodes. Failure was defined as any of the following:

1. No symptomatic relief in epiphora.
2. Acute dacryocystitis in the post-operative period.
3. Blockage of lacrimal passage with regurgitation of clear or mucoid fluid on syringing.

To find out the cause of failure, postoperative nasal endoscopy was performed. The patients with scar formation at osteotomy site were managed by surgical endoscopic revision (at a later date).

Results

A total of 90 patients {mean age 54.3 years, range 6–65 years} were included in this study. Out of these, 19 (21 %) were males and 71 (79 %) females. All the patients had unilateral NLD blockage and underwent endoscopic DCR surgery. Anatomical patency was achieved in 84 out of 90 (93.33 %) patients, while maintenance of anatomical patency along with symptom relief (12–18 month post-op) could be achieved in 80 of 90 (88.88 %) patients (Table 1).

The incidence of complications was low. 6 (6.66 %) out of 90 had complications. Two patients had nasal bleeding on first postoperative day for which they were treated conservatively by light nasal packing for 48 h. Two patients had nasal synechia formation, which were removed on OPD basis endoscopically. Another two had granulation tissue formation at ostium which could be removed easily on OPD basis. There was no documented orbital and subcutaneous emphysema, conjunctival fistula formation, retrobulbar haemorrhage, medical check ligament injury, medial rectus paresis or orbital fat herniation.

Five out of 90 (5.55 %) patients required additional surgical procedures; septoplasty in 2 patients, uncinectomy in 2 and chonca bullosa resection in 1 patient was done concomitantly with endonasal DCR surgery.

Table 1 Summary of the result

Surgical result	Endonasal DCR without stent
Anatomical patency	84/90 (93.33 %)
Anatomical patency and symptom relief	80/90 (88.88 %)

Discussion

The current prospective study included 90 patient presenting with epiphora due to NLD obstruction, who were operated for endonasal DCR during the study period of 3 ½ year from October, 2008 to April, 2012. Overall results were found to be satisfactory without stent (88.88 % success rate). It would be pertinent here to discuss and compare the positive and negative aspects of the endonasal approach along with the experience of other investigators. Avoiding stent allowed not only to cut down the cost of the procedure but also minimized the distress and required follow up visits by the patient from distant rural areas. Another important benefit of endonasal approach was feasibility of dealing with any other intranasal pathology simultaneously like septoplasty, uncinectomy or removal of choncha bullosa, if needed in the individual case.

The first study evaluated in the case series analysis is done by Martimore et al. [23]. He did endoscopic DCR without stent and reported a success rate of 87 %. His study included a small number of patients and the average duration of follow up is 7.6 months. This was followed by many authors reporting their experience which were not included due to lack of randomization or non-availability of data on duration of stenting and follow up.

In recent years number of authors have described Endoscopic DCR without silicon stenting [12]. Though Smirnov [13, 14] in his initial study mentioned a higher

success rate with stenting, he subsequently corrected his own observations after 2 years and demonstrated that silicone stenting is unnecessary as his success rate with or without silicone tube was 78 and 100 % respectively. Unlu et al. [15] further had similar results (84.2 % with stenting and 94.7 % without stenting). Some authors have even advocated that stenting should never be done in primary endonasal DCR, in fact it should be avoided in revision cases as well, unless there is associated canalicular stenosis [16]. Our experience matches that of these investigators.

Higher success rate has been in patients where silicon stent was used both by Al Qahtani and Shah. However, both the authors have stated that the statistical difference is not found to be significant between the two groups. Rate of success was found higher by Naik and Kakkar in patients without stenting. All studies included in case series, are tabulated in below (Table 2). The study by Pittmore et al. [25], describes success rate of 94 % without the use of stents and the duration of follow-up is longest amongst all studies (37 months)

Failure in Endoscopic DCR surgery i.e. closure of ostium may result from bone or membrane formation or adhesion between middle turbinate and ostium. Silicone stenting has been traditionally used by many surgeons to preempt this problem by preventing stenosis and maintaining patency during the healing phase. However, this practice is controversial as prolonged presence of stent can lead to tube prolapse or overproduction of granulation tissue, which can increase the probability of failure. Whether this is caused by the stent itself due to reaction with silicon or due to the mechanical effect of friction at this site is unknown. Other possible complications due to tight silicone tubing include bleeding from nasal cavity, corneal abrasion, orbital injury, CSF leakage through the fractured ethmoid, canalicular erosion and lacrimal pump syndrome etc. These points argue for need for further

Table 2 Tabulation of studies

S. no.	Study name	No. of patients	Follow up duration	Stent duration	Success rate (%) (With stent)	Success rate (%) (Without stent)
1	Martimore et al. [23]	15	7.6 months	–	–	87
2	Smirnov et al. [13]	42	4 months	Not specified	89	75
3	Smirnov et al. [14]	42	6 months	8 weeks	78	100
4	Unlu et al. [15]	36	10 months	8 weeks	84.2	94.70
5	Vikas Kakker et al. [24]	40	10 weeks	6 weeks	85	90
6	Pittore et al. [25]	64	37 months	–	–	94.3
7	Al Qahtani et al. [26]	173	12 months	Not specified	94.00	91.00
8	Naik et al. [27]	238	6 months	6 weeks	92.00	94.00
9	Shah et al. [28]	129	28 weeks	21 weeks	93.30	92.30
10	Present study (2015)	60	18 months	–	–	88.80

research and investigation to clearly establish the efficacy of stenting in endoscopic DCR.

We could demonstrate a high surgical success rate without using other post-op preventive procedures like use of antimetabolites like mitomycin C [17] or marsupialization of the sac on the lateral nasal wall [18–20] which have been incorporated by other investigators. Four out of 90 patients in our study had no symptomatic relief despite achieving anatomical patency. Such discrepancy of functional and anatomical outcome has been discussed by Geoff Rose et al. [21, 22] actually epiphora can results from either overproduction of tear or from derangement in the outflow tract.

Conclusion

Endoscopic DCR is a safe and effective method of surgical treatment of nasolacrimal duct obstruction. It is not needed to stent the opening surgically created between the lacrimal sac and the nasal cavity. Case series analysis also does not suggest a favorable outcome with placement of a silicon stent as opposed to non placement of stent.

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Conflict of interest None

Ethical standard All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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