Double Posterior Based Flap Technique in Primary Endoscopic Dacrocystorhinostomy with and without use of Lacrimal Stent

Pradeep Pradhan¹*, Swagatika Samal², Priti Lal¹ and VP Venkatachalam¹

¹Department of Otolaryngology, I.P University, India
²Department of Pathology, Medical University Rohtak, India

Abstract

Objective: To demonstrate the double posterior based flap technique in primary endoscopic dacrocystorhinostomy and to compare the long-term surgical outcomes between patients with and without use of lacrimal stent in chronic nasolacrimal duct obstruction.

Material method: Total 28 patients with chronic nasolacrimal duct obstruction were included in the study from September 2012 to August 2014. All patients underwent Endoscopic dacrocystorhinostomy with posterior based double lacrimal and mucosal flap technique. In 14 patients lacrimal stents were put for 2 weeks, and in rest 14 patients were operated without using the stent. Patients were evaluated 1 month, 3 months and 1 year after the surgery to check the lacrimal patency and to look for the complications associated with the procedure.

Results: Out of 28 cases, recurrences of symptoms were noted in 2 (7.14%) cases, 1 (7.14%) from stenting group and 1 (7.14%) from non stenting group at the end one month and 3 months. At the end of 1 year, only 24 patients attended the outpatient clinic (11 from non stenting group and 13 from stenting group) and of them 1 (9.09%) from non stenting group and 2 (15.38%) from stenting group had recurrence of symptoms. The success rate of procedure in non stent group was 90.91% as compared to the stent group which was 84.62% at the end of 1 year. None of the patients in both groups had any major intraoperative or postoperative complications.

Conclusion: Double posterior based mucosal and lacrimal flap technique in Primary EDCR is an effective surgical technique associated with satisfactory outcome. No significant difference in the results and complications were noted between non stenting group and stenting group.

ABBREVIATIONS

NLD: Nasolacrimal Duct; DCR: Dacrocystorhinostomy

INTRODUCTION

Dacrocystorhinostomy (DCR) is a surgical procedure commonly performed for the relief of epiphora due to chronic dacryocystitis resulting from lacrimal sac or nasolacrimal duct (NLD) obstruction. Conventionally, ophthalmologists practice through an external approach for the relief of symptoms, associated with satisfactory results [1]. This procedure, however, is not free from complications, facial scarring and disruption of the canthal ligaments are the major complications leading to decrease in patient compliance for the procedure. Though the initial descriptions of an intranasal approach started to appear about a century ago, but the first modern endoscopic endonasal procedure was described by Mc Donogh and Miering in 1989 [2]. In recent years, endoscopic DCR is the preferred approach in most cases for NLD obstruction. Multiple approaches to the sac and several technique modifications have been described in the past decade for endoscopic dacrocystorhinostomy. The use of silicon stents and peristomal injection of antimetabolites, use of nasal and lacrimal flaps for reconstruction of stoma are some of the modifications expecting to decrease the stomal stenosis to improve the success rate of the procedure [3-5].

In our study, we have taken 28 primary cases of epiphora
undergoing endoscopic DCR using double posterior based flap technique. In 14 patients, silicon lacrimal stents were put intraoperatively and the remaining 14 were managed without stenting. The scope of this report is to demonstrate the surgical technique and to compare the results and complications obtained between the stent and non stent group undergoing primary endoscopic DCR.

**MATERIALS AND METHODS**

This is a prospective study conducted in a tertiary care referral hospital from September 2012 to August 2014. Total of 28 patients with chronic nasolacrimal duct obstruction were included in the study. The preoperative ophthalmological consultation for probing of the lacrimal pathway and a lacrimal irrigation examination was done in each case to assess the anatomical site of blocking. All patients were subjected for routine diagnostic nasal endoscopy to rule out local nasal pathology prior to posting for surgery. Patients with canalicular or common canalicular obstruction (pre-saccal stenosis) were excluded. 14 patients were operated without the use of silicon lacrimal stents (group A) and in rest 14 patients (group B) stents were applied intraoperatively and were kept for 2 weeks.

**Operative technique**

All patients were operated under local anesthesia. Informed written consent was taken from each patient prior to surgery. Patients were premedicated with intramuscular injection of analgesic (pethidine 50mg) and sedatives (phenorgan 25mg). Decongestion of the nasal mucosa was achieved with pledgets (soaked in xylometazoline hydrochloride 0.1% + 4% lidocaine), placed in the area anterior to the middle turbinate. 2 ml of 2% xylocaine with adrenaline (1:100,000) was infiltrated over the lateral wall anterior to middle turbinate and over the axilla of the middle turbinate. Regional nasal pathologies associated with difficult access to lacrimal sac, such as deviations, spurs or concha bullosa, when present were corrected first and patients with concomitant chronic rhinosinusitis or nasal polyposis were operated prior to endoscopic DCR.

A horizontal incision was given 8-10 mm above the axilla of the middle turbinate extended 1 cm anteriorly over the frontal process of maxilla. Another horizontal incision was given starting from uncinate process to frontal process of maxilla parallel to the first incision at the level of midpoint of the vertical height of the middle turbinate. Both the incisions were joined anteriorly by a vertical incision.

The mucosal flap is elevated with Freer’s elevator. Frontal process of maxilla, lacrimal bone, uncinate process and agar nasi cell were identified. Frontal process and lacrimal bones were removed with bone punch and circular knife respectively. Anterior thick frontal bone is removed with Smith-Kerrison punch forceps and the lacrimal sac was completely exposed (Figure 1). After exposure of the lacrimal sac, the medial sac wall was put in tension by a metallic probe inserted through the inferior canaliculus. Vertical incision was made along the anterior third of the tented sac wall to ensure the largest possible posterior flap. The sickle knife is used to make the inferior and superior releasing incision on the posterior lacrimal flaps. The lacrimal flap was then trimmed with the pediatric through biting forceps. The elevated mucosal is also trimmed so that both the flaps get approximated closely to each other over the lateral nasal wall (Figure 2). As a final step, the patency of the lacrimal pathway was checked with several saline irrigations. Silastic nasal tubing was placed passing through both the punctum and secured in the nasal cavity and the flaps are secured with gel foams (Figure 3). Nasal packing was performed only in cases of associated sinus surgery or septoplasties. Patients were placed on broad spectrum antibiotics for one week and antibiotic eye drop for 3 weeks. Lacrimal stents are removed after 2 weeks and nasolacrimal patency was checked by putting saline in the conjunctiva and monitoring the flow under endoscopic visualization. Patients were subsequently allowed to visit the outpatient clinic at 1 month, 3 months to assess the nasal patency and for the debridement of nasal crust. Final evaluation for results and complications were documented at the end of 1 year.

Figure 1 Showing exposure of right lacrimal sac after removing the maxillary process by Smith-Kerrison punch forceps.

Figure 2 Showed double posterior based lacrimal and nasal flap approximated over the left lateral nasal wall (Black arrow).

Figure 3 Shows silicon lacrimal stent placed in the right nasal cavity after 2 weeks of surgery.
RESULTS

Of 28 patients included in the study, 17 patients were females (60.71%) and 11 were males (39.29%) with a mean age of 40.6 years (range 18-48 years). Average follow-up period ranged between 6 and 18 months (mean 12 months). The characteristics of the study population have been demonstrated in Table 1. Most patients reported epiphora as a result of chronic dacryocystitis and 5 patients were observed to have dacryocystocele in the preoperative period. Prior to performing endoscopic DCR, 5 (17.85%) patients had undergone septal corrective surgery, 3 patients (10.71%) required functional endoscopic sinus surgery for chronic rhino sinusitis with nasal polyposis and 3 patients had undergone conchoplasty to get adequate exposure to the lacrimal sac.

Out of 28 cases, recurrences of symptoms were noted in 2 (7.14%) cases, 1 (7.14%) patient from stenting group and 1 (7.14%) from non stenting group at the end 1 month which remained so at the end of 3 months. After 1 year, of 28 patients, only 24 patients attended the outpatient clinic (11 patients were from non stenting group and 13 were from stenting group) and of them 1 (9.09%) patient from non stenting group (group A) and 2 (15.38%) from stenting group (group B) had recurrence of symptoms. The final outcome of the endoscopic DCR in non stent group was 90.91% as compared to the stent group which was 84.62% at the end of 1 year. None of the patients in both groups had any major intraoperative or postoperative complications (Table 2).

5 (17.85%) patients (3 from stenting group and 2 from non stenting group) developed asymptomatic synechia between the middle turbinate and lateral nasal wall (Figure 4). This difference is not found to be significant (p=0.880). 1 patient was found to be associated with anterior nasal bleeding from non stenting group in the immediate postoperative period, which was managed conservatively by nasal drop. One major complication i.e. prolapse of the orbital which was found in one patient in the stenting group who had history of functional sinus surgery 2 years back and no anatomical landmark was identified during the surgery. One patient had presented with asymptomatic lid edema in the non stenting group which resolved after 24 hours.

DISCUSSION

With the advancement of Endoscopic sinus surgery, endoscopic DCR is frequently performed procedure to relieve epiphora in patients of NLD obstruction. Endoscopic approach not only avoids an external incision but also enables the surgeons to overcome the associated intranasal pathologies causing of DCR failure, including an enlarged middle turbinate or ethmoid sinus disease [6]. Including external scarring of the facial skin, external dacrocystorhinostomy can cause risk of hemorrhage and disruption of medial canthal anatomy. On the other hand, due to enhanced visualization through straight and angled endoscopes, the unnecessary complications can be avoided.

There are different studies reported, showing the success rate of the endonasal endoscopic approach varies between 58% and 97%, which are lower than rates with external DCR (75-99%) [4,7-9]. The most common cause of surgical failure in the former approach is a rhino-stomal stenosis [8]. In an attempt to increase the success rate of the procedure, different flap designs have been evolved in the past to enhance better mucosal healing of the bony stoma by decreasing the peristomal granulation tissue. In the current study the mucosal and lacrimal flaps were made, pedicled posteriorly and approximating to each other over the lateral nasal wall.

Looking in to the literature various studies have been performed in the past demonstrating the double posterior based mucosal and lacrimal flap technique in endoscopic DCR.
with encouraging postoperative results. Trimarchi M et al. [10] demonstrated 91.30% success rate in primary endoscopic DCR and overall success rate of 95.65% after a second revision endoscopic DCR by anastomosing between the nasal mucosa and lacrimal flaps. Tsirbas A, Wormald PJ [11] also reported 91% success rate using both nasal and lacrimal flaps. Similarly Jin HR et al. [12] achieved 96% success rate using nasal mucosal flaps for the reconstruction of the lacrimal stoma. Kansu L et al. [13] compared the results between patients undergoing endoscopic DCR with and without preserving the posterior mucosal flap and demonstrated 95% success rate when the mucosa was preserved and 93% success rate when it was sacrificed. The rationale of the flap technique is to boost primary intention healing and to create a well epithelialized surgical fistula. Recently, Khalifa et al. conducted a study to compare the safety and efficacy of endoscopic DCR with double posteriorly based nasal and lacrimal flaps to conventional endoscopic DCR, concluded that the flap technique has a comparable success rate with a possibly better mucosal healing requiring less debridement in the postoperative period [14]. Keeping in view that it is the stomal stenosis either caused by the natural healing process or the granulation tissue leading to failure of the procedure, lacrimal tubings have been tried intraoperatively to maintain the lacrimal patency in the postoperative period while performing endoscopic DCR. A study conducted by Jin et al. reported 83% success rate in endoscopic DCR after application of stent [15]. On the other hand, some studies indicate that the silicone stent itself is a reason for surgical failure due to granulation tissue formation and punctual erosion [16,17].

In our study, 90.91% of the patients had complete relief of symptoms in non stent group compared to the stent group which was 84.62% at the end of 1 year and there was no significant difference in the results (p=0.588). None of the patient in both groups had any major intraoperative or postoperative complication. Nasal corrective surgeries (Septoplasty and functional endoscopic sinus surgery) before Endoscopic DCR did not affect the final outcomes when compared between both groups. Also the lacrimal stents which had been used in postoperative period were kept for a shorter duration i.e. for 2 weeks (conventional 4 weeks), antipating less granulation tissue and stomal stenosis. Although it is relatively a small sample size, the use of double posterior based nasal and lacrimal flap technique in endoscopic DCR is an effective surgical procedure with long term successful outcome. Uses of lacrimal stents do not have any significant effect on final outcome in patients undergoing primary endoscopic DCR.

CONCLUSION

Use of posterior nasal mucosal flap in endoscopic DCR is a good surgical procedure enabling early epithelisation and preventing peristomal granulation tissue and stenosis resulting in good long term surgical outcome. Patients with endoscopic DCR without the use of silicone stents showed similar success rates to that of non stenting patients when latter is allowed to stay for a short duration. This suggests that stents are not mandatory for every primary endoscopic DCR in the presence of good surgical technique.

REFERENCES