

ORIGINAL ARTICLE

ENDOSCOPIC TRANSNASAL DACRYOCYSTORHINOSTOMY: OUR EXPERIENCE AND CASE SERIES ANALYSIS

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ABSTRACT

Background: This study aims to describe our surgical technique and results for endoscopic transnasal dacryocystorhinostomy for the blocked nasolacrimal passage in patients presented in the department of Otolaryngology and ophthalmology at a tertiary care center.

Methods: A consecutively presenting case series of blocked nasolacrimal passage were selected for transnasal endoscopic dacryocystorhinostomy. Bone removal done by cold instruments and the drill was used to remove the bone over the superior aspect of the sac. Medial wall of the sac was removed to marsupialize the sac in the nasal cavity. Septoplasty was done in 13 patients (17.10 %). The specific surgical approach with or without septoplasty and the use of endolight was discussed. Postoperative follow up including endoscopic examination and results are documented.

Results: A total of 76 cases were included. Mean age was 37.32 (range 6-76)). An endolight was used in all cases to localize the site of nasolacrimal sac 72 cases (94.74 %) have successful outcome in terms of relief of symptoms, whereas 4 (5.26 %) cases had persistent epiphora. Revision procedure were done and 3 (3/4, 75 %) cases had successful outcome. The overall success rate in our series of primary and revision ETDCR is 98.68 %.

Conclusion: Endoscopic transnasal dacryocystorhinostomy is an effective treatment for nasolacrimal duct obstruction. Use of the endolight to localize and the power drill to expose the sac and septoplasty; contribute to the ultimate surgical success

KEY WORDS: Dacryocystorhinostomy, Nasoendoscopy, Dacryocystitis, Epiphora

INTRODUCTION

Dacryocystorhinostomy (DCR) is the surgical procedure done to relieve the obstruction of the nasolacrimal duct. The objective is to surgically marsupialize nasolacrimal sac into the nasal cavity evading the obstructed nasolacrimal duct. Traditionally, it is being done by ophthalmologist via an external approach through medial canthal incision. Though the functional output is mostly fruitful but this results in a visible scar. Therefore ophthalmologists and otolaryngologists started to look for an alternate approach through the nose, thereby avoiding the external scar.

A review of history of Endoscopic transnasal dacryocystorhinostomy (ETDCR) revealed that Caldwell in 1893 was credited with reporting of the intranasal

route for DCR. He did this by trephination of nasolacrimal duct¹. West in 1910 presented his series using the transnasal route by removing the window of bone over the lacrimal sac². Berryhill and Dorenbusch reported their 20 years' experience in 1982 wherein they modified the West's operation and developed a trans septal approach to lacrimal sac by creation a window in the nasal septum to improve the visibility of area³. Despite of a breakthrough the interest among otolaryngologist remained low due to poor visibility with the traditional headlight.

With the advent of endoscopes and their use in nasal surgery in nineties, experience of endoscopic dacryocystorhinostomy was beginning to appear in the literature. Rice in United States⁴ and McDonough in 1989⁵, presented their initial results

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of endoscopic DCR. With the advantage of excellent intranasal visualization of anatomy, and simplicity of the procedure appealed many. The basic method revolved around elevation of the mucosa and the bone over of the lacrimal sac and marsupialization it into the nasal cavity. The interest of otolaryngologist in the procedure has enhanced globally, as is now reflected widely in medical literature since 1990. With the obvious advantages like freedom from external scar, no chances of damage to medial canthal ligament and comparable functional results, the external DCR was taken as "end of an era" in 1997⁶.

In the beginning the procedure of ETDCR was done by traditional cold steel instruments. Continuing evolutions progressed it into a highly specialized procedure, utilizing laser⁷, powered instruments to remove the bone over lacrimal sac⁸, and application of Mitomycin C to prevent stenosis of ostium⁹.

The success rate has been measured in terms of restoration of functional anatomy in terms of a patent ostium, evidenced by endoscope, symptomatic relief from epiphora and visualization of flow of Fluorescein through ostium. In the most recent series by Ali et al the success rate was reported to be around 97% in terms of anatomy and 91 % on the count of function¹⁰. The parameters to achieve the high success rate are excellent visualization, complete exposure of lacrimal sac particularly above the axilla of middle turbinate, meticulous surgical technique to marsupialize the lacrimal sac, aftercare of surgical site and follow-up. In the current study we have targeted all these factors to evaluate the usefulness and efficacy of the procedure.

METHODS

This was a prospective study jointly done by Otolaryngology and Ophthalmology departments of Ziauddin University Hospital on all the patients who presented with epiphora due to nasolacrimal duct obstruction, mucocele, acute and chronic dacryocystitis, from August 2011 to August 2013.

A total of 76 patients were included in the study who underwent ETDCR. All the patients were initially assessed in the ophthalmology department for demography and the confirmation of nasolacrimal duct blockage. Regurgitation test and probing and syringing were employed. The otolaryngology assessment comprised of nasal examination with and without endoscope to pick any concomitant nasal and sinus pathology.

All surgeries were done under general anesthesia. Prior to that the nasal cavity was packed with neurosurgical patties soaked in 4% lignocaine with 1:1000 adrenalin solution; these were placed around the middle turbinate for 10 minutes. After

removal solution of 2% lignocaine with 1:200000 adrenalin injected anterior to uncinate process and axilla of middle turbinate to obtain a bloodless operative field. In cases where deviated nasal septum was found to obstruct the view of surgical field, septoplasty was done. Both the puncta were dilated by Nettleship punctum dilator and then vitrectomy light was passed through the upper punctum. The nasal cavity was entered with Karl Storz 0° 4mm wide angle sinuscope attached to a Stryker camera system. With vitrectomy light transillumination exact localization of lacrimal sac was noted. Two parallel incisions given by angled vitrectomy knife, first 1 cm above the axilla of middle turbinate, and another just above the inferior turbinate. The length of the incisions were about 8mm. A vertical incision uniting the previous incision given by angled vitrectomy knife 1 cm anterior to lacrimal crest. The mucoperiosteum was elevated by suction Freer's elevator to expose the bone over the lacrimal sac and then removed. The lacrimal crest overlying the sac was removed by Kerrison 2mm rongeur to expose the sac. The bone covering the superior sac was always found to be thicker and required to be removed by otological drill utilizing 2mm diamond burr. The vitrectomy light could now be seen clearly and an incision was given over the lacrimal sac that was made tented by the light. Horizontal incisions made at the vertical incision on sac to create anterior and posterior flaps so that the lacrimal sac was now like opened book. The anterior flap removed by the rongeur and posterior by Blakeley forceps so that the sac mucosa should be approximated to the nasal mucosa in the end. The silicon stenting was done only in cases with traumatic injury to nasolacrimal duct or where revision External DCR or ETDCR was planned. A piece of gel foam was applied to the marsupialized sac and a light nasal packing with ribbon gauze soaked in fusidic ointment applied.

Post-operative care and follow up

The nasal packs were removed after 24 hours and a seven day course of antibiotic and analgesic was prescribed along with saline nasal spray and antibiotic eye drops. Patients were followed in clinic every week for three consecutive weeks, then every month for six months and finally every three months. At the initial follow-up nasal cavities were examined for crusts and fibrin coagulum which were removed, subsequently neo ostium was examined for patency by Fluorescein test and improvement of symptoms. In cases where silicon stents were applied, they were removed after 3 months.

RESULTS

Between august 2011 and august 2013 76 (Female 58 and 18 male) patients were treated for distal nasolacrimal duct obstruction by ETDCR. Mean age was 37.32(range 6-76). Of these 76 patients 67 were

for primary ETDCR including two post traumatic cases, 09 were revision surgeries following failed external DCR (ExDCR) done in other centers, and 65 had an idiopathic nasolacrimal duct blockage. The duration of symptoms at the time of presentation was from less than six months to 20 years. Among the symptoms with which presented are depicted in Table 2. Among the sinusal symptoms nasal obstruction was reported by eleven patients (14.43 %) though gross deviated nasal septum was found in twenty-six patients (34.21 %). Septoplasty to achieve sufficient space to accommodate endoscopes and instruments was done in thirteen patients (17.10 %). ETDCR was done primarily in sixty-seven cases, and revision surgeries for failed ExDCR done in nine cases, table 3.

The patients were asked about the resolution in symptom after a follow-up of one year. Out of 72 cases 94.75% have successful outcome in terms of relief from epiphora no recurrence of medial canthal swelling and lacrimal abscess, whereas four (5.26 %) cases had persistent epiphora. Among these four cases, three had rhinostomy closure observed due to fibrosis and one had middle turbinate hypertrophy obstructing the patent neo ostium on nasal endoscopic examination. Revision procedure were conducted and three out of four (75 %) cases had successful outcomes. The overall success rate in our series of primary and revision ETDCR is 98.68 %. Success in our series was determined by resolution of epiphora and patent ostium on one year follow-up.

No significant complications encountered pre and postoperatively. One patient had mild epistaxis following removal of nasal pack after surgery, and one had mild lower eyelid edema, which was resolved by medical treatment.

Table 1: Demographics of 76 Patients who underwent endoscopic transnasal Dacryocystorhinostomy Surgeries

Characteristic	Total
Total Number of patients	76
Gender	
Male	58(76%)
Female	18(24%)
Age in year	
Mean	37 (± 14.01) years
Range	6 - 74 years

Table 2: Clinical presentations of the patients

Symptoms	No. of Patients	Percentage
Epiphora	76	100 %
Purulent secretion from canaliculi	70	92.10%
Medial canthal swelling	76	60.50 %
Nasal symptoms	11	14.43 %

Table 3: Procedure of Endoscopic transnasal DCR procedures performed

Primary ETDCR	67	88.15%
Revision ETDCR	09	11.84%

Table 4: Success rates of the group and different subgroups

Successful outcome	72	94.74%
Unsuccessful outcome	04	05.26%
Successful outcome in Revision ETDC	03	
Overall success rate primary and revision ETDCR		98.68%

DISCUSSION

Over two decades period from the beginning of endoscopic approach to lacrimal sac as of today ETDCR practice has gained momentum. It has now been adopted as a standard procedure for treating distal nasolacrimal duct blockage. The ExDCR considered by ophthalmologist as gold standard. ETDCR, when compared with the conventional method has brought equivocal functional success rate^{11, 12}. The obvious advantages being avoidance external scar, clear and magnified view of the lacrimal crest, ease of the procedure with traditional cold steel instruments and a superadded correction of concurrent nasal pathology. In addition it can be offered in acute infective conditions of lacrimal sac, carry lesser morbidities, the paradigm has now shifted in favor of ETDCR.

One of the advantage of endoscopic approach is to deal with nasal pathology simultaneously. This may range from correction of nasal septal deviation to have sufficient access to lacrimal anatomy or the treatment of symptomatic septal or turbinate and sinus disorder in the same sitting¹³. In this series we performed 13 septoplasty and one anterior partial middle turbinectomy relieving the nasal and sinus symptoms.

In one of the identical series¹⁴ the preoperative workup protocol dacryocystography and CT scan was routinely done in all the cases to know the site of obstruction. In the current series CT scan and dacryocystography was done only in two cases with previous history of maxillofacial trauma. We considered clinical workup to be sufficient to assess the level of obstruction of nasolacrimal pathway. This saved the cost of the procedure significantly.

The use of endoilluminator light or vitrectomy light has been advocated through one of the punctum to identify the exact position of lacrimal sac intranasally by some authors in post-traumatic or revision cases¹⁵. While it is not considered useful by Ananth.

et. al as the position of sac is more or less constant in their view ¹⁶. At our center we used endolight routinely in every case as minor variations in the lacrimal sac anatomy were commonly encountered in our series. This particularly pertains to the superior limit which is documented to be 8mm above the anterior attachment of middle turbinate ¹⁷. We found it at the level of anterior attachment in seven cases. We recommend the use of endolight in every case to pick up any surprising variation in anatomy, preventing any mishap during the procedure.

The exposure of lacrimal sac and marsupialization into the nasal cavity were evolved in our experience with time. Initially it was diathermy of mucosa of frontal process of maxilla done to minimize bleeding. Then we started the superior, inferior and anterior incisions to have a posterior based flap. Bone over the sac was removed by Kerrison rongeur. Difficulties to encounter thickness of bone in superior aspect forced us to use drill with 2mm diamond burr. The use of powered instruments helped in complete exposure of lacrimal sac, thereby creating easy in marsupialization as followed by others ¹⁸. It is documented in one of the series that inadequate bone removal is the important cause of failure ¹⁹. Use of powered drill has become a standard protocol of the procedure now. The current practice is to create the anterior and posterior flap and this gives better outcome. Creation of ostium could be achieved by endoluminal transcanicular diode laser ²⁰, but expensive equipment and a lower success rate has discouraged its routine use.

Many adjunctive procedure are done to keep the ostium patent to have good long term results. One is application of Mitomycin C, an antimitotic drug application around newly created ostium. This prevent fibrosis and closure ²¹. Another method is the use of silicon tubes stents. Various comparative studies did not show any advantage of stents in achieving the higher success rate ²², rather its use has caused crusting, granulations formation and infection, dropping the successful outcome ^{23, 24}. In our series none of the adjunct procedures are used routinely. We selectively use stenting in revision ETDCR from failed ExDCR and in cases with history of trauma. Our center has previously described the experiences with ETDCR without stenting ²⁵. Our center recommend non stenting in primary ETDCR. This recommendation is based on higher success rate in our series.

The complications of ETDCR includes preoperative hemorrhage, trauma to perioperative structures like uncinat process, orbital trauma with transient damage to middle rectus muscle causing diplopia, synachie between rhinostomy and the nasal septum resulting in the closure and hence recurrence of epiphora ²⁶. We had encountered only

lower lid edema and mild postoperative epistaxis which were managed conservatively.

CONCLUSION

The success rate in our series indicates the logical choice of the endoscopic approach to the conventional nasolacrimal duct obstruction operation. The ETDCR with powered instruments ensures complete exposure of lacrimal sac, particularly the superior aspect results in sufficiently large rhinostomy to prevent re-stenosis and recurrence of symptoms. The use of trans illumination of lacrimal sac by endolight is useful tool in to identify variations in anatomy. Meticulous surgical approach and comprehensive post-operative care in first two weeks resulted in higher success rates. The silicon stenting is required in selected cases and Mitomycin C application is not essential.

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