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Functional outcome of endoscopic and external dacrocystorhinostomy in a teaching hospital

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ABSTRACT

Background: The objective of the study was to compare and analyse the results of two different techniques of dacrocystorhinostomy (endonasal and external) in different etiological groups.
Methods: This prospective study was carried out for nasolacrimal duct obstruction from October 2016 to October 2018 who underwent dacrocystorhinostomy by two different methods. The patient was divided into two groups one who underwent endonasal DCR (n=55) and another group who underwent external DCR (n=55). In each group they were subdivided into 3 groups on the basis of aetiology into idiopathic, post traumatic and revision cases. The results were evaluated in follow up period of 6 months. At the end of the study, decoding of the groups was done and the results were analysed statistically, using Chi Square test and student t-test, using SSPS III software. P value of less than 0.05 was considered statistically significant.
Results: The success rate in endonasal DCR and external DCR was almost same in all the three groups ($p>0.05$).
Conclusions: This prospective study shows that both the methods have almost same success rate. This study also emphasises proper case selection and interdepartmental cooperation for optimum results.

Keywords: Endoscopic endonasal DCR, External DCR, Idiopathic DCR, Post–traumatic DCR and revision DCR

INTRODUCTION

Intranasal techniques of dacrocystorhinostomy (DCR) were introduced in the early 1900s, and the modern endonasal endoscopic technique was first described in late 1980s. However, acceptance of intranasal approaches had been guarded due to inconsistent success rate.

Compared with external approach of Toti modified by Dupuy-Dutemps, which is considered as "gold standard" for NLD (naso lacrimal duct) obstruction, there are some definite advantages of endonasal DCR; good cosmesis due to absence of a postoperative scar in medial canthus, preservation of saccular pump mechanism as no dissection of medial palpebral ligament is necessary, ability to do bilateral DCR in same sitting, and also associated abnormality in the nasal anatomy can be corrected in same sitting.[1]

As number of cataract surgeries are increasing so as to provide an infection free lacrimal system for optimum result has led to upsurge in demand of DCR surgeries.

Although many studies have compared results between endonasal and external technique of DCR, in this study we not only tried to analyse results but also tried to focus on ideal case selection for both the techniques for best results.

METHODS

This prospective study was carried out from October 2016 to October 2018 in Shri Guru Ram Rai Institute of

Medical and Health Sciences, Dehradun in patients who had NLDO diagnosed by syringing and probing. Imaging and DCG (dacryocystograpgy) are not routinely performed in our centre. Study included two groups; one who underwent endonasal DCR (55 cases) and second group who underwent external DCR (55cases).

Exclusion criteria for surgeries included acute lacrimal passage infection; pre saccal obstruction; eyelid anomaly or abnormality; suspected malignancy; age below 5 years; partial and functional NLDO as determined by Jone's dye test; those who lost to follow up.

Choice of approach to surgery was based on surgeon's preference depending on the preoperative evaluation of lacrimal system using nasal endoscopy, patients choice of anaesthesia and cost of procedure. Those cases having concurrent nasal pathology were taken into endonasal DCR group.

'Success' was defined as subjective resolution of epiphora, and/or discharge and objective evidence of patent nasolacrimal passage as suggested by syringing and nasal endoscopy.

'Failure' was defined as persistence of epiphora and/or discharge with evidence of blocked syringing and/or closed osteotomy opening.

Technique of surgeries

All endonasal DCR were performed under general anaesthesia, visualization was made adequate by decongestion of nasal turbinates and resection of septal deviation. Using the maxillary line and superior attachment of middle turbinates the mucosa over the frontal process is incised using a knife. The incision extends 2-3 mm above the superior attachment of middle turbinate to mid point of uncinate process inferiorly. The mucosa was elevated using Freer's elevator. The elevated mucosal flap was reposited back at the end of surgery. This exposed the frontal process of maxilla. Now, the lacrimal bone was removed after removing the upper one third of uncinate process. This exposes the lacrimal sac. The hard lacrimal crest is then punched out with a straight or angled Kerrison punch. In few cases drilling with dimond burr was required. Complete removal of bone is the most critical step as superior extent of lacrimal sac lies above the insertion of middle turbinate. The medial wall of sac was exposed and can be confirmed by passing a probe from lower canaliculus which tends to tent the medial wall of sac. The medial wall of sac was incised using angled keratotome. The stoma is made so as to expose widely the opening of common internal punctum. Silicone stents (STI) were placed in all cases of trauma (5), 6 cases of fibrosed lacrimal sac and 10 cases of revision for a period of 6 months. Nasal packing was done in all cases.

Standard external DCR were performed mostly under local anaesthesia along with sedation except in children, apprehensive patients and bilateral NLDO who required general anesthesia.

Follow up

In both the groups, there was no drop out at any stages of follow up visit.

In endonasal DCR group, regular intranasal saline wash was done after 24 hours. Patients were discharged with advice of oral antibiotics, oral analgesic medications and nasal douching on 2-3 postoperative days. Patients were advised to visit OPD weekly for 4 consecutive weeks for suction clearance, release of synechia if any and granulations around silicone stents if any.

The patients were followed up on monthly basis for 6 consecutive months.

In external DCR group, sutures were removed on 7th day. Follow up was done on 1 month, 3 month and at 6 month.

Statistical analysis

At the end of the study, decoding of the groups were done and the results were analysed statistically, using Chi Square Test and Student t-test, using SSPS III software. P value of less than 0.05 was considered significant and less than 0.001 as highly significant.

RESULTS

Total 110 cases of DCR was carried out (55 endonasal and 55 external) on total 84 patients (41 endonasal and 43 external) with mean age of 50.63±15.87 years and 51.39±15.06 years respectively. Fourteen cases in endonasal group and 12 in external group underwent bilateral surgeries. The male:female ratio in endonasal group was 1:2.4 whereas in external DCR group it was 1:2.07. Out of 110 surgeries done, 11 cases were having history of trauma (5 in endonasal and 6 in external group). 16 cases underwent revision for failed DCR (10 underwent endonasal DCR and 6 cases underwent external DCR), and 40 cases in endo DCR and 43 in external DCR were idiopathic (Table 1).

Both the study group consisted of subjects of same criteria to reduce variability in results, as shown in Table 1. There was no significant difference between two groups in terms of age and gender ($p>0.05$).

Overall success rate in endonasal DCR group was 49/55 (89%), whereas in external DCR group success rate was 48/55 (87.27%). This is statistically insignificant ($p>0.05$) (Table 2).

Table1: Showing study group.

	Endonasal DCR	External DCR	P value
Total no. of cases	41	43	0.89 (>0.05)
Total no. of DCR	55	55	1.00 (>0.05)
Bilateral procedure	14	12	0.82 (>0.05)
Mean age in yrs (SD)	50.63 (15.87)	51.39 (15.06)	0.82 (>0.05)
M:F ratio	1:2.4	1:2.07	0.39 (>0.05)
Idiopathic	40	43	0.79 (>0.05)
Post-traumatic	5	6	1.00 (>0.05)
Revision	10	6	0.43 (>0.05)
STI	21	25	0.62 (>0.05)

P value was calculated using Student-t test method.

Table 2: showing results in both the groups.

	Endonasal DCR (%)	External DCR (%)	P value
1) All cases	89	87	0.76 (>0.05)
2) Idiopathic	92.5	90.69	0.95 (>0.05)
3) Post-traumatic	60	83.3	0.55 (>0.05)
4) Revision	90	66.6	0.50 (>0.05)

For p value calculation= 1,2 Chi square method and for 3,4 Student t test method was used.

In idiopathic group, success rate was 37/40 (92.5%) in endonasal DCR group, whereas in external DCR group success rate was 39/43 it (90.69%). This is statistically insignificant (p>0.05) (Table 2).

In traumatic group, success rate was 3/5 (60%) in endonasal DCR group, whereas in external DCR group success rate was 5/6 (83.3%). This is statistically insignificant (p>0.05) (Table 2).

In revision cases, success rate was 9/10 (90%) in endonasal DCR group, whereas in external DCR group success rate was 4/6 (66.6%). This is statistically insignificant (p>0.05) (Table 2).

In endonasal DCR group, common complications encounterd were lacrimal stent displacement in 3 cases, periorbital ecchymosis in 17 cases, medialization of middle turbinate in 8 cases, granulations around stent in 5 cases and in the osteum/noe-osteum 3 cases.

In external DCR group, epistaxis was the most common complication, followed by nasal synechiae and restenosis of neoostium.

DISCUSSION

One of the major concerns performing endonasal DCR for managing NLDO is lower success rates as compared with external DCR. Traditionally, reasons for failure of endonasal DCR has been attributed to surgeons learning curve, poor postoperative follow up, damage to nasal mucosa and lateral wall of sac, small bony opening and sialistic tubes causing reactions, granuloma, etc. This study emphasises that proper case selection will reduce failure rate in endonasal DCR group.

In idiopathic group, success rate in endonasal DCR group was (90%) while in external DCR group it was (89.74%), the difference was statistically insignificant (p>0.05). This study is in concordance with previous study done by Hartiken et al and Wormold.[1,2] The endoscopic approach has advantage in primary cases such as absence of skin scars, maintenance of lacrimal pump mechanism through preservation of medial canthal tendon. This can also address simultaneously other associated nasal pathology like DNS (deviated nasal septum), concha bullosa and prominent Aggar nasi cells. In our study, DNS 9/30 (30%), concha bullosa (16%) and prominent Agar nasi 2/30 (6.6%) was found and were corrected in the same sitting.

In post-traumatic group, success rate was 81.8% in endonasal DCR group, whereas in external DCR group it was 90%, the difference was statistically insignificant (p>0.05). This findings were similar to the results as shown by Mirza et al and Sharma et al.[3,4] We also advocate the use of external approach in severe post-traumatic bony deformity induced NLDO because of unimpaired view of surgical field.

In revision group, the success rate was much higher in endonasal DCR group (92.8%) in comparison to external DCR group (66.6%), the difference is statistically insignificant (p=0.05). This is in contrast to most of the studies showing comparable results in both the groups such as, by Tsirbas et al, Demarco et al.[5,6] This difference may be due to small number of cases in our study.

In present study, occlusion of the internal ostium (rhinostomy site) by granulation and fibrosis was seen in 11 cases of endoscopic group. McLean et al reported that, in revision DCR healing by fibrosis occurred in most cases and new bone formation was minimal.[7] In our study, rhinostomy occlusion with bone tissue was found in 4/14 (28.5%) cases of endonasal group and 3/6 (50%) cases in external DCR group. In both the groups, one of the reason for failure was attributed to inadequately opened bone window.

The advantage of endonasal DCR is direct access to the rhinostomy site and to concurrently address the nasal and paranasal pathologies in revision cases, makes it as ideal approach in such cases. The sac can also be localized easily on anterior superior part of middle turbinate attachment and osteotomy can be performed exactly over the sac as sac should be opened from middle and not from the lower or upper end. Otherwise, the sac cannot be completely drained and Sump syndrome develops.[8]

The endoscopic technique requires steep learning curve.[9,10] This also has high equipment and instrumentation cost, but it has revolutionized the lacrimal sac surgery in terms cost effectiveness due to higher number of cases per session with equally effective results.[11] DCR is the simplest surgery out of all endoscopic nasal surgeries in skilled hand. As applicable for any surgeries, proper selections of cases are must for best results. We are of the opinion that, this surgery must be done in a team which consists of otolaryngologists and ophthalmologist. The preoperative evaluation must include endoscopic evaluation to identify concurrent nasal pathologies. In our opinion, if there is/are associated nasal pathologies, it is better to choose endonasal approach for best results. Similarly, preoperative imaging and DCG in traumatic cases will guide a surgeon about the severity of trauma and thereby approach of surgery. In our opinion, in post-traumatic cases with gross bony deformities, it is better to approach via external route due to wide surgical field which gives surgeon's better visualisation of lacrimal system and neighbouring structures. In revision cases, we can directly address the rhinostomy site via endoscopic route because it has been noted that failures are due to closure of rhinostomy site in most of the cases. This also helps us in addressing the pathology like granulation tissue removal, synechiae release, widening of bony window etc. Ibrahim et al reported shorter recovery time in endonasal DCR.[12]

CONCLUSION

Our study result shows that, both the approaches for DCR are equally effective, but each having their own merits and demerits. To achieve best results surgeon must consider proper case selection, regular follow up and interdepartmental cooperation.

In addition, this will also help us to explore difficult cases of lacrimal sac pathology situated in nasal anatomical area with much ease.

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REFERENCES

1. Hartikainen J, Antila J, Varpula M, Puukka P, Seppä H, Grenman R. Prospective randomized comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. Laryngoscope 1998;108:1861–6.
2. Wormald PJ Powered endoscopic dacryocystor-hinostomy. Otolaryngol Clin N Am. 2006;39:539–49.
3. Mirza A, Al-Barmani A, Douglas SA, Bearn MA, Robson AK. A retrospective comparison of endonasal KTP laser dacryocystorhinostomy versus external dacryocystorhinostomy. Clin Otolaryngol. Allied Sci. 2002;27:347–51.
4. Sharma B. Non endoscopic endonasal dacryocystorhinostomy versus external dacryocystorhinostomy. Kathmandu Univ Med J. 2008;6:437–42.
5. Tsirbas A, Davis G, Wormald PJ Revision dacryocystorhinostomy:a comparison of endoscopic and external techniques. Am J Rhinol. 2005:19:322–5.
6. Demarco R, Strose A, Araújo M, Valera FC, Moribe I, Anselmo-Lima WT Endoscopic revision of external dacryocystorhinostomy. Otolaryngol Head Neck Surg. 2007;137:497–9.
7. McLean CJ, Cree IA, Rose GE Rhinostomies:an open andshut case? Br J Ophthalmol. 1999;83:1300–1.
8. Jin HR, Yeon JY, Choi MY Endoscopic dacryocystorhinostomy: creation of a large marsupialized lacrimal sac. J Korean Med Sci. 2006;21:719–23.
9. Woog JJ, Kennedy RH, Custer PL, Kaltreider SA, Meyer DR, Camara JG. Endonasal dacryocystorhinostomy: a report by the American Academy of Ophthalmology. Ophthalmology. 2001;108:2369–77.
10. Ben Simon GJ, Joseph J, Lee S, Schwarcz RM, McCann JD, Goldberg RA. External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral centre. Ophthalmology. 2005;112:1463–8.

11. Cokkeser Y, Evereklioglu C, Er H. Comparative external versus endoscopic dacryocystorhinostomy: results in 115 patients (130 eyes). Otolaryngol Head Neck Surg. 2000;123:488–91.
12. Ibrahim HA, Batterbury M, Banhegyi G, McGalliard J. Endonasal laser dacryocystor-hinostomy and external dacryocystorhinostomy outcome profile in a general ophthalmic service unit: a comparative retrospective study. Ophthalmic Surg Lasers. 2001;32:220–7.

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