

External Dacryocystorhinostomy Versus Endonasal Dacryocystorhinostomy for Chronic Dacryocystitis: A Prospective Comparative Study

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Abstract

Introduction: Dacryocystorhinostomy (DCR) is an operation that creates a fistula between the lacrimal sac and nasal cavity to facilitate drainage of the tears in cases of nasolacrimal duct obstruction. Initially 'DCR' was performed by using an external approach for acquired nasolacrimal duct obstruction. Of lately endoscopic DCR is evolving as an equally effective alternative intervention. **Objective:** The present study is to correlate the surgical outcome of external DCR and endonasal DCR regarding the patency rate and to assess the intraoperative and postoperative complications of both the interventions. **Materials and Method:** This prospective clinical study was carried out in the Department of Ophthalmology and ENT, SIMS and RC, Bangalore, from 2016-2017. A total of 30 consecutive patients having complaints of watering with complete nasolacrimal duct obstruction diagnosed by syringing; known cases were selected for DCR surgery. Dacryocystography was done in all the cases. Among 30 patients a total of 15 patients underwent external DCR and rest of the patients underwent endoscopic DCR. Revision cases were excluded from the study group. A detailed history, regarding symptoms was collected systematically. Data pertaining ocular examination, lacrimal syringing, intra-operative and postoperative complications and finally ultimate surgical outcome were collected. Data was analyzed by SPSS statistical software. ROC test was employed to draw the significant inference. **Results:** The result showed that both surgical approaches had almost similar success rate ie. external DCR had 87% success rate with good specificity of 89.0% and sensitivity 79.99% and endoscopic DCR had 80% success rate with 83.22% specificity and sensitivity 71.88%. The complication rate was low in both the groups and no appreciable difference in complication rate was seen in both types of surgery $p > 0.01$. **Conclusion:** Surgical outcome of both endoscopic and external DCR for Chronic Dacryocystitis was quite satisfactory $p < 0.001$. The complication rate was low. Thus, these two different dacryocystorhinostomy techniques will be acceptable alternatives for the treatment of chronic dacryocystitis. With external DCR still the gold standard for chronic dacryocystitis, endoscopic DCR is a safe, minimally invasive effective alternative to external DCR, but it requires expertise and expensive equipment for endoscopy.

Keywords: Dacryocystorhinostomy; External; Endonasal; Endoscopic.

Introduction

Normal drainage of tear from the conjunctival sac into the nose is dependent on patency of the nasolacrimal passage that includes the lacrimal puncta, the lacrimal canaliculi, the common

canaliculus, the lacrimal sac and the nasolacrimal duct, which opens into the inferior meatus of the nose. Inflammation of the lacrimal sac is known as Dacryocystitis. Chronic Dacryocystitis is commonly due to an obstruction to the lower end of the nasal duct following chronic inflammation of nasal mucosa causing strictures of nasolacrimal duct or may also be caused by pressure of nasal polyp, hypertrophied inferior turbinate or extreme deviation of septum. All resulting in obstruction to NLD with inflammation of the sac. NLD obstruction may be confirmed by syringing, Jones test and dacryocystorhinography (DCG).

Many surgeries have been advocated for this condition starting from dacryocystectomy to Dacryocystorhinostomy (DCR) with placements of

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various implants and tubes. But DCR is the most accepted procedure today. It can be done with external or endonasal access. The basic indication is same in all cases and either route can be used. Classically; DCR is performed by using an external approach. It was described by Addeototi in 1904 [1]. The endonasal approach was first introduced by Caldwell in 1893 [2] because of poor visibility of endonasal anatomy during surgery this technique was not popularized. The advent of the nasal endoscopes brought new consideration to lacrimal sac surgery. In 1989 Mc. Donogh & Meiring did first endoscopic transnasal DCR [3]. The reported success rate of both procedures ranges from 63% to 97% [4,5]. Present study was carried in our institute to compare the surgical results of external and endonasal DCR in patients with chronic dacryocystitis with NLD block. In an Indian context very limited study has been there about this new Intervention. Due to this paucity the present study was done to correlate the surgical outcome of external DCR and endonasal DCR regarding the patency rate and to know the intraoperative and postoperative complications.

Materials and Methods

This was a prospective, non-randomized study, conducted in the Department of Ophthalmology, in association with Department of Otorhinolaryngology at a teaching medical centre for duration of 12 months from June 2016 to May 2017. Before starting the study, institutional ethical committee clearance was obtained. A total 30 patients with diagnosis of nasolacrimal duct obstruction admitted in our hospital were enrolled for the study. External DCR was done in 15 eyes whereas endoscopic DCR was done in 15 eyes. All patients were followed up to a minimum of 6 months at 1 month, 3 months and 6 months subsequent intervals. All cases, medical and ocular history were taken preoperatively. A detailed ophthalmic and ENT examination was carried out to rule out any other coexisting ocular or nasal pathology. Preoperative investigations included a complete heamogram, blood sugar, bleeding and clotting time. Patency of the nasolacrimal duct was checked by sac syringing and dacryocystography was done in all cases to confirm the level of obstruction. cases having good lacrimalsac outline with obstruction in nasolacrimal duct were selected for the study. Cases with fibrosed sac and canalicular block were excluded. Preoperative counseling for both the procedures were explained in detail with their advantages and disadvantages

to the patients. Selection of type of operation was left to the patient's choice as per the ethical norms.

An external DCR operation was done for all recruited patients under local anaesthesia (2% xylocaine with adrenaline 1 in 1,00,000) whereas, all endoscopic DCR operations were done under local anaesthesia except in children, uncooperative patients and acute cases. In the latter, general anaesthesia was used. Follow up visits were done at one week, one month, 3 months and after six months post operatively with regular lacrimal syringing, endoscopic nasal cleaning. Oral antibiotics, topical antibiotic ointment for eye and oral NSAIDS were given post operatively. Saline nasal drops administered for all the patients up to 6 weeks to prevent crusting.

The result of external and endoscopic DCR was considered as complete cure or failure depending on the symptomatic relief and patency of lacrimal drainage pathway following the operation. The failure was defined as no symptomatic relief from watering, failed lacrimal syringing postoperatively and/or postoperative nasal endoscopy showing scarring in the intranasal osteotomy. Data regarding surgical outcome and complications were analyzed and compared. Data was analyzed by SPSS statistical software. ROC test was employed to draw the significant inference

Results

Age and sex - Mean age of the patients in external DCR group was 54 years and the patients in endoscopic surgery was 39 years. There was predominance of female over male patient (2.3:1) and age ranged from 10 to 65 years. [Table 1 and 2]

The clinical presentation varied from watering of eyes alone to lacrimal fistula. (Pie Diagram 1: Showing clinical picture of chronic dacryocystitis). The commonest indication for DCR was epiphora (64%). Acute dacryocystitis (2 cases) were treated medically before surgery.

The average duration of surgery in endoscopic DCR group was about 40mins±10mins and in external DCR group was 65mins±10mins. Both the study groups were evaluated for a period of 6 months by sac syringing and persistence of symptoms (Table 3)

At 6 month follow-up, 87% (13 cases out of 15 cases) ultimately had a successful surgical outcome in external DCR compared to endoscopic DCR which showed a successful outcome in 80% (12 cases out of 15 cases). Complete block

with no symptomatic relief was seen in 1 case in conventional DCR (7%) and 2 cases in endoscopic DCR (13%). The result showed that both surgical approaches had almost similar success rate. (Table 3). Complication rate was low in both types

of surgery. complications in external DCR include Hypertrophied external scar in 1 case and Closure of osteum in 1 case and in endonasal DCR include nasal synechia formation(1case), Granulation at the osteum with partial narrowing (3 cases).

Table1: Comparison of External & Endonasal DCR with respect to gender distribution

Group	Male					Female				
	No	Specificity(%)	Sensitivity(%)	PPV	NPV	No	Specificity(%)	Sensitivity(%)	PPV	NPV
External DCR (n=15)	05	68.88	56.89	60.12	73.25	10	78.12	74.21	80.02	68.55
Endonasal DCR (n=15)	04	65.33	54.22	58.12	63.02	11	82.11	76.88	83.12	70.16
Total	09	67.10	55.55	59.12	68.13	21	80.11	75.54	81.57	69.35

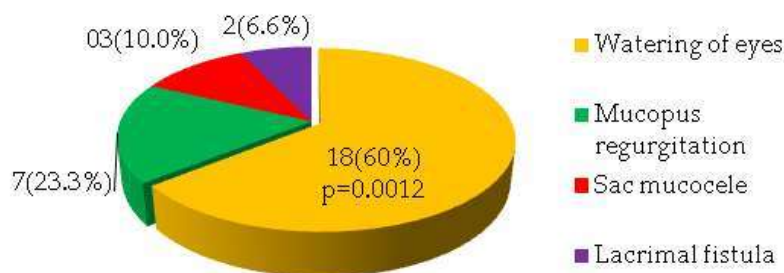
Table 2: Correlation of External & endonasal DCR age wise break up

Age in years	Number of cases in External DCR	Number of cases in Endonasal DCR	P-value
11-20	1(3.33%)	0(0.00%)	0.86
21-30	1(3.33%)	1(3.33%)	0.74
31-40	1(3.33%)	6(20.00%)	0.025
41-50	6(20.0%)	4(13.33%)	0.085
>51	6(20.0%)	4(13.33%)	0.089

Table 3: Distribution of symptomatology of the patients

Grade	Lacrimal syringing	External DCR (no of cases)	Endonasal DCR (no of cases)	Persistence of symptoms
1	Patent	13(87%)	12(80%)	Nil
2	Partial block with clear fluid regurgitation	01	02	Occasional watering
3	Partial block with mucoid regurgitation	nil	01	No relief
4	Complete block	01	02	No relief

Pie Diagram 1: Distribution of clinical features (n=30)



Discussion

Chronic dacryocystitis is the suppurative inflammation of the lacrimal sac with obstruction of nasolacrimal duct. DCR is the treatment of choice for chronic dacryocystitis. DCR can be performed by two approaches either externally by an

ophthalmologist or endonasally by the rhinologist. External DCR is regarded as the conventional approach for the treatment of nasolacrimal duct obstruction [6]. This allows the direct visualization of the anatomical structures surrounding the lacrimal sac compared to endoscopic DCR [7]. But the disadvantages of this procedure includes

cutaneous scar, relatively more intra operative bleeding and the potential injury to medical canthal structures, cerebrospinal fluid rhinorrhoea and functional interference with the physiological action of lacrimal pump [8]. Hence, there was a need for new technique to minimize these disadvantages. Over the last few decades endoscopic DCR has shown equally promising results especially due to lack of external scar, less intra operative bleed and relatively less operating time [7]. Assessment of failure can also be viewed endoscopically, so mistakes can be corrected immediately. The options for converting to external DCR in difficult cases or those with lacrimal sac tumours is always possible with endoscopic DCR [9]. But the disadvantages include restenosis of the opening requiring second surgery, expensive equipments and long learning curve. Also not indicated in cases of epiphora due to canalicular block. Hence we conducted a prospective, non-randomized study to evaluate the efficacy and safety of these two techniques. In our study, female to male ratio was 2.3:1. This shows that the nasolacrimal sac and duct obstruction is more common in females than males. The cause may be anatomically narrow NLD in females. The results are similar to other studies [10,11,12]. The mean age of the patients who underwent external DCR group was 54 years compared to endoscopic DCR was 39 years. This indicates that acquired nasolacrimal duct obstruction is more common in middle age group. Similar data was found by many previous studies [6,11]. In our study, epiphora was the commonest presenting symptom which was similar to other studies [6,15,16]. Lacrimal syringing and dacryocystography were done in all patients presenting with epiphora to determine the level of obstruction and to know the lacrimal sac condition. The average duration of surgery in external DCR group was 65mins±10mins and in endoscopic DCR group was about 40mins±10mins. At 6 month of follow-up, 87% out of 15 cases ultimately had a successful surgical outcome in external DCR compared to endoscopic DCR which showed a successful outcome in 80% out of 15 cases. Various studies Khan et al., Karim et al., and others have found similar success rate ranging from 78% to 97% [17,18]. Complication rate was low in both types of surgery. Complications in external DCR include Hypertrophied external scar in 1 case and Closure of osteum in 1 case. In endonasal DCR include nasal synechia formation (1 case) and Granulation at the osteum with partial narrowing (3 cases). External DCR showed relatively more intra operative bleeding compared to endonasal DCR. Drawback of our study is that it was a

hospital-based study, which will result in some selection bias. The study period is short and also the study was done on a small group of patients. There is a difference in age group between the patients of endoscopic and external DCR with young patients preferring endonasal DCR. This may affect the surgical outcome which is a limitation of our study. Again as the endoscopic and external DCR procedures were performed by different surgeons, which may also affect the surgical outcome.

Conclusion

DCR is the treatment of choice for nasolacrimal duct obstruction. It can be performed by external or endoscopic approach. Both these techniques have comparable surgical outcome and minimal complications. Hence can be acceptable alternatives for dacryocystitis management. External DCR requires minimum cost and easy to learn whereas endoscopic DCR needs costly equipment and a long learning curve but has an advantage of a safe, minimally invasive effective day care technique with no external scar. So the choice of surgery should depend upon patient's preference, availability of resources and surgeon's expertise.

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