



Comparative Study of External Dacryocystorhinostomy and Endonasal Endoscopic Dacryocystorhinostomy

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Abstract

Background: stenosis of nasolacrimal duct with the resultant stagnation of lacrimal fluid and subsequent infection is the most common cause of dacryocystitis. Dacryocystorhinostomy stands as the gold standard in treatment of chronic dacryocystitis. It can be performed via 2 approaches: External and Endonasal.

Aim: This study was done to compare the success rates and merits and demerits between External DCR and Endonasal Endoscopic DCR

Method: It was a single-center prospective randomized comparative interventional study completed in the duration of two years done in the Upgraded Department of Ophthalmology & Department of Otorhinolaryngology of MGMMC & MY Hospital. A total of 40 cases with chronic dacryocystitis presenting with NLD obstruction based on symptomatic, clinical and radiologic grounds were included in the study and divided randomly into 2 groups. Each group subjected to External and Endoscopic DCR respectively.

Result: There were no significant difference in success rates between both the groups. However variation was noted in merits and demerits of both the techniques of external and endonasal DCR. The study revealed that after a mean follow-up of 3 months, difference in success rates (patency) between these groups were statistically insignificant (X^2 test = 2.264, $P = 0.322$). (Table 3)

Conclusion: Although statistically insignificant, At the end of 3 months follow-up period, the success rate was highest in External DCR (90%) in comparison to Endoscopic DCR (80%). But Endoscopic DCR is a minimally invasive scarless surgery with cosmetically more acceptable by young patients and has less intraoperative bleeding as it is a direct approach to the lacrimal sac.

Keywords: dacryocystorhinostomy, dacryocystitis, nasolacrimal duct.

Introduction

Dacryocystorhinostomy (DCR) has been considered as the standard procedure for treatment of acquired nasolacrimal duct obstruction (NLDO), in which an anastomosis is created between the lacrimal sac and nasal cavity by removing the bone that separates these two

structures and bypass the occluded nasolacrimal duct of the downstream.

DCR which was first described by Toti in 1904, is still gold standard procedure owing to its high success rate¹. Though over time several modifications have been introduced to overcome the various issues in original technique such as

prolong operative time and post operative visible scar.

DCR can be performed by 2 routes: (i) conventional route through transcutaneous incision, (ii) endoscopic endonasal route without disrupting the neurovascular plane.

Caldwell in 1893, first described Endonasal dacryocystorhinostomy but did not gain much success because of the poor monocular view but with the introduction of endoscope permitting direct adequate visualization, this approach gained considerable popularity in last two decades.

Material and Method

This is scientific and ethical committee approved prospective, comparative, interventional study. A total of 40 diagnosed cases of chronic dacryocystitis (due to NLDO) within age group of 18-70 yrs were randomly divided into 2 equal groups. 1st group included those patients in whom Conventional DCR was performed and 2nd group included patients of Endoscopic DCR Patient with acute dacryocystitis, post traumatic bone deformity, fibrosis, malignancy of sac or bleeding disorder were excluded from the study. Participants included in the study underwent anterior segment evaluation by slit lamp, regurgitation test, lacrimal sac syringing and probing, routine blood investigation, imaging studies like X-ray PNS, Dacryocystography and ENT evaluation.

Surgical Technique

□ 1st group after preoperative nasal packing and LA, underwent external DCR through incision of 8 mm size on the side of the nose below the medial canthal tendon, and the dissection was carried down to bone, after cutting MPL. The periosteum was reflected from the anterior lacrimal crest to reveal the lacrimal sac fossa. The sac was then reflected laterally. The nose was entered by pushing a blunt instrument through the suture line between the lacrimal bone and the frontal process of the maxilla. Kerrison punches were used to remove bone

between the sac fossa and the nose, to create an opening large enough to anastomose the sac and nasal mucosa. Flaps were created in the medial sac wall and in the adjacent nasal mucosa. The posterior flaps and then the anterior flaps of the sac and nasal mucosa were sutured together to form a mucosa-lined tunnel across the ostium.^{2,3}

- In 2nd endoscopic group, patient was prepared by local infiltration of middle turbinate, axilla and adjacent lateral wall done using 2% xylocaine with 1:1,00,000 adrenaline and nasal decongestion by 0.1% xylometazoline.
- Under GA using nasal endoscopic visualization, superior incision was made using scalpel blade or cautery probe horizontally 8-9 mm above the axilla of the middle turbinate extending anteriorly up to frontal process of axilla and vertically just above the insertion of inferior turbinate. Inferior incision from the insertion of the uncinata was made to join the vertical incision and posteriorly based mucosal flap was made to expose the lacrimal bone. Lacrimal bone was removed using Kerrison punch to expose lacrimal sac followed by vertical incision along the entire length of the lacrimal sac from the fundus down to the nasolacrimal duct. The lacrimal sac was then completely marsupialized and both the anterior and posterior sac flaps were laid open and flat like an open book on the lateral nasal wall. Returned the remainder of the flap onto the lateral wall and ensured that the exposed bone was covered. Nasal cavity was packed using antibiotic soaked gauze pack or merocele.^{3,4}

Post operative Oral Antibiotics & Anti-inflammatory drugs were started for 5 days along with decongestive nasal drops and topical antibiotics.

Success of surgery was assessed post operatively on 7th day, 15th day, 1 month and 3 months by checking anatomic patency through lacrimal sac

syringing . Analysis of study was done using chi square test.

Results

A total of 40 cases of chronic dacryocystitis with NLD block and varied presentation were consented with mean follow up of 3 months.(Table 1)

There were 5 (25%) males and 15(75%) females in group 1 and 6(30%) males and 14(70%) females in group 2.

Difference in gender distribution among the groups was not significant. (X^2 test =0.1642, $p=0.9212$).

In group 1 Mean age of patient was 44.25 (± 8.3) years with range of 29-61yrs. In group 2 mean age was 34.35 (± 10.6) years with range of 19 -55 yrs. The age difference between the groups was not significant. ($p= 0.603$).There were no significant

differences between the two groups for age and gender though demographic profile of the three groups showed a female predominance in each group with mean age in the range of 18 to 70 years.

Intraoperative excessive bleeding from nasal mucosa in EX DCR group was 60% and 20% in EN DCR group. Also difficulty in localization of sac was 35% in EX DCR and 10 % in EN DCR. Difference in intraoperative complication was not significant ($p = 0.42$)(Table 2)

Anatomical success at the end of 3rd month was achieved in 18(90.0%) cases for EX- DCR and 16 (80.0%) cases for EN-DCR.

There was no statistically significant difference regarding anatomical success rate (patency) between these groups (X^2 test =2.264, $P = 0.322$). (Table 3)

Table 1 Incidence of various modes of presentation

Modes of presentation	Group 1		Group 2	
epiphora	20	100%	20	100%
mucocoele	3	15%	1	5%
discharge	8	40%	6	30%
Nasal obstruction	6	30%	7	35%
fistula	0	0	0	0

Table 2 Incidence of Complications

Complication	Group 1		Group 2	
Intraoperative				
Excessive bleeding	12	60%	4	20%
Difficulty in localization of sac	7	35%	2	10%
postoperative				
Periorbital pain (1 st wk)	20	100%	20	100%
Periorbital swelling(1 st wk)	20	100%	14	70%
Suture abscess	4	20%	0	0
Epistaxis	1	5%	2	10%

Table 3 Follow up

parameters	Group 1				Group2			
	1 st wk	2 nd wk	4 th wk	12 th wk	1 st wk	2 nd wk	4 rd wk	12 th wk
Weeks								
Sac syringing								
Patent	20	18	17	17	19	18	16	16
Obstructed	0	2	3	3	1	2	4	4
Subjective assessment								
Pain	20	18	06	05	20	20	15	08
Epiphora	08	06	03	03	04	03	03	03

Table 4 Success Rate

OUTCOME	External DCR		Endoscopic DCR	
	No.	%	No.	%
Successful	18	90	16	80
Failure	02	20	04	20
Total	20	100	20	100

Discussion

In our study incidence of dacryocystitis due to NLDO in females was 70-75% and in males was 25-30% (3:1). This correlated with the study of Dolman et al (2003) (Female:male ratio 3:1) and Duke elders who observed similar incidence of 75-80% in females and 20-25% in males.⁶This finding could probably be attributed to narrower lacrimal fossa in females predisposing to obstruction as stated by Jorge et al.⁷

The mean age in our study was 44.25 (\pm 8.3) years in 1st group, and 34.35 (\pm 10.6) year in group 2nd Wormald et al (2003) found average age of presentation to be 59 years⁸ while Weidenbecher et al (1994) in their study observed maximum incidence between 50-80 years.⁹Our observation did not corroborate with literature studies, which may be attributed to small sample size.

The success rate of external DCR has been reported at 90% to 97%, depending on the surgeon's experience by Olver JM et al (2003). The success rate of endoscopic DCR has been reported between 82% to 86% (Rice DH et al, 1990; Shun Shin et al, (1998). In our study external DCR had a success rate of 90% and endoscopic 80% although difference was statistically insignificant yet reported success rate in the literature correlates with our study.

Intraop complication vis. excessive bleeding from nasal mucosa was found in 60% and 20% patients and difficulty in localization of sac was encountered in 35% and 10% respectively in group 1 and group 2. Intraoperative bleeding was found to be less in Endoscopic DCR compared to EX DCR. ($p=$ 0.0098). This finding corroborated with study done by Moras et al.

Conclusion

Although success rates of both the surgeries are comparable, endoscopic DCR has an added advantage of avoidance of cutaneous scar, cosmetically more acceptable by young patients, less intraoperative bleeding while simultaneously allowing correction of any intranasal pathology over EX DCR, but it has certain drawbacks like provision of expensive instrumentation, risk of complication of anaesthetic drugs (GA).

Also external DCR has many advantages over EN DCR like small, no requirement of nasal packing, short learning curve, long term patency of ostium. So the choice of surgery should depend upon patient's preference, availability of resources and surgeon's expertise.

Limitations

Being a small sample size, results obtained from the study may be insufficient to draw conclusion on firm grounds

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