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A Comparative Analysis of Endoscopic Transnasal Dacryocystorhinostomy and External Dacryocystorhinostomy

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Abstract
BACKGROUND: *Dacryocystorhinostomy (DCR) surgery is a procedure that aims to eliminate obstruction within the lacrimal sac, and relief the epiphora. A DCR procedure involves removal of bone adjacent to the nasolacrimal sac and incorporating the lacrimal sac with the lateral nasal mucosa in order to bypass the nasolacrimal duct obstruction. external dacryocystorhinostomy has been the procedure of choice since a century but advent and advancement on endoscope has brought revolution in minimal invasive transnasal procedure there by giving us Endonasal dacryocystorhinostomy procedures. Here we compare both the procedure to asses the best possible treatment option for Epiphora and dacryocystitis.*
METHODS: *The prospective study involved all the patients with Chronic dacryocystitis who comply with inclusion and exclusion criteria and underwent Transnasal endoscopic DCR & External DCR. A total of 40 patients were selected in a period of 10 months from Feb 2019 to Nov 2019 into the study who were further divided into two groups. 10 underwent External DCR AND 10 underwent Endonasal DCR. The intra operative and post operative finding were further evaluated.*
RESULTS: *Both External DCR and Endonasal DCR had comparatively equal success rate and comparable complications with no statistical significant difference.*
CONCLUSION: *External DCR gives opportunity to examine the pathology in the sac where as Transnasal Endoscopic DCR is better in young female as it leaves no external scar and very useful in revision surgery. The correct approach for patient should be determined based on investigative finding and discussion with patient as both the procedure have good results and successful out come post operatively.*
Keywords: *Chronic dacryocystitis, Dacryocystorhinostomy,external dacryocystorhinostomy, Endoscopic dacryocystorhinostomy.*

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I. Introduction

Chronic dacryocystitis is defined as the chronic inflammation of the lacrimal sac due to stricture of the nasolacrimal duct secondary to chronic inflammation. The usual presenting symptom is epiphora, which is aggravated by exposure to wind and dust. In some cases there may be swelling at the site of the sac and the conjuctiva frequently inflamed. On applying pressure over the sac, mucopus or sometimes frank pus regurgitates through the puncta. The diagnostic procedures like lacrimal probing, lacrimal irrigation, dacryocystography, the jones dye test, the fluorescein test and radionuclear cystography can be performed and exact pathology can be confirmed.

Dacryocystorhinostomy (DCR) surgery is a procedure that aims to eliminate fluid and mucus retention within the lacrimal sac, and to increase tear drainage for relief of epiphora. A DCR procedure involves removal of bone adjacent to the nasolacrimal sac and incorporating the lacrimal sac with the lateral nasal mucosa in order to bypass the nasolacrimal duct obstruction. This allows tears to drain directly into the nasal cavity from the canaliculi via a new low-resistance pathway.

For over a century, the gold standard of treatment for epiphora due to nasolacrimal duct obstruction has been dacryocystorhinostomy. Toti in 1904, reported this procedure for external dacryocystorhinostomy. He made a hole in the lacrimal sac and another hole in the nose and approximated the two with a tight pressure bandage.[1]

This operation has got refined over the years into the present day external dacryocystorhinostomy. Endonasal dacryocystorhinostomy procedures were first described in 1893 by Caldwell, in which a portion of the inferior turbinate was removed and the nasolacrimal duct was followed till the lacrimal sac[1]. With advent of rigid nasal endoscopes in the 1970s, the intranasal endoscopic approach to the lacrimal sac was possible.

The transnasal endoscopic DCR gave minimal invasive approach to DCR and no external scar, no disruption of the medial palpebral ligament or the angular facial vessels as a benefit over external DCR.

Here in this study we compares the outcome of external DCR with that of Trans nasal endoscopic DCR.

II. Methods

This prospective study included all the patients with Chronic dacryocystitis who comply with inclusion and exclusion criteria and underwent Transnasal endoscopic DCR & External DCR. A total of 40 patients were selected in a period of 10 months from Feb 2019 to Nov 2019 into the study who were further divided into two groups.

Group A – 20 Patients who underwent External DCR.

Group B – 20 Patients who underwent Transnasal endoscopic DCR.

Inclusion criteria:

1. Patients with constant Epiphora/ Dacryocystitis and Naso-lacrimal duct obstruction confirmed clinically by syringing and by dacryocystography.
2. Patients with age more than 15 years.
3. Patients willing to undergosurgery.

Exclusion criteria:

1) Patient less than 15 or more then 60 years of age
2) Patients with nasal and canalicular pathology
3) Patient with bleeding disorder
4) HbsAg and HIV positive patients and other chronic inflammatory diseases that would interfere with wound healing.
5) Hypertension, Diabetes mellitus, chronic cardiac illness, chronic renal failure patients, malignancies, and medically certified as unfit for the anaesthesia.

All the 40 patients underwent the procedure in local anaesthesia with sedation and all the procedure were uneventful.

III. Results

The study was performed on 40 patients of which 20 patients underwent External DCR and 20 underwent Transnasal endoscopic DCR. Written and informed consent was taken from all the patients about there involvement in the study and use of data collected for publication and demonstration. Maximum number of patients were of 25 to 45 age group. Damage to the anterior group of ethmoid air cells was the most commonly encountered complication in external DCR and difficulty in removal of lacrimal bone in endoscopic DCR.

Post operatively epiphora was seen more commonly in External DCR and presence of granulation tissue seen commonly in Endoscopic DCR and also being the common cause of failure of surgery.

TABLE 1:AGE WISE DISTRIBUTION OF PATIENTS

AGE	GROUP 1	GROUP 2
15-25	1	1
26-35	7	11
36-45	9	6
45-60	3	2

TABLE 2:INTRAOPERATIVE COMPLICATIONS

INTRAOPERATIVE COMPLICATIONS – GROUP 1		INTRAOPERATIVE COMPLICATIONS – GROUP 2	
COMPLICATIONS	**NO. OF PATIENTS**	**COMPLICATIONS**	**NO. OF PATIENTS**
INTRAOPRATIVE BLEEDING	1	INTRAOPRATIVE BLEEDING	2
TEARING OF ANTERIOR NASAL FLAP	4	TRAUMA TO MIDDLE TURBINATE	1
DAMAGE TO ANTERIOR ETHIMODAL AIR CELLS	3	DIFFUCULTY IN REMOVAL OF LACRIMAL BONE	3
LACERATION OF PUNCTUM	3	DAMAGE TO ANTERIOR ETHIMODAL AIR CELLS	1

TABLE 3 :POST-OPERATIVE COMPLICATIONS

POST-OPERATIVE COMPLICATIONS – GROUP 1		POST-OPERATIVE COMPLICATIONS – GROUP 2	
COMPLICATIONS	**NO. OF PATIENTS**	**COMPLICATIONS**	**NO. OF PATIENTS**
HAEMORRHAGE	0	HAEMORRHAGE	0
INFECTION	1	GRANULATION IN SAC	3
HYPERTROPHIC SCAR	1	EPISTAXIS	1
EPIPHORA	4	EPIPHORA	2

TABLE 4 :CAUSES OF FAILURE OF SURGERY

CAUSES	GROUP 1	GROUP 2
ADHESIONS	1	0
SYNECHIAE	1	1
GRANULATION TISSUE	1	2

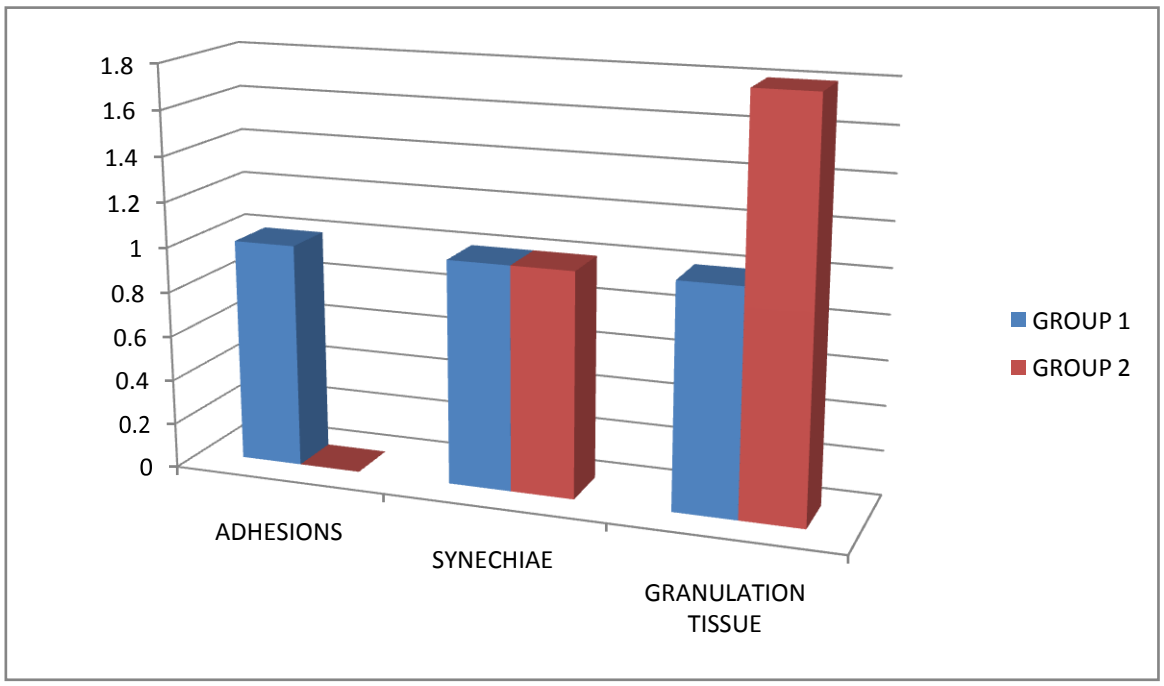

Figure -1: Causes of failure of surgery.

IV. Discussion

The success rate of procedure was defined by anatomically patent naso-lacrimal system confirmed by irrigation at the end of 3 months from surgery. In age wise distribution of patients a maximum incidence was seen in the 2nd and 3rd decades of life. In a study which was conducted by Cokker et al (2000), the age of the patients ranged from 4 to 76 years.[2] In the present study, the patients were aged between 15 to 60 years of age. There is a decline noticed between both extrems of age this may be due to fact that the amount of lacrimal secretion is less in ectermes of age (Dutton 1994). In addition to this the exposure to dust and allergies is more in the 2nd to 4th decade of life.

32 of the patients were females and only 8 were males. In a study conducted by Sprekelsen et al (1996), 80% of the patients were females and only 20% were males.[3] . The striking prediliction for females can be explained by the narrower lumen of the bony naso-lacrimal canal. It is also possible that endocrine factors may be playing a role in the aetiology of chronic dacryocystitis.

The most common intra operative complication seen in external DCR was tearing of anterior nasal flap followed by damage to anterior ethmoidal air cells and laceration of punctum.

Where as in endoscopic DCR intra operative bleeding was seen in two cases primarily due to trauma to nasal mucosa other complications being difficulty in removal of lacrimal bone and damage to adjacent structure which was rarely seen.

The proper position for creating nasal stoma cannot be assed in external DCR and may end up damaging the anterior nasal flap and anterior ethmoidal air cells.

In transnasal endoscopic DCR the lacrimal bone is more hard as we go superiorly and difficulty may be seen in high up lacrimal bone, as the nasal mucosa is highly vascular there may be some amount of nasal bleeding intra operatively which can be stopped with 2%lignocaine mixed with adrenaline packing and warm saline wash.

Post operative complication was seen rarely in both the procedure more commonly recurrent epiphora was seen in both the types, followed by granulation tissue formation in endoscopic DCR. Most common cause of failure of surgery was granulation tissue formation in the nasolacrimal sac.

Both the procedures had minimal intra-operative and post-operative complications. Endoscopic DCR totally avoided an external scar and injury to the medial palpebral ligament and injury to the angular vein. The greatest advantage of endoscopic DCR is that, after making a wide excision of the lacrimal sac, the result could be checked on the operating table. The procedure was accomplished without interference from any of the external structures surrounding the eye. A success rate of 90% was observed in both the approaches. As described earlier the success of the procedure was defined as a patent lacrimal drainage system at the end of 3 months. The success rate of external DCR has been reported at 90% to 97%, depending on the surgeon's experience. (Olver JM, 2003)[4]. The success rate of endoscopic DCR has been reported between 82% to 86% (Rice DH et al, 1990; Shun Shin et al, 1998).[5,6] Our success rate with endoscopic DCR was comparatively equal to external DCR.

V. Conclusion

Most patients in the study were from 24-24 years of age with female preponderance more commonly involving left side of the eye due to more acute angle of nasolacrimal system.

Both External DCR and Endonasal DCR have comparatively equal success rate with no statistical significant difference.

External DCR gives opportunity to examine the pathology in the sac where as Transnasal Endoscopic DCR is better in young female as it leaves no external scar and very useful in revision surgery.

The correct approach for patient should be determined based on investigative finding and discussion with patient as both External Dacryocystorhinostomy and External Dacryocystorhinostomy have good results and successful out come post operatively.

DECLARATIONS

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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