Trans nasal powered endoscopic dacryocystorhinostomy with and without stenting

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Abstract: Study design; prospective randomized comparative study **Objective**: To compare the effectiveness of powered endoscopic endonasaldacryocystorhinostomy with and without stenting in patients with epiphora. **Methods**: An endoscopic dacryocystorhinostomy (EDCR) was performed in 40 patients diagnosed as having epiphora or chronic dacryocystitis due to complete nasolacrimal duct obstruction with patent canaliculi. the patients in this study were divided into 2 groups; group A; 20 patients (with stent = lacrimal tube) and group B; 20 patients (without stent). The surgery was performed in all patients by the same nasal surgeon andophthalmic surgeon. **Results**: In group A;17 patients (85 %)fulfilled the criteria of success while there were3 patients (15 %) withfailure, Revisionendoscopic DCR was performed in these cases and it improved subsequently. In group B; 18 (90 %) fulfilled the criteria of successwhile 2 cases (10 %) with failure was reported. Revision endoscopic DCR was performed in these cases and it improved subsequently, although the success rate in group B was more than that in group A, it was statistically non-significant **Conclusion**: powered endoscopic endonasaldacryocystorhinostomy with and without stenting are effective and safe techniques in treatment of epiphora with more good results with EDCR without stent.

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1.Introduction:

Epiphora is a common complaint in otolaryngology and ophthalmology, and usually has to be corrected surgically when caused by lacrimal drainage obstruction. Dacryocystorhinostomy (DCR) is a procedure used to create a lacrimal drainage pathway into the nasal cavity to reestablish the permanent drainage of a previously obstructed excretory system.[1] External dacryocystorhinostomy (DCR) for the treatment of nasolacrimal duct obstruction was first described by Toti in 1904. Caldwell described the first endonasal operative approach to the lacrimal system in1893. It was modified by West in 1910 and advocated by Mosher in 1921. Despite all this, end nasal approach could not gain popularity because of limited transnasal visualization. With the advent of rigid nasal endoscopes and fibreoptic light carrier systems, surgical access through the nasal cavity has been greatly enhanced because of better illumination and magnification. In 1989, McDonogh and Meiring described the endoscopic nasal DCR. Many modifications and different techniques in the Procedure have been described by different authors to establish that endoscopic DCR could be safely Performed in adults with less morbidity and comparable success rates to those with traditional external approach.[2]Now DCR includes minimally invasive procedures carried out with the use of endoscopes and lasers.[1]Endoscopic surgery is better than external DCR in preserving the lacrimal pump system and leaving no surgical scar. Patient preference and availability of each service should direct management. Hence endoscopic endonasal DCR surgery should be considered for primary treatment of nasolacrimal duct obstruction. [3]

2. Patients & methods:

A prospective randomized comparative study was carried out between January 2010 to December 2012, which included 40 patients were selected and diagnosed as having epiphora or chronic dacryocystitis due to complete nasolacrimal duct obstruction with patent canaliculi. Any patient with partial obstruction was excluded. Clinical examination and testing was doneto diagnose the nasolacrimal duct obstruction by regurgitation test, dye test and syringing.under controlled hypotensive general anesthesia with endotracheal intubation. Any nasal conditions as deviated septum and concha bullosa were treated simultaneously at the time of endoscopic surgery.An endoscopic DCR was performed eitherwith (intubation of the nasolacrimal duct with silicon tube) or without stent.

Surgical technique:

The patient was positioned supine with the head supported. The nose and affected eye were exposed in the operative field. The nasal cavity was packed

with nasal wicks soaked in adrenalinezed saline (1:50,000) for adequate decongestion to achieve a bloodless field. 30 degree with 4 mm diameter nasal endoscopes was used for surgery. The lateral wall of nose and around the axilla of the middle turbinate were infiltrated with adrenalinezed saline (1:50,000). A sickle knifewas used to make the mucosal incision starting one cm. above the lateral attachment of the middle turbinate to one cm. anterior to it then vertically for one cm. Frère elevator was used to elevate a1.5 cm strip of the mucosaanterior to the lateral attachment of the middleturbinate to expose the lacrimal fossa which is formed by lacrimalbone posteriorly and frontal process of maxilla anteriorly. The lacrimal bone was removed by a periosteum elevator and a small diamond burr connected to a drill was used to remove the frontal process of maxilla to expose the medial wall lacrimal sac.

The position of the lacrimal sac is confirmed by pressing the sac area externally which causes bulging of the lacrimal sac into the nasal cavity. A final rhinostomy of 1- 1.5 cm was performed exposing the entire medial wall of the lacrimal sac. A sickle knife was used to incise the medial wall of the lacrimal sac after tenting with lacrimal prope.. The medial wall of the sac was then removed by Blackesley forceps making as wide opening as much as possible.Patency of the stoma is checked by sac syringingand confirming the free flow of irrigating fluid by theendoscope. Only adequate amount of nasal mucosais removed so as to expose the sac, so that there isno granulations tissue formation. No stenting was performed in 20 patients and a silicone lacrimal tube was used as a stent in 20 patients. Nasal packing is done for 48 hrs. The patients were discharged in the same day of surgery after full recovery.

Postoperative care and follow up:

Patients were advised to use antibiotic steroid eye drops, nasal decongestant spray, and regular saline nasal irrigation for 2 weeks. Nasalendoscopy , sac syringinganddye test were done after one month to check the patency of the stoma and toremoveany crusts orgranulations if present .Then patientswere followed every month for3monthsthen at6months and 1year.

The patients were evaluated according to;reliefof symptoms,endoscopic visualization ofthepatent stomaand positive dye testwere considered as a successfulresult .A failed procedure was reviewed at3monthsandassessed for its cause and revision surgery. Anyunderlyingcause offailurewas treated first andthenrevisionsurgery performed.

3. Results:

The study was carried out between January 2010 to December 2012, included 40 patients 18 males (45 %) and 22 females (55 %) their ages ranged from 8 to 60 years old(mean 42.7 years), diagnosed as having epiphora or chronic dacryocystitis due to nasolacrimal duct obstruction with patent canaliculi, 23 in right eye and 17 in left eye. 4patients in group A and6patientsingroupB under wentseptoplasty before EDCR. Patients were followed after one month then every month for3 monthsthen at6months and 1year.(Table1).

Patient's duration of symptoms ranged from 6 monthsto26 months with an average of22.4months. Patientswere divided into2groups ;group A (with a stent) includes20patients and group B (without a stent) includes the remaining20patients (Table 2).

Relief ofsymptoms and endoscopic visualization of the patent stomamade into the lacrimal sac with sac syringing and positive dye test determineda successful outcome.In group A;17 patients (85 %)fulfilled the criteria while there were3 patients (15 %) withfailure. Revisionendoscopic DCR was performed in these cases and it improved subsequently.

In group B; 18 (90 %) fulfilled the criteria while 2 cases (10 %) with failure was reported. Revision endoscopic DCR was performed in these cases and it improved subsequently,However there was more success and less failure in group B "without a stent" than group A "with a stent" but it was statistically non-significant as p value = 0.5 in success and 0.58 in failure (Table 3).

As regarding postoperative complications in both groups, there were few complications thus reflecting the safety of both techniques

Table 1:Demographic data

Age:	range (8-60 y)	mean (34.7)
Sex :	males 18 (45 %)	females 22 (55 %)
Side:	RT. 23	Lt. 17
Etiology:		
	1-Congenital: 1 (2.5 %)	2- traumatic: 3 (7.5 %)
	3-Inflammatory: 19 (47.5 %)	4- idiopathic: 17 (42.5 %)

Table 2:Symptoms and signs in both groups

Symptoms;	
Epiphora; 40 (100 %)	discharge; 27 (67.5 %)
Swelling; 25 (62.5 %)	
Signs;	
+ veregurge test; 40 (100 %)	- ve dye test; 40 (100 %)
- ve syringing; 40 (100%)	

Table 3: Success and failure rates in both groups

	Group A	Group B	Qi square	*P* value
Success	17(85%)	18(90%)	0.23	0.5
Failure	3(15%)	2(10%)	2.9	0.58

Table 4: postoperative complications in both groups

Postoperative complications	Group A	Group B
Granulations	4(20%)	1(5%)
Lacerations of puncti	2(10%)	0(0%)
Infection	6(30%)	2(10%)
Crustations	5(25%)	1(5%)
Adhesions	3(15%)	1(5%)

4. Discussion:

Endoscopic DCR (EDCR) is considered as one of recent surgical techniques in management of epiphora due to chronic dacryocystitis. Intranasal endoscopic DCR is a simple, minimally invasive, day care procedure and had comparable result with conventional external DCR. [4]

In this study, EDCR was evaluated either with or without stent in 40 patients that were followed within one year to judge the effect and safety of both methods of EDCR. our results showed that the success was more in group B (EDCR without a stent) that was 90 % while it was 85% of patients of group A (EDCR with astent).

In this study, very low incidence of complications that were more with EDCR with a stent thus reflecting safety of EDCR in both groups

These results were similar to those obtained by Yi-fan *et al.,* that shown no significant difference in the success rates between the EDCR with and without silicone intubation (p value = 0.81)[1]

Also similar results were reported by Ashok *et al,.* 2006 in which eighteen children underwent endoscopic the DCR procedure. There were 5 males (27.7%) and 13 females (72.3%) with the maximum incidence between the age group of 4—7 years (age ranging from 10 months to 11.2 years). The follow up period ranged from 6 to 19 months average being 8.2 months. Relief of symptoms and endoscopic visualization of the patent stoma made into the lacrimal sac with sac syringing determined a successful outcome. Seventeen patients (94.4%) fulfilled the criteria.[2]

This was similar to Shahrokh *et al*, 2010 that stated that, there were no major complications during or after the operations. Complete cure occurred in 89.5% (after 6 months) and 74.2% (after 1 year) of the cases. Anatomical patency was shown by lacrimal system irrigation with fluorescein in 81.5% of the cases after the 12-month follow-up. It was found that patients younger than 55 years, with symptoms lasting less than 1 year, and without history of nasal problems, had significantly higher surgical success rates. Moreover, rates of failure were significantly lower in cases whose canaliculi were intubated for 5 to 6 months.[5]

This also was comparable to results obtained by Thomas *et al,* 2012with success rate was 82.3% while it was 85.7% among the controls. Granulations, adhesions, and obliterative sclerosis occurred in a similar number of patients of both groups. However, granulations and adhesions did not have a bearing on the success rate in either group.[6]

In the study of Pittore *et al.,* the results in patients undergoing primary EDCR were better than those for revision of ExDCR, with an anatomical and functional success rate of 94.3%. Results following revision of ExDCR were 90.9% including one patient who was submitted to a second procedure. With very low incidence of complications as no major complications occurred intra- operatively. One post-operative septalhaematoma occurred, that was treated with incision and drainage, one epistaxis, treated

conservatively, and 4 cases of septalsynechia which, however, did not interfere with functional outcome or require further treatment.[7]

In the study of *et al.,* the overall success rate was 79% (49/62), with 96.3% (26/27) success for anatomic and 65.7% (23/35) for functional NLDO. Success rates for anatomic NLDO were 100% (8/8) with selective stenting and 94.7% (18/19) with routine stenting (*P*>.05). Success rates for functional NLDO were 60.9% (14/23) with selective stenting and 75% (9/12) with routine stenting (*P*>.05). In the selective stenting group, 2/8 of the anatomic obstructions and 8/23 of the functional obstructions required stents.[8]

Also in a recent study in which out of 129 patients, 90 underwent silicon stent placement (group A) as against 39 patients in which DCR was done without stenting (group B). Out of 90 patients of group A, 84 (93.33%) showed complete recovery of symptoms (epiphora grading 0-1) Out of 39 patients of group B 35(92.30%) showed complete recovery of symptoms at six months follow up. Patients with stent placements showed a slightly higher rate of success as compared to patients without stenting (93.33%) and (92.30%). There was however no statistical difference in the success rate between group A and group B (*p*- 0.80).[9]

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