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ENDOSCOPIC DACRYOCYSTORHINOSTOMY VERSUS EXTERNAL DACRYOCYSTORHINOSTOMY IN AL- JUMHORY TEACHING HOSPITAL IN MOSUL CITY

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ABSTRACT

Background: Endoscopic Dacryocystorhinostomy (DCR) is a minimally invasive procedure used to bypass the nasolacrimal duct. **Objective***:* The objective of this study is to assess the outcome of endoscopic transnasal Dacryocystorhinostomy (DCR) in our center (Al-Jumhory Teaching Hospital) in treating 63 patients complaining of epiphora and recurrent or chronic dacryocystitis, comparing our results with the reviewed literature. **Patients and Methods**: sixty three (63) patients, with age range (from 5-55 years), underwent endoscopic DCR in the period from March/2008- July/2009 in Ophthalmology Unit in Al-Jumhory Teaching Hospital/ Mosul/ Iraq. Standard procedure was implemented using the drill and inserting temporary' stents. Patients were followed up for 6-13(average of 9.5) months to assess the outcome of surgery. **Results**: There was improvement in symptoms in 45 patients with disappearance of epiphora with 72% success rate. two patient**s** had orbital fat prolapse and 11 patients developed postoperative adhesions. No major complication, as severe bleeding, CSF leak or serious orbital injury occurred. Revision surgery was done on 10 failed cases, only 3 patient**s** had clinical improvement. The total success rate after revision surgeries is 76%. **Conclusion:** We conclude that endoscopic DCR is a safe technique in treating nasolacrimal duct obstruction with an acceptable success rate that matches many studies.

KEYWORDS: Dacryocystorhinostomy (DCR).

INTRODUCTION

DCR is a surgical procedure by which lacrimal flow is diverted into the nasal cavity through an artificial opening made at the level of lacrimal sac. The operation can be carried out using an external or endoscopic surgical approach. The external approach was described first by Toti in1904[1] & became the surgery of choice for most ophthalmologists.in 1989 McDonough & Meiring described endoscopic trans nasal DCR,[2] since this description a number of modifications using Lasers has also been described as a useful tool in endoscopic DCR. There are certain advantages of the endoscopic DCR[3], there is no external scar, it preserves the lacrimal pump system, any intra nasal pathology that have caused failure of a previous procedure can be addressed including adhesions, enlarged middle turbinate and septal deviation. More of the lacrimal sac is preserved with the endoscopic procedure. There is only 1 in 40 instance of air regurgitation during nose blowing after endoscopic procedure, while the incidence is higher with the external procedure. There is also diminished risk of CSF leak with the endoscopic procedure. There are also some disadvantages, no mucosal flaps are created, mucosal flaps have been found to decrease recurrence rates in the external procedure. a smaller rhinostomy is performed in endoscopic DCR than external procedure with higher healing rate. There are certain complications to an endoscopic DCR some are unique to the endoscopic approach and some are shared by the external approach. in particular, closure of the ostium, and intranasal adhesion from the endoscopic procedure can occur. Canalicular laceration, pyogenic granuloma, and CSF leak have been reported. orbital hemorrhage can certainly occur from the interior ethmoid artery during the endoscopic procedure. though many types of endoscopic approaches have been attempted, long term success rates have not been equivalent to that achieved with external DCR which approximated 90%.[4],[5],[6]

The lacrimal system consist of superior and inferior puncta, which turn into the superior and inferior canaliculi, which then join into the common canaliculus. this region is known as the upper lacrimal system. the common canaliculus turns into the nasolacrimal sac which is about 12-15m long which is eventually narrow s into the nasolacrimal duct. which is about 18 mm long, and that eventually empties into the inferior meatus. the sac and the duct comprise the lower lacrimal system. Tears move from the eye into the nose through a mechanism called the lacrimal pump. lid movement causes the puncta to close against each other, pushing tears into the lacrimal sac, which contains the lacrimal lake. when the eyes open a negative pressure is created in the lacrimal lake, pushing it down further in to the nose. The lacrimal fossa overlies the lacrimal sac, a very good land mark is the anterior portion of the middle turbinate(figure1). The lacrimal fossa is bounded by the anterior lacrimal crest, which consists of the frontal process of maxillary bone. the posterior lacrimal crest is made of the lacrimal bone itself.

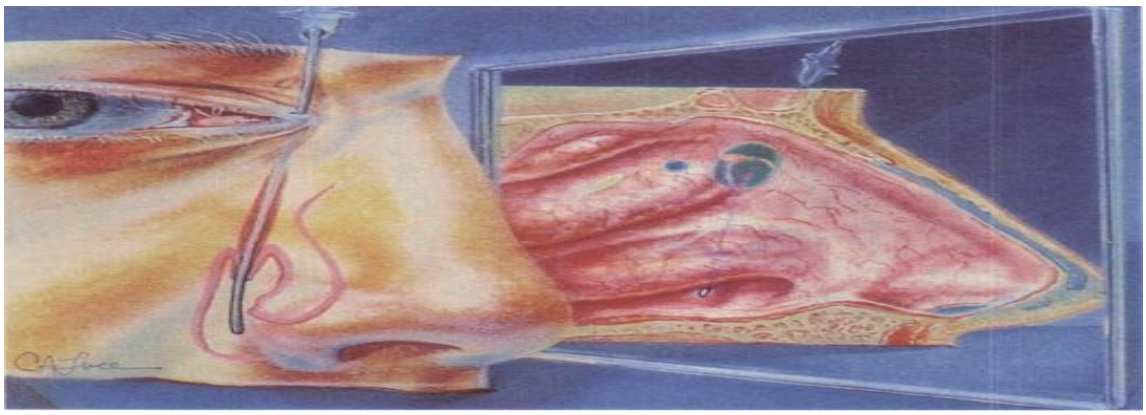


Figure 1: the origin of middle turbinate corresponds to lacrimal fossa.

MATERIALS AND METHODS

Sixty three patients were included in this study which was performed in the departments of ophthalmology and ENT in Al-jumhory teaching hospital/Mosul/Iraq. in the period from march 2008- July 2009.patients' age range from 5-55years (mean 31.44). all patients were evaluated in the ophthalmology department before surgery, pre-operative evaluation consists of patient's history to note whether or not the epiphora is unilateral or bilateral and whether tearing is constant or intermittent, environmental factors such as allergies, medications history, or previous history of trauma or surgery. On physical examination ; palpating the region of lacrimal sac to elicit any reflex from the puncta, the eye lids were examined for any laxity or inflammation or visible punctual obstruction. the canaliculi were evaluated through probing, and the nasolacrimal duct further evaluated through irrigation of the duct with a syringe. Jones test was performed to test the patency of the nasolacrimal system. the test is performed by placing fluorescein in the conjunctiva sac and seeing whether or not the fluorescein can be visualized in the nose if after period of five minutes there is impaired out flow, it's likely that there is an obstruction somewhere in the duct or somewhere in the system, if we don't see any dye in the nose after five minutes we perform a secondary test by irrigating the duct, if after irrigation no dye is found in the nose, the dye has never reached the lacrimal sac, the obstruction is likely proximal, if we see the dye after irrigation then the dye did reach the nasolacrimal sac and it's likely that the obstruction is distal. In the ENT department there were further assessment by diagnostic nasal endoscopy. CT was done for 2 patients with nasal polyp that didn't resolve with proper medical therapy.

Patients symptoms and endoscopic findings of the neo-ostium were evaluate post operatively, irrigation through the punctum was performed to evaluate the patency the neo- ostium post operatively. surgery was considered un successful if the patient had one or more of the following post-operative out comes.

1-no marked improvement of pre-operative chronic epiphora or any episode of dacryocystitis.

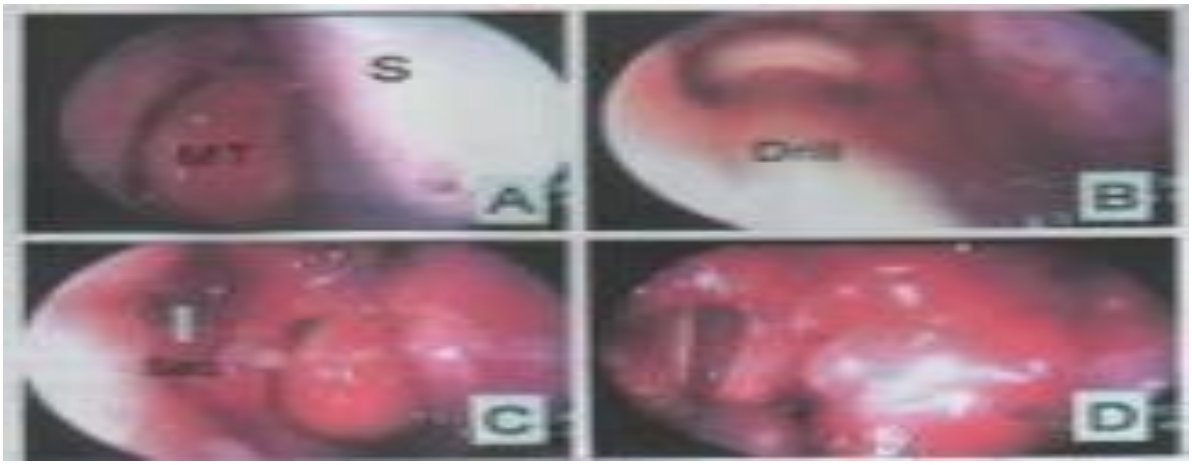
2-inability to irrigate the lacrimal system.

3-nasal endoscopy revealing obstruction of the neo-ostium with granulation tissue or synechia.

The operative procedure

All endoscopic procedures were done under general anesthesia in combination between ophthalmologists and ENT surgeons. during the procedure, zero degree endoscope was used exclusively through out. the first step done by the ENT surgeon where he do incision of mucosa just anterior to the anterior end of the middle turbinate (figure 1), the mucosal flap was elevated to expose the frontal process of maxilla. an angled drill with diamond bur was used to remove the bone and to expose the lacrimal sac. the ophthalmologists identify the sac by propping it from the lower canaliculus. the bony window was enlarged to expose the sac as much as possible. the inner part was first incised with sickle knife and the medial portion excised. The ophthalmologists insert the stent (a silicone bicanalicular tube – canalicular intubation set tube) from both upper and lower canaliculi and knotted in the nose haemostasis was achieved by using patties soaked with 1:1000 adrenaline. Two

patients had additional endoscopic sinus surgery to treat co-existent sinus disease. the step was performed by the ENT surgeon. also eighteen patients needed septoplasty done by the ENT surgeon in conventional method to get access to the lacrimal sac area. these interventions were decided prior to the surgery through ENT assessment. figure (2) shows the step of operation in a patient who needed concomitant septoplasty.



Figure(2): the steps of endoscopic DCR on the right side. see the sialastic sheet S on the septum after septoplasty (A). drilling of the area anterior to middle turbinate MT(B). the sac is opened (C). stent is inserted (D).

Post-operative care and follow up

All patient were given oral antibiotics for 2 weeks topical antibiotics were given for further two weeks. patients were followed weekly in the first month and monthly for at least 6 months. patient with nasal polyps were given nasal sprays for three months.the patency of lacrimal passages is checked with fluorescein dye applied into the conjunctiva sac at the time of stent removal at the third month and the recovery of fluorescein in the nose checked with cotton wick in the nose Figure (3), or by nasal endoscopic examination when there is suspension, figure(4) shows the endoscopic finding at the time of stent removal.

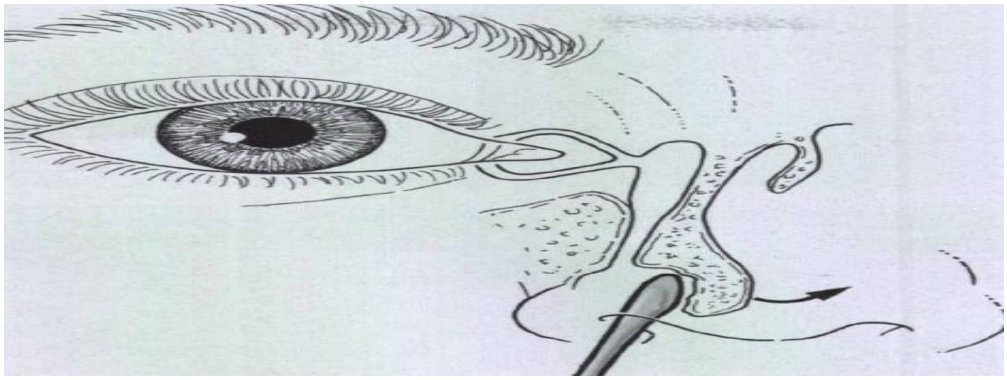


Figure 3: checking of patency with fluorescein.

Figure 4: shows the endoscopic finding at the time of stent removal. the fluorescein dye applied to the conjunctiva exists into the nasal cavity.

RESULTS

63 patients under went endoscopic DCR for nasolacrimal duct obstruction and or chronic dacryocystitis, the distribution of age, gender &involved side of our patients show in table (1).

Table 1: demographic distribution of DCR patients (T=total R=right L=left).

Age (years)	total	gender		Side			
		m	f	Unilateral			Bilateral
				R	L	Total	
1-10	3	0	3	0	3	3	0
11-20	14	7	7	7	6	13	1
21-30	11	3	8	5	6	11	0
31-40	19	6	13	8	11	19	0
41-50	9	2	7	2	7	9	0
51-60	7	2	5	3	3	6	1
Total	63	20	43	25	36	61	2

Table 2: shows the details of additional DCR procedures.

Age(years)	Number	FESS	Spt
1-10	3	0	0
11-20	14	1	4
21-30	11	0	2
31-40	19	0	8
41-50	9	1	4
51-60	7	0	0
Total	63	2	18

Table(2) additional procedures needed in endoscopic DCR.

FESS=functional endoscopic sinus surgery spt=septoplasty

18 of them had septoplasty to correct obstructing septal deviation. 2 patients (19,42) female patients had endoscopic sinus surgery done at the same session to treat co-existent sinus disease. In 2 male patients orbital fat prolapse occurred during the surgery, yet the operation was completed with no serious post-operative complications. In 11 patients post-operative adhesion occurred. No major complications like severs hemorrhage, orbital injury, optic nerve injury, or CSF leak occurred. Follow up period was 6-13 months(average 9.5) and the stent was removed at the end of third post-operative month. The primary success was 72 % (71.428%). 45 patients had clinical improvement with relief of epiphora and no further attacks of post-operative dacryocystitis. it was evidenced by endoscopic of examination neo-ostium in the nose with fluorescein dye applied in to the conjunctiva, the dye was seen existing through the neo-ostium into the nose. 18 patient had no or little improvement of their complaint. Of them 5patients were missed. 13 patients had further assessment. 3 patients were found to have canalicular obstruction missed in pre-operative assessment which was evidenced by normal nasal endoscopy of neo- ostium and failure of irrigation of lower lacrimal canaliculus. 10 patients with adhesion granulations in the operative site underwent revision surgery with lysis of adhesions and granulation tissue and re inserting the stent. nasal steroid drops (betamethasone) was prescribed to patients to prevent granulation. Only 3 patients improve after 3 months. 7 patients who failed the revision surgery were underwent conventional DCR. The following Table (3) shows the results and complications of endoscopic DCR in this study.

Table 3: complications and results of endoscopic DCR.

Age(y)	No.	Complications	success	Failure
1-10	3	0	3	0
11-20	14	3 (AD)	10	4
21-30	11	8(6:AD)(2:OP)	4	7
31-40	19	2(AD)	14	5
41-50	9	0	7	2
51-60	7	0	7	0
Total	63	13	45	18

AD= adhesion OP=orbital fat prolapse

DISCUSSION

The advantages of the endoscopic approach in DCR are minor traumatization, preservation of lacrimal pump function, and reduction of surgical time. The success rate of endoscopic DCR is comparable to that of the traditional external procedure, with minimal morbidity and the possibility to treat simultaneous Sino nasal diseases.[7]

It is not easy to compare the published success rates of lacrimal surgery because different studies use different criteria of success and varying patient selection. In 1999 the Royal College of Ophthalmologists published guideline for clinical governance suggests that freedom from epiphora 3 months after surgery is the marker for a satisfactory procedure.[8] In our patients, the success was determined by resolution of symptoms and anatomic patency assessed by fluorescein flow on nasal endoscopy. The primary success rate in our study is 72%, and the follow up period was averaged 9.5 months (from 6- 13 months). The success rate increased to76%(76.190%) after revision surgeries.

Reported success rates of endoscopic DCR in several reviewed papers range from 79.4% to 96%[5][7][9][10][11][12] while laser endoscopic DCR is successful between 58% and 85%.[12] Success rates of 94% and 58% have been reported in two groups of patients that underwent endoscopic DCR, with expert and non-expert surgeons, respectively.[7]

If we compare the success rate of this study with the above mentioned literatures, we see that the total success rate is 76%. In the first 28 cases in this series we had success rate of 60.71(17 out of 28), in the second 35 patients, we had only 7 failures making the success rate 80%. These figures match many reviewed studies.

When we first performed endoscopic DCR, it was still a new experience for the surgeons in Mosul center. The improved results in the second half of cases confirms the learning curve of the endoscopic procedure which was demonstrated in several studies, with higher success rates in more experienced surgeons.[5]

The endonasal approach often requires septal or turbinate surgery to optimize access to the lacrimal area. The incidence of concomitant procedures in a study was 21.5% of patients required additional endonasal procedures to improve access to the lacrimal area.[13] Another study showed that 35% of patients needed septoplasty, and 19% had additional endoscopic sinus surgery.[14] In our study18 patients(28%) needed septal correction, and 2 patients(3.17%) needed sinus surgery. Complications of endoscopic DCR include re-stenosis of the opening, bleeding from the nasal cavity, orbital injury, CSF leak through a fractured ethmoid and corneal abrasion or canaliculi erosion due to overly-tight silicone tube placement.[15] The only significant complication encountered in our patients was two cases of orbital fat prolapse during surgery, which had no significant sequel. Similar case was noticed (one case of orbital fat exposure) in a study on 36 patients using powered drill.[16] The most common cause of a surgical failure in endoscopic DCR is obstruction of the neo-ostium by granulation tissue or synechia that forms postoperatively[17][5] to avoid or prevent obstruction of the neo-ostium, some adopted the use of steroids or mitomycin-C.[18] In our patients, we used topical steroid drops (betamethasone) in those in whom granulation tissue was evident on nasal endoscopy in an attempt to prevent or reduce recurrence.

Although silicone stents are absolutely inert and usually harmless, on prolonged placement they can act as a nidus for granuloma formation and infection, leading to failure of the lacrimal procedure in the long run.[19] Removal of the stents before 3 months is considered a cause of failure, granulation tissue may be detected after 3months of stenting.[7] We adopt removal of the stents at the end of the third month post operatively.

CONCLUSION

Endoscopic trans nasal DCR is an effective and safe method in treating patients with nasolacrimal duct obstruction and chronic or recurrent dacryocystitis with rapid relief of symptoms.it is easy to learn and results improve with increasing experience in this method. we recommended it as the first surgical step in the symptomatic patients with nasolacrimal duct obstruction who failed to respond to medical treatment.

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