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OUTCOME OF INITIAL 100 CASES OF ENDOSCOPIC DACRYOCYSTORHINOSTOMY IN KIRKUK

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ABSTRACT

This study aimed at determining the effect and safety of endoscopic dacryocystorhinostomy (ENDO-DCR) in initial 100 cases of nasolacrimal duct obstruction. This study was done in Kirkuk general hospital from 2010 to 2017 with a total of 100 cases. A standardized method was applied to all cases through employing an endonasal technique to the lachrymal sac. Then, an operative resection was applied to the mucosa of nose, lacrimal bone and a part of the anterior maxilla. Next, a complete removal of the medial wall of the lacrimal sac was done. A tube of canalicular silicone intubation was placed for 6 months after operation. The key results of such measures were epiphora resolution, lack of discharge and clearness of the ostium. The success of ENDO-DCR method with adjunctive tube of canalicular silicon intubation was demonstrated in 80 cases (80%) and 10 cases represented acceptable improvements. However, there were minor complications faced during or after operation period. Finaly Endoscopic dacryocystorhinostomy is a safe and effective method for treating nasolacrimal duct obstruction in adults and children with nasolacrimal duct obstruction and epiphora.

Keywords: Epiphora, Nasolacrimal duct obstraction, Epiphora, DCR.
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النتائج المبدئية لمائة حالة لتصليح القناة الدمعية عن طريق التنظير الانفي الجراحي في كركوك

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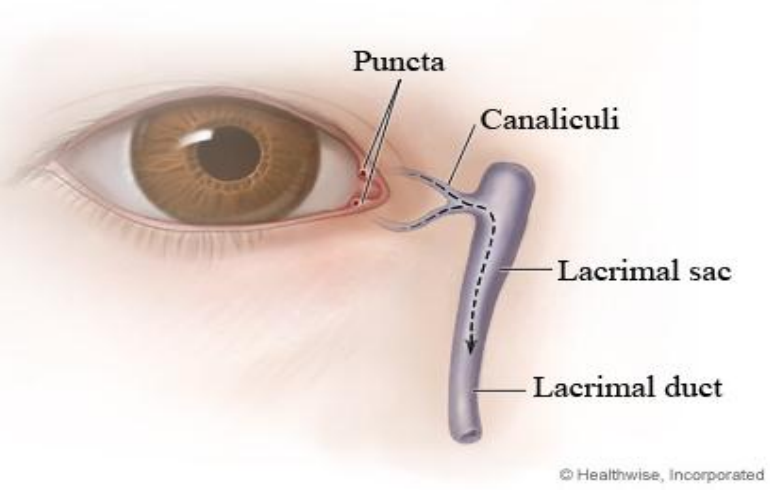
الملخص

الغاية من هذا البحث لبيان النتائج المبدئية لمائة حالة لتصليح القناة الدمعية عن طريق التنظير الانفي الجراحي في كركوك, اجري هذا البحث في مستشفى كركوك العام من سنة 2010 الى سنة 2017 وبحدود 100 مريض كانون يعانون من زيادة وافراط في دمع العين وبصورة مستمرة نتيجة لانسداد القناة الدمعية.حيث تم اجراء تصليح القناة الدمعية لهم عن طريق التنظير الانفي الجراحي. وكانت نتيجة العملية اختفاء الاعراض في 80 بالمائه من المرضى . مع تحسن ملحوظ في عشرة بالمائة من المرضى, وتوصلنا الى نتيجة ان عملية تصليح القناة الدمعية عن طريق التنظير الانفي الجراحي امينة وكفوءة مع مضاعفات بسيطة وقليلة نسبيا وبالاستنتاج نوصي باجراء التنظير الانفي الجراحي لانسداد القناة الدمعية بدلا من الطريقة التقليدية عن طريق الشق الجراحي وما يتركه من اثار على الوجه.

الكلمات الدالة: فرط تدمع العين, انسداد القناة الدمعية , تدمع العين , تصليح القناة الدمعية بالناظور DCR

1. Introduction

The purpose of the nasolacrimal system is to drain tears from the ocular surface to the lacrimal sac and finally the nasal cavity. Blockage of the nasolacrimal system can cause tears to flow over the eyelid and down the cheek. This is known as epiphora. The parts of nasolacrimal drainage system are puncta, canaliculi, lacrimal sac and nasolacrimal duct.



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In adults, primary acquired nasolacrimal duct obstruction (NLDO) represents a popular reason for epiphora. This disease is more common in women about 4-5 times (1). Several factors have been regarded in the acquired NLDO etiology. Chronic inflammation is the most common factor (2). In addition, local trauma and iatrogenic causes comprising complications of surgeries of rhinoplastic and maxillary sinus, and repair of midfacial fracture are supposed to be among other causative factors (2). In 1893, Caldwell first proposed the external approach. Since 1904, the external and endonasal approaches have been the surgical treatment accepted for this disease (3,4). Closing the opening of rhinostomy was regarded a major reason for surgical failure in external DCR. In external DCR, some methods have been proposed in order to provide a permanent opening of rhinostomy after the completion of mucosal healing. These methods include employing silicone stent, applying mitomycin-C to the opening of rhinostomy and stitching the mucous flaps. In the endonasal DCR, inserting the silicone stent represents the most normally favored method (5). Some studies believe that surgical consequences of endoscopic DCR are improved by employing silicone stent. In contrast, other works argue that this stent causes an operative failure because of the formation of granulation tissue and other complications, such as punctual erosions and incision of canaliculi.

Accordingly, this paper was conducted to assess the outcomes of initial 100 cases of ENDO-DCR. Ophthalmologists prefer applying the external approach as a traditional technique to reach the bone. After that, an external osteotomy is performed, the mucosa of nose is opened and the flaps of lacrimal sac are formed from outer side to inside. The approach of endoscopy-assisted endonasal happens in the opposite way. At first, a flap of nasal mucosa is formed, and then osteotomy of endonasal bone is performed to uncover the lachrymal sac and its marsupialization to inner part of the cavity of nose. The endoscopic detection and observation of the whole lachrymal sac was really excellent. The ratios of success related to such method through employing both methods, namely the external and endoscopic ones, have been greater than 90% as applied by experts.

The endoscopic approach has a number of advantages including minor traumatization, preserving the function of lacrimal pump and reducing time of surgery. Rate of success related to endoscopic DCR has been analogous to rates of the classical external method with low rates of illness and the probability to manage concurrent sinonasal illnesses (6,7).

2. Patients and Method

Design of the Study

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A series of retrospective single surgeon case was carried out. Hence, the evaluation of 100 endoscopic DCR processes was performed through utilizing charts and records of hospital, focusing on gender, age, clinical presentation, symptom, result, period of removing silicone tube and period of follow- up. From 2010 to 2017, patients were observed primarily or an ophthalmologist referred them. Table (1) clarifies the statistical data of patients. All adult patients were exposed to a preoperative evaluation of lacrimal punctae and medial canthal area (with irrigation). The epiphora etiology was diagnosed as acquired or congenital. The symptom for endoscopic management was continuous epiphora in spite of probing/irrigation, epiphora with crusty discharge or frequent dacryocystitis. The children age ranged between 3-18 years old. As an outcome, the total success was described by the complete removal of symptoms as proved by no discharge or tearing. On the other hand, the incomplete success was described by minor discontinuous tearing with important improvement in comparison with the status before operation. Finally, the anatomic success was described by total success (no more complains of epiphora) as well as incomplete success (postoperative improvement, exposed ducts and clearness of ostium on irrigation, with continuing minor complaints). Endoscopic evaluation was applied to the ostium of all the recurring cases.

Table 1. Statistical data of 100 patients who experienced endoscopic dacryocystorhinostomies and presentation before surgery

AGE OF PATIENTS	AGE 3-18 YEARS	AGE 18-40 YEARS	AGE 40-60 YEARS	TOTAL NO
N0 OF PATIENTS	27 (27%)	59 (59%)	14 (14%)	100
MALE	9	15	6	30
FEMALE	18	44	8	70
RATIO OF FEMALE / MALE	2%	2.9%	1.3%	70/30= 2.3%
EPIPHORA	15	20	4	39
DACROCYSTITIS	10	30	8	48
MUCOCELE	2	9	2	13

3. Techniques of Operation

General anesthesia was applied for performing Endoscopic DCR. The patient was lying down with elevating the head 15 degrees. After reducing the mucosa of nose by using a packing gauze saturated with a combination of 1:200,000 epinephrine and 2% lidocaine, the same solution was used to filtrate the mucosa that surrounds the lacrimal sac. An endoscope with 4 mm diameter, 0 or 30 degrees was

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utilized. A sickle knife was used to make a vertical mucosal incision 8 mm frontal from the uncinate process attachment at the lateral wall of nose. Then, it was expanded from just above the frontal attachment of the mid turbinate to that of the lower turbinate (Fig. 1A).

The elevation of mucous flap was done backward off the maxilla bone. After that, cutting forceps were used to remove it (Fig. 1B). Next, rongeurs and diamond bur of DCR were used to gently remove bone that covers the lacrimal sac until the sac was broadly visible to the fundus level (Fig. 1C). Removing all bone that covers the common opening of canalicular is important. A metallic probe of lacrimal was passed through inferior canaliculi and gently pushed medially to tent the sac lumen and facilitate the incision on the sac. Then, a no. 12 blade was used to make a horizontal incision on the lower border of the visible wall of sac. Once the lumen was identified, a slit knife was used to make a vertical incision, which was expanded to the sac fundus. The creation of a flap of an anteriorly based lachrymal sac was done. Then, this flap was everted and mended to exactly face the mucosa of nose (Fig. 1D).

A tube of silicone bicanalicular is positioned if it is intended (Fig. 1E). The visible sac was lightly filled with a small patch of gel foam for keeping the flap in position during the initial period of healing. There should be a light nasal packing unless there is associated surgery of nose. Oral antibiotics, ophthalmic drops and nasal steroid spray were prescribed for each patient after operation. Patients were observed frequently for nasal dressing. The application of nasal irrigation with saline was done to avoid the creation of crust. After six months, the silicone tube was removed.

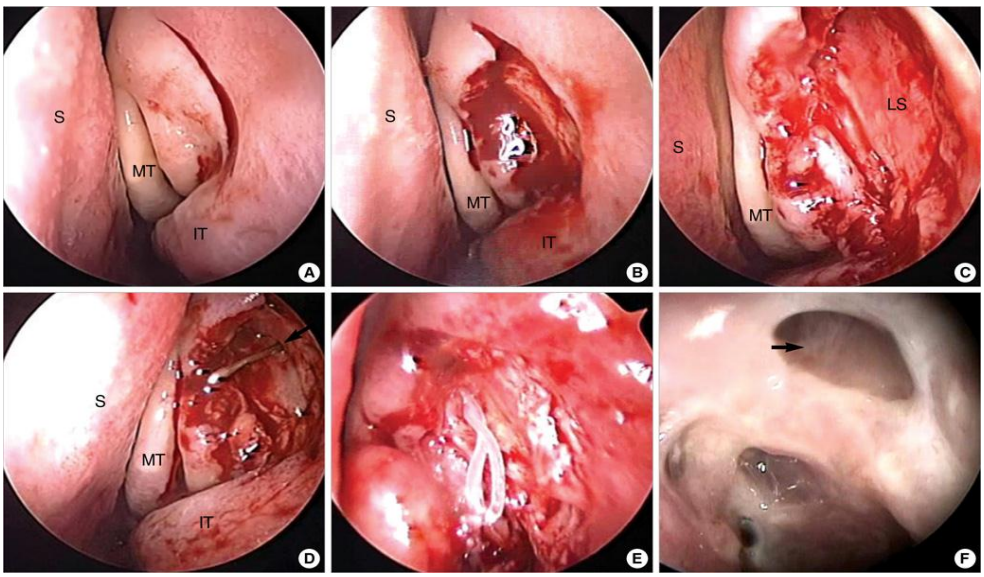

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Fig.1

Operative procedure of ENDO-DCR (S refers to septum; MT is middle turbinate; IT indicates inferior turbinate; LS is the lacrimal sac). (A) making a columnar mucous incision at the lateral wall of nose. (B) Elevating and resecting the mucosal flap. (C) Removing the maxilla bone that covers the lachrymal sac. (D) Everting and adjusting the flap of anteriorly based lachrymal sac to exactly oppose the mucosa of nose. Notice that the opening of joint canalicular (shown with arrow) is observable. (E) Positioning the tube of silicone bicanalicular. (F) The result of nasal endoscopy within six months after surgery. The opening of rhinostomy (arrow) is broad and clear.

4. Care After Surgery and Follow- up

On the next day after surgery, all patients were discharged. Eye drops (topical combination of antibiotics and steroids) were prescribed for ten days. Instructions were given to the patients/parents on using saline nasal spray for nasal mucosal decongestion (3) times per day for one week. Upon discharge, the examination of patients was performed. The removal of silicone tubes was done after 6 months of surgery. As for young children, sedation was administered to them. Depending on illnesses or other associated pathology, outpatient clinic follow- up was applied to patients at least 2 years.

5. Outcomes

Table **2** shows the classification of etiology into two types: congenital (20 cases – 20%) and acquired (80 cases – 80%). During the period of this study, 100 endoscopic DCRs were applied. Demographics were categorized into three groups according to age: 3-18; 18–40 and 40-60 years old.

Table 2. Demographics categorization according to etiology, age and gender

Etiology (total group: *n* = 100)			
Congenital	20(20%)		
Acquired	80 (80%)		
SPLIT BY AGE	3-18	18-40	40-60
CONGENITAL	10	10	0
ACQUIRED	17	49	14
TOTAL	27	59	14

Table 2. Demographics categorization according to etiology, age and gender

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GROUPS	CONGENITAL	ACQUIRED
MALE	5	18
FEMALE	15	62
FEMALE/ MALE	15/5	62/18

Table (3). Outcomes

	NO EPIPHORA	PART IAL IMPROVEMENT	NO IMPROVEMENT	REVISION SURGERY
SUCSESS RATE	80 (80%)	14(14%)	6(6%)	4(4%)

Table (4). revision cases

Total number of recurrence	Revision cases	No epiphora	2 patients refuse surgery
6	4	4	

Table (5). COMPLICATIONS

Total number of cases	TUBE EXTRUSION	ADHESION
5(%)	2 (%)	3(%)

As for the children group, 20 cases (<18) were identified (as shown in Table **1**) with an average age of 7. The female to male ratio was 15/5. Postoperatively, 2 patients were identified with extrusion of the silicone tube. There were no reports on ecchymosis of the cheek. The rate of complications after surgery was 5% of total cases with a total of 100 endoscopic processes. Silicone tubing was applied to all patients. The mean time for removing silicone tube was 6 months. Generally, there was outpatient clinic follow- up for 2 years as a minimum.

6. Discussion

In fact, the ENDO-DCR technique is considered a commonly accepted and safe procedure coequal with the 'traditional' external technique. It resulted in good rates of success and low rate of complications, which was found to be 5% in this study. Success rates of revision surgery showed noticeable improvements. In this study, the average time of follow- up was 2 years.

As mentioned earlier, the results were widely different during the last ten years (81–97%) (Tarbet & Custer 1995 (6); Sprekelsen & Barberan 1996 (7); Hartikainen et al. 1998 (8); Woog et al. 2001 (9); Durvasula & Gatland 2004 (10); Tsirbas et al. 2004 (11); Ben Simon et al. 2005 (12); Leong et al. 2010 (13); Roithmann et al. 2012 (14). Based on this study averages, the anatomic success

in all different groups was 80% complete recovery and 14% with satisfactory recovery. This result agrees with that of the studies conducted during the last ten years.

Previous studies indicated that there are relatively low results of revision surgery with an irregular estimation of 50%. These studies demonstrated that it is not likely for failure after initial adjustment to benefit from further adjustments (Tarbet & Custer 1995 (6); Sprekelsen & Barberan 1996 (7); Hartikainen et al. 1998 (8); Woog et al. 2001 (9); Durvasula & Gatland 2004 (10); Tsirbas et al. 2004 (11); Ben Simon et al. 2005 (12); Leong et al. 2010 (13); Roithmann et al. 2012 (14)). However, and based on the current results, it can be concluded that failure after initial adjustment can benefit from further redo operation. This failure could be due to fibrosis, granulation tissue or local synechiae of the ostium.

In addition, the less recurrent reasons include bone neogenesis, inadequate osteotomy, inadequate opening lachrymal sac and failure to locate the lachrymal sac throughout surgery (Leong et al. 2010 (13); Roithmann et al. 2012 (14)). The external DCR has been considered a typical technique in managing NLDO for a long time (Hartikainen et al. 1998 (8)). Here, there is a disadvantage represented by external scarring that is resulted from cutaneous incisions and disruption of the medial canthal ligaments that could cause dysfunction of lacrimal pump (Tarbet & Custer 1995 (6); Ben Simon et al. 2005 (12)).

Further intranasal problems can be addressed by the surgeon through applying the endoscopic approach. Such problems include obstruction by a deviated septum. Different from the nasolacrimal structure in adults, specific anatomic aspects in children, especially those older than 6 years, worth further investigation (Mahapankar et al. 2002(15); Berlucchi et al. 2003(16); Gupta & Bansal 2006(17); Eloy et al. 2009(18); Celenk et al. 2013(19)). The smaller dimension of anatomic operation, such as the vestibule and cavities of nose, poses a technical endoscopic challenge. It is recognized that in those children, the ostium of the nasolacrimal duct has a highly variable form because of the largeness of the inferior turbinate (Leibovitch et al. 2006 (20); Eloy et al. 2009 (18). This paper described the pediatric group individually. Hypertrophy of the inferior turbinate and strictures are often just part of the normal anatomic spectrum in the pediatric group. The air path in nose is much narrower compared to that of adults. This causes additional problems in accessibility and visualizations. In children, septoplasty is normally avoided due to having future implications on facial growth.

7. Conclusion

Results of this paper concurred with other similar studies. They showed that the endonasal DCR is an effective and safe technique for adults and children with continuous epiphora. The study also proved that surgery of redo could be beneficial in improving symptoms. Finally, it is necessary to have a comprehensive information about the anatomy of nose and operative mechanisms. If they are applied well, they can result in promising outcomes.

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