

Endonasal Endoscopic Dacryocystorhinostomy (EESC-DCR) for Treatment of Nasolacrimal Duct Obstruction, Modified Wormald's Technique

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Abstract The objective of this prospective descriptive study of 30 patients with nasolacrimal duct obstruction in Samut Sakhon hospital was to study surgical results of endonasal endoscopic dacryocystorhinostomy (EESC-DCR) with Modified Wormald's Technique. Thirty patients (34 eyes), aged 64 years on average, were treated by EESC-DCR during January 2002 - August 2007. The mean duration of symptoms before treatment was 8 years, duration of silicone stent insertion 90 days and, follow up time of 6 months. The surgical functional success rates evaluated by patient saccal irrigations were 100 percent in this short term follow up period. Anatomic success with a patent nasolacrimal system was achieved in 32 of 34 operations (94%) by nasal endoscopic evidence. Overall symptomatic and anatomic success was seen in 28 of 34 operations (82%). The surgical success rates of EESC-DCR were high (82%) and comparable to external DCR and EESC-DCR outcomes in other reports. EESC-DCR may be an alternative treatment for patients with nasolacrimal duct obstruction with advantages of preventing a scar on the skin and preserving the pump function of the nasolacrimal sac with equally surgical result as external approach.

Key words: nasolacrimal duct obstruction, dacryocystorhinostomy, endoscopic

Introduction

Nasolacrimal duct (NLD) obstruction is a common disorder caused by blockage of the nasolacrimal duct situated between lacrimal sac and the nose. The causes of obstruction are sometimes acute or chronic inflammation, congenital malformations, trauma, and tumor.⁽¹⁻³⁾ Symptoms are manifested by the presence of chronic epiphora and / or swelling of lacrimal sac

with subsequent dacryocystitis. Although it is not a serious condition, the symptoms like epiphora or repeated infections are quite annoying and cosmetically distressing.⁽³⁾ Dacryocystorhinostomy (DCR) surgery is indicated when medical therapy has failed to improve the patient.⁽⁴⁾ The aim of this operation is to create direct pathway for tear, situated between the lacrimal sac at the corner of the eye and the nasal

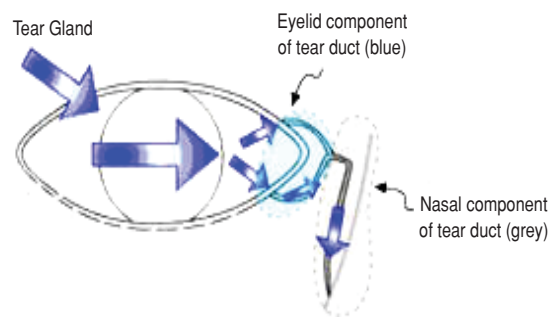
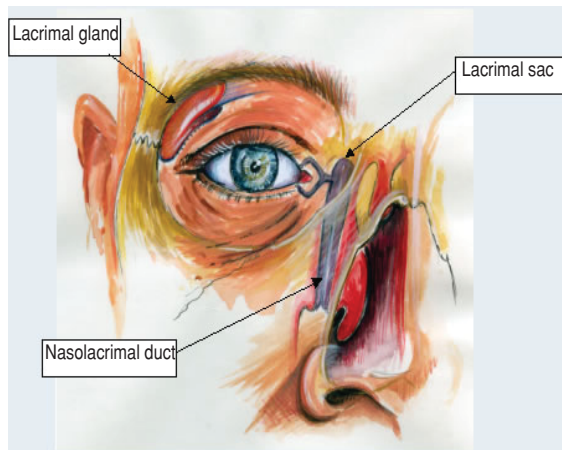


Fig. 1 Lacrimal drainage system (From WWW. eyetext.com.html)

cavity through the artificial opening at lacrimal bone.⁽⁵⁻⁷⁾

Toti A, first described DCR performed through an external incision for the treatment of nasolacrimal duct obstruction in 1904⁽⁵⁾. External DCR usually involves extensive removal of bone at the lacrimal fossa and hence risks disruption of the lacrimal pump mechanism.^(6,7)

Caldwell described the first intranasal DCR in 1893⁽⁶⁾ then in 1989, McDonogh & Meiring⁽⁷⁾ described the endoscopic endonasal DCR. Endonasal DCR surgery has the advantages of preventing a scar on the skin and preserving the pump function of the nasolacrimal sac.^(6,7) Many surgeons have tried many modifications in the procedure to introduce possible less invasive one, such as endoscopic radiofrequency DCR or transcanalicular DCR (endo-canalicular DCR), balloon dacryocystoplasty.

Different lasers of holmium YAG, argon, carbon dioxide and potassium titanium phosphate (KTP) laser have been tried in literatures.⁽⁸⁻¹²⁾ A transcanalicular approach with the Neodymium YAG laser has also been described.⁽¹³⁾ Many of the techniques described advocate the use of silicon stents, left in situ

for 2 weeks to 6 months.^(14,15)

The aim of this study was to evaluate the success rates of endoscopic DCR with silicone stenting. Attempts were made on many various technique and a simple technique was selected.

Methodology

Prospective nonrandomized descriptive interventional case series of 34 consecutive endonasal DCRs performed from January 2002 to August 2007 were enrolled into the study. The present study was approved by Samut Sakhon Local Ethics Committee.

There were 30 Thai patients (12 male/18 female) whose 34 eyes underwent endonasal DCRs. Four patients with bilateral diseases were operated in both eyes separately after first side was improved. The average age of the patients was 64 years old (range 32-84; SD 20.2 years). The mean duration of symptoms before treatment were 8 years (range 6 months -14 years).

The most common presenting symptoms was epiphora (100%), 15 eyes had pus from canaliculi punctum (44%) and 6 eyes had abscess formation (17%).

Patients who had nasal pathology such as nasal



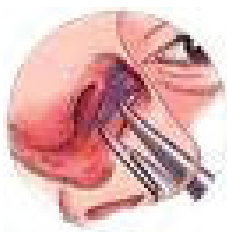
Fig. 2 Left lacrimal abscess

polyp, sinusitis, severe deviated nasal septum, tumor and who undergone previous lacrimal surgery were excluded.

Fluorescein dye testing with 0 degree nasopharyngoscopy visualization was performed in all cases before surgery and 6 months after dacryocystorhinostomy. Duration of silicone stent insertion were 60-90 days. The follow up period were 6 months in all patients.

Operative technique

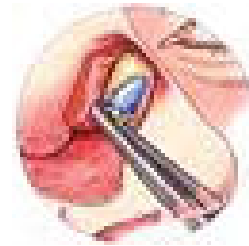
Surgery was performed using Modified Wormald's Operative Technique.⁽¹⁶⁾ The procedures were done under general anesthesia in all patients. The nasal cavity and middle meatus were decongested using 1 percent ephedrine, 15 minutes before surgery for adequate decongestion and vasoconstriction. Zero degree and 30 degree nasal endoscopes with camera (Storz) were used for surgery. The lateral wall of nose along the area of lacrimal fossa externally was infiltrated with 1 percent xylocaine with adrenalin (1:50,000). A punctum dilator was used to dilate the



punctum of the superior and inferior canaliculus.

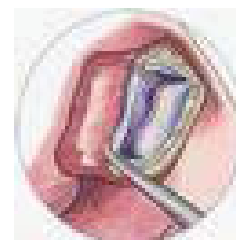
A sickle knife, Rosen's knife, and electric cauter were used to elevate the mucosa anterior to the anterior attachment of the middle turbinate to expose the lacrimal bone.

Removal of the overlying bone was done by



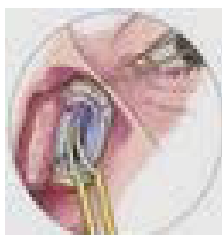
punch forceps or sometimes by the sheathed bony drill (mastoid drill, or microdebrider), exposed the entire medial wall of the lacrimal sac, large enough for exposure of common canaliculi as Wormald's technique bony opening⁽¹⁶⁾. In some cases; uncanecotomy, anterior ethmoidectomy, agger nasi removal were necessary. The bony defect was smoothed with drill or microdebrider. The position of the lacrimal sac was confirmed by passing a Bowman's lacrimal probe from the punctum, which was seen tenting the lacrimal sac.

Incision of a large posterior flap at the medial



lacrimal sac wall was done using slit knife. Posterior flap was reflected posteriorly and push under nasal mucosa (if possible), followed by removal of the remaining small anterior flap.

The next step was the most difficult for some



surgeons. Stenting of the lacrimal apparatus was performed by using handmade silicone tube in all operations and were usually removed at 8 to 12 weeks postoperatively.^(14,15) The patient was discharged 2 or 3 days after nasal suction and lacrimal sac irrigation.

The keys of operative technique were meticulous management of lacrimal sac flap and nasal mucosa, large Wormald's technique bony opening.⁽¹⁶⁾ It is recommended not to generate heat by excessive drilling and finally careful mucosal-sac wall flap approximation.⁽¹⁶⁾

The aim of this operation was to create the pathway of the tear and relieve of watery sticky eye discharge. Evaluation of both symptoms (function) and anatomical success during follow up periods were done after removal of the tubes. The follow-up period was 6 months after operation. The criteria for surgical success were defined as clinical cured without unreasonable epiphora, be able to irrigate the lacrimal system postoperatively, opening of ostium and fluorescein dye can visualized during postoperative nasopharyngoscopy.

Results

Anatomic success with a patent nasolacrimal system was achieved in 32 of 34 operations (94%). Symptomatic relief and anatomic success which fulfill the criteria of surgical success were seen in 28 of 34 operations (82%). Among six of the failure cases, four patients were still symptomatic despite a patent nasolacrimal system and well-healed ostium. The remaining two had scar and fibrosis of ostium.

No major intraoperative or postoperative complication were seen. Minor complication consisted of bleeding from nasal mucosa and bone occurred in 9 (26%) eyes. Ecchymosis of eyelids were seen in 15 eyes (44%).

Discussion

The success rate of external DCR ranges from 75 to 99 percent⁽¹⁷⁻¹⁹⁾ compared to success rate of the endoscopic technique has been reported as 80 to 95 percent with instruments and stents⁽²⁰⁻²²⁾, 77 to 83 percent using the laser.⁽⁸⁻¹³⁾ These reported success rates were operated with the use of silicone stents, which are removed from 4 weeks to 24 weeks postoperatively.⁽¹⁵⁾ The success rates which stents were not utilized ranging from 81 percent to 90 percent.⁽²³⁻²⁵⁾ The success rate of 82 percent with this simple, ordinary instruments and stent using technique in this series is comparable to all reported by previous studies with various techniques and more sophisticated instruments. The average follow up period of 6 months is comparable to the average follow up period in other studies using stents.⁽²⁰⁻²⁴⁾ Regarding the six failure cases, four still had symptoms despite a patent nasolacrimal system and well-healed ostium may be due to partial pathway fibrosis or stenosis⁽²⁰⁻²⁴⁾ so the new tracts failed to function properly. The cause may be related to surgical skill because two of the four cases were operated at the early stage period of this study. The remaining two had scar and fibrosis of ostium that caused repeated stenosis. Both presented with duration of obstruction for over 5 years (5, 6 years). But the causes of failure were still uncertain due to the small sample sizes.

In normal subjects, negative pressure is created during blinking. The suction power of the pump mechanism is more effective after endoscopic than external DCR from preservation of orbicularis muscle and medial canthal ligament tension.^(23,24) In cases

with epiphora due to NLD obstruction, the lacrimal pump function is restored after successful DCR.^(23,24)

There is some controversy, however, regarding the use of stenting for DCR. Those who advocate its use report an increased patency rate, due to maintenance of the ostium of the lacrimal sac into the middle meatus and correction of presacal stenosis.^(6,7,20-24) Allen and Berlin⁽¹⁴⁾, however reported a higher failure rate when using silicone tubing. A suggested reason for this was the presence of granulomatous inflammation in association with silicone intubation.^(14,15) Stenting of the nasolacrimal system is also associated with complications including punctal erosion and slitting of the canaliculi.⁽¹⁵⁾ In this series, all operations performed using stents. The reasons that stenting technique was selected because fibrosis and repeated stenosis were frequently encountered in the preceding pilot study. It was believed that adequate stenting time with low reaction silicone stents, removed after complete, mucosal healing, may protect the excessive contracture of the opening.^(14,15,19) Regular check up for granulation is necessary once surgeons decided to use stent.⁽¹⁹⁾

The key of success of the endoscopic DCR are the stoma should be wide enough^(16,26), bony edges of the stoma smooth^(16,26); nasal mucosa handled with care to prevent formation of the synechiae & granulations⁽²⁷⁾; stent are significant in chronic case which prone to fibrosis⁽¹⁵⁾; and regular follow up with nasal suction.⁽²³⁻²⁵⁾

Summarizing, it can be said that the described technique is equally effective with cosmetic result and safe as others. It compares favorably with external DCR, laser assisted DCR and DCR without stents as described in literature. Moreover, it has an added advantage of cheaper, easy to perform, promising outcomes in all patient conditions and does not require sophisticated instruments.

Conclusions

The technique of endonasal DCR involves creation of a large bony ostium and construction of nasal and lacrimal sac mucosal flaps interposition. Its anatomic success rate of 94 percent, symptomatic and anatomic success, seen in 82 percent compares favorably with that of other techniques for endonasal DCR and is also similar to the success of external DCR. Experience in endoscopic nasal surgery is important in endonasal DCR, as other ancillary procedures may be required within the nose at the time of surgery. This technique is safe, quick and does not need sophisticated instruments. Post-operatively, most patients had a wide lacrimal window with preserved lacrimal pump movement at the superior sac remnant.

Acknowledgement

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บทคัดย่อ การผ่าตัดรักษาท่อน้ำตาส่วนระหว่างถุงน้ำตาและช่องจุมูกอดตันโดยการผ่าตัดผ่านทางช่องจุมูก ด้วยกล้องวิดีโอทัศน โดยวิธีประยุกต์การผ่าตัดแบบเวอร์มอล

นฤวัต เกสรสุคนธ์

กลุ่มงานโสต ศอ นาสิก โรงพยาบาลสมุทรสาคร

วารสารวิชาการสาธารณสุข 2552; 18:333-9.

งานวิจัยแบบไปข้างหน้าเชิงพรรณานี้ ศึกษาผลการผ่าตัดรักษาท่อน้ำตาอุดตันในช่วงระหว่างถุงน้ำตาและจุมูก โดยการผ่าตัดด้วยกล้องวิดีโอทัศนผ่านทางช่องจุมูก โดยวิธีการผ่าตัดที่ประยุกต์จากวิธีของเวอร์มอล โดยศึกษาเก็บข้อมูลผู้ป่วย ที่รับการผ่าตัดด้วยวิธีนี้ของโรงพยาบาลสมุทรสาคร ระหว่างมกราคม 2545 ถึงสิงหาคม 2550 กลุ่มตัวอย่างผู้ป่วย 30 ราย (34 ตา) เป็นชาย 12 ราย หญิง 18 ราย อายุระหว่าง 32-84 ปี เฉลี่ย 64 ปี ระยะเวลาเฉลี่ยที่เป็นโรคก่อนทำการรักษา 8 ปี ระยะเวลาของการค้างท่อเพื่อขยายท่อน้ำตา 90 วัน ติดตามผลการรักษาเป็นเวลา 6 เดือน พบว่าหลังผ่าตัดในระยะเวลาสั้นขณะล้างท่อน้ำตาน้ำลงจุมูกได้ทุกราย (100%) ส่องกล้องตรวจพบมีรูเปิดในจุมูก 32 ราย (94%) โดยรวมพบอาการทางคลินิกและการส่องกล้องดีขึ้น 28 ราย (82%) สรุปผลสำเร็จของการผ่าตัดรักษาท่อน้ำตาส่วนระหว่างถุงน้ำตาและจุมูกอดตันโดยการผ่าตัดผ่านทางช่องจุมูกด้วยกล้องวิดีโอทัศนพบได้ร้อยละ 82ใกล้เคียงกับรายงานอื่น ๆ เป็นทางเลือกของการผ่าตัดที่ได้ผลไม่แตกต่างจากการผ่าตัดเปิดแผลจากภายนอก แต่มีข้อดีก็คือไม่ต้องมีแผลบนใบหน้า และสามารถคงความสามารถในการดูดน้ำตาจากดวงตาของถุงน้ำตา

คำสำคัญ: ท่อน้ำตาอุดตัน, ผ่าตัด, กล้องวิดีโอทัศน