

EFFICACY OF DIODE LASER TRANSCANALICULAR DACRYOCYSTORHINOSTOMY IN ACQUIRED NASOLACRIMAL DUCT OBSTRUCTION

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ABSTRACT

Background: The procedure of choice for the treatment of acquired nasolacrimal duct obstruction is dacryocystorhinostomy. Diode laser transcanalicular dacryocystorhinostomy is a relatively new procedure. This study was conducted to evaluate the surgical outcome of diode laser transcanalicular dacryocystorhinostomy for the treatment of acquired nasolacrimal pathway obstruction.

Material & Methods: This was an interventional study of 36 patients with nasolacrimal pathway obstruction, admitted to Basrah General Hospital, from March 2008 to April 2010. Diode laser transcanalicular dacryocystorhinostomy with or without silicon tube insertion was done. Patients were followed for 6 months to evaluate the success rate of the procedure.

Results: The age range of patients was 6-60 years. Eleven (31.25%) were males and 25(68.75%) females. All these cases were unilateral. Thirty-three (93.05%) of patients were operated under general and 3(6.94%) under local anesthesia. The overall success rate was 62.5% in non-intubated patients and 93.75% with intubation.

Conclusion: Diode laser transcanalicular dacryocystorhinostomy is a successful surgical procedure for the treatment of nasolacrimal duct obstruction. Intubation is recommended in cases of nasolacrimal duct obstruction.

KEY WORDS: Nasolacrimal duct obstruction, Diode laser, Transcanalicular dacryocystorhinostomy.

INTRODUCTION

Watering eye or epiphora and pus discharge are the usual presenting symptoms of nasolacrimal duct obstruction. The condition is characterized by matting of the eye lashes, recurrent conjunctivitis and positive regurgitation test. Sometimes the condition complicates and results in pain, swelling and even pus formation. In children the disease occurs because of delayed canalization of the lacrimal pathway.

The procedure of choice in most of these conditions is dacryocystorhinostomy (DCR). The classical operation was first introduced by Toti¹ in 1942 and modified by Bourguet.² It involves external incision over the lacrimal sac and creation of a fistula through the nasal bone directly into the nasal cavity.

Transcanalicular DCR is a new procedure involving transcanalicular opening in the lacrimal sac and the nasal bone passing the nasal mucosa into the nasal cavity using diode laser probe and then insertion of a tube which remains in situ for three months.

This study was conducted to evaluate the surgical outcome of diode laser transcanalicular dacryocystorhinostomy for the treatment of acquired nasolacrimal duct obstruction.

MATERIAL AND METHODS

This was a prospective interventional study of 36 patients with acquired nasolacrimal pathway obstruction, admitted in Basrah General Hospital from March 2008 to May 2010.

All the studied patients were hospitalized and detailed ophthalmic and nasal examinations were carried out. The site of obstruction was evaluated with regurgitation and lacrimal sac irrigation test. Other diagnostic procedures like dacryo-cystography and Jones test were not performed. Most of the operations were carried out under general anesthesia and in unfit patients, local anesthesia by using lidocaine 2% with adrenaline 1:80000 to block the supratrochlear and infraorbital nerves. Nasal pack soaked with 2% lidocaine and 1:1000 adrenaline was applied in ipsilateral nasal cavity in all cases to decrease potential intra and postoperative bleeding. The puncti were dilated

with Nettleship dilator and using Bowman probes, the canaliculi were dilated up to the medial wall of the lacrimal sac (hard stop). The fibroptic probe of a Diode 812 nm Laser in repeated pulse mode about 8 mW, 0.2 second repetition time, 0.2 pulse duration. With nasoscopic aid the nasal cavity was visualized directly or through a screen monitor. Laser is used to open the medial wall of the nasal cavity and the underlying bony structures passing through the nasal mucosa to the nasal cavity. The same procedure done with the upper canaliculus. Using the usual lacrimal intubation tube, the metallic probe is passed to the nasal cavity where the rhinologist pass it out of the nose, the other tube is also passed out of the nose where both are tied together. Waxed nasal packing applied to both nostrils. Post operative medications included systemic antibiotics, analgesic and tranxaminic acid. Each patient discharged from the hospital after 24 hours postoperatively and was reviewed two days postoperatively for removal of the nasal packing. The lacrimal tube was removed after 6 months of surgery. The success criteria were absence of watering and regurgitation on pressure and patency of lacrimal pathway on syringing.

Table 1: Age distribution of the studied patients.

Age	Number of patients n (%)
6-20	3 (8.30)
21-30	4 (11.80)
31-40	20 (56.94)
41-50	8 (21.50)
>50	1 (1.38)

Table 2: Indications for transcanalicular dacrycystorhinostomy in the studied patients.

Disease	Number of patients (%)
Chronic dacryocystitis	33 (91.66)
Mucocele	2 (5.56)
Canalicular obstruction	1 (2.78)

Table 3: Comparative results of various techniques of End-DCR.

Author	Procedure	Success percentage	Comments
Heikki Seppa (1994)	Endonasal CO2-NdYAG laser DCR	83	Additional use of fiberoptic illuminator of sac & microscope
Weiden Backer (1994)	End-DCR with stent	95	Traumatic cases had little less favourable results
Zhou et al (1996)	End-DCR with stent	93.7	Used dacryocysilluminator
Yung & Hardman (1998)	Inferior End-DCR with stent	90	Quicker, tube is used
Siddeshi (2000)	End-DCR with stent	83	Safe, effective, quick & acceptable
Mater & Schmidt (2000)	End-DCR with stent	90	Dacryoendoscope & microdrill
Hesham ALI (2001)	Endoscopic guided trephination (Hesham DCR)	83	Endoscopic insertion of large lacrimal maintainer
Bambuli & Chamero (2001)	End-DCR with stent	91.7	Safe & effective than other techniques
Peter John (2002)	End-DCR and comparison between diode & cautery	91.9 86.6	Diode laser better than cautery
S Mortimore et al (1999)	End-DCR with stent	87	Stent used in only cicatrized & revision cases

RESULTS

The study included 36 patients in which 11 (31.25%) were males and 25 (68.75%) females. The age of the patients was between 6 to 60 years with 82% of cases between 31 and 40 years age group. (Table 1)

Unilateral cases were selected in all these patients. Primary surgery was performed in 34 (95.83%) and secondary surgery in 2 (4.10%) patients. The commonest indication was chronic dacryocystitis in 33 (90.97%) patients, followed by mucocele 2 (6.25%) and canalicular obstruction in 1 (2.77%) patients. (Table 2)

Most of the patients 33 (91.66%) were operated under general anesthesia, and only 3 (8.34%) under local anesthesia. Twenty (55.5%) patients were not intubated and 16 (44.4%) were intubated after opening by laser.

After 6 months follow-up, the success rate in non-intubated patients was in 12/20 (62.5%), while in intubated patients 15/16 (93.75%).

DISCUSSION

External DCR, endoscopic DCR³, endoscopic laser nasal DCR,^{4,5} dacryocystoplasty and endoscopic radiofrequency assisted DCR⁶ are the various procedures used to relieve lacrimal passage obstruction. The recent procedure is the endoscopic DCR, has the advantage of elimination of scar, preservation of canthal anatomy, bleeding, pain and morbidity but the disadvantages are the cost and lack of surgical skill.⁷

In a study in 1998 the success rate of external DCR was compared with endonasal endoscopic DCR, and it was found that the success rate at one year after surgery was 75% for endonasal endoscopic DCR and 91% for external DCR.⁸ In our study the success rates of diode laser transcanalicular DCR without lacrimal tube insertion was 62.5% and with intubation it was 93.75%.

In our study, the male patients were 31.35%, while the females were 68.75%. This result is comparable with Mushtaq findings, who stated that the sac problems were more in females.⁹ An anatomical reason for female predominance is narrow lumen of the bony canal, which was found to be the commonest site of obstruction in females.¹⁰ In our study more than 90% of the patients were suffering from chronic dacryocystitis and the commonest site of obstruction was the nasolacrimal duct.

In a study done by Ali¹¹ 92% of the patients were operated under general anesthesia, which nearly equals the current study, in which 93% of

the patients were operated under general anesthesia. On the other hand, in Hurwitz study of 120 patients, 81% were operated under local anesthesia and 18.3% under general anesthesia.¹²

In one study, soft tissue infection was found to occur in approximately 8% of patients who did not receive systemic antibiotics after surgery,¹³ In our study all patients were given amoxicillin-clavulanic acid for 7 days postoperatively, and no infection was reported.

In patients without intubation we performed syringing on the second postoperative day to know about the patency of the lacrimal passage and in intubated patients after the removal of tube 6 months after surgery. Failure occurred in 37.50% of the non-intubated patients. Most of the failures were noticed during the first 2-3 months of surgery.

Lacrimal tube dislodgement is not unusual and sometime it become difficult to reposition it.¹⁸ This dislodgement probably because of unsecured tube or the patients in our community are repeatedly looking in the mirror and pulling the lower lid to see the position of the tube. In the present study this happened with 2 patients. Hopkisson secured the tube with a sleeve and observed tube prolapse only in one case out of his 47 patients.¹⁹ In order to prevent this complication the tube was secured to nasal mucosa using 4/0 black silk, but it was observed that the knot of 4/0 black silk slip away within two weeks in most of the cases and the tube was left hanging freely.

Some time in cases of prolapsed tube the reposition of the tube becomes difficult. In the two of the prolapse tube, it was removed and syringing showed failure of flow, and recurrence of symptoms took place. The possible cause of failure of reposition of the tube was the obstruction of osteotomy site by the granulation tissue.

Known causes of failure of DCR are obstruction of the common canaliculi, closure of osteotomy site, retained stent material and excessive scar formation within the rhinostomy.^{14,15} The failed cases were reopened, and it was found that the cause of failure was the closure of osteotomy by the granulation tissue. In majority of cases the canalicular system remained opened. Various techniques have been used to reduce the chance of failure in DCR including the use of mitomycin C.^{16,17}

CONCLUSION

Diode laser transcanalicular dacryocystorhinostomy is a successful surgical procedure for the treatment of nasolacrimal duct obstruction. Intubation is recommended in cases of nasolacrimal duct obstruction.

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