
EFFICACY OF DIODE LASER TRANSCANALICULAR DACRYOCYSTORHINOSTOMY FOR THE TREATMENT OF ACQUIRED NASOLACRIMAL DUCT OBSTRUCTION

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Abstract

This study designed to determine the surgical outcome of transcanalicular dacryocystorhinostomy for the treatment of blocked lacrimal pathway.

This is a prospective study of 36 patients admitted in Basrah General Hospital from March 2008 to May 2010.

The age of the patients was in range from 6 to 60yrs. Forty five (31.25%) were males and 99(68.75%) were females. All of these cases were unilateral. Thirty three (93.05%) of the total patients were operated general local anesthesia and the rest 3 (6.94%) were under local anesthesia. The overall success rate was 62.5% in non-intubated patients and 93.75% with intubation.

It is concluded that Diode Laser Transcanalicular dacryocystorhinostomy is still a new surgical procedure for the treatment of nasolacrimal duct obstruction and need further refinement of the surgical procedure and studies for evaluation of effectiveness and success.

Introduction

Watering eye (epiphora) and pus discharge are the usual presenting symptoms of a patient who is suffering from a nasolacrimal duct obstruction. The condition is characterized by positive regurgitation test, matting of the eye lashes and recurrent conjunctivitis. Sometimes the condition complicates and results in pain, swelling and even pus formation. In children the disease occurs because of the 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 Totil in 1942 and modified by Bourguet^{1,2}. 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 involves 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 remain in situ for 3 months.

Material and methods

This is a prospective study of 36 patients admitted in Basrah General Hospital from March 2008 to May 2010. All these patients had a clinical diagnosis of a nasolacrimal duct obstruction. All these 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 procedure like dacryocystography and Jones test were not performed. Most of the operations were carried out under general anesthesia and in unfit patients local anesthesia with using Xylocaine 2% was used with Adrenaline 1:10000 to decrease potential intra and postoperative bleeding. A nasal packed soaked with 2%

Xylocaine and two vials of injection adrenaline was applied in ipsilateral nasal cavity in almost all cases. The puncti dilated with Nettleship dilater 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 is 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 3-6 months of surgery. The success criteria were absence of watering and regurgitation on pressure and patency of lacrimal pathway on syringing.

Results

This study included 36 patients in which 11 (31.25%) were males and 25(68.75%) were females (Table I).

Table I: Ditribtion of patients according to sex.

Gender	No. of patients n (%)
Male	11(31.25)
Female	25(68.75)

The age of the patients was between 6 to 60 years with 82% of cases between 31 and 40 years (Table II).

Table II: Distribution of patients according to age.

Age	No. 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)

Unilateral cases were selected in all these patients. Primary surgery was done in 34(95.83%) and secondary surgery was in 2(4.10%) patients. The commonest

indication was chronic dacryocystitis, 33(90.97%). This is followed by mucocele, 2(6.25%) and canalicular obstruction 1(2.77%) (Table III).

Table III: Indications of operation.

Disease	No. of patients n (%)
Chronic Dacryocystitis	33(90.90%)
Mucocele	2(6.25%)
Canalicular obstruction	1(2.77%)

Most of the patients were operated under general anesthesia 33(93%), and only 3(6.94%) were under local anesthesia. Twenty (55.5%) patients were non-intubated and 16(44.4%) were intubated.

After 6 months follow up the success rate in non-intubated patients were in 12 (62.5%) and failure were in 8 (37.5%).

The success rate in intubated patients were 15(93.75%) and failure were in only 1(6.25%).

Discussion

External DCR, endoscopic DCR³, endoscopic laser nasal DCR^{4,5}, dacryocystoplasty and endoscopic radiofrequency assisted DCR⁶ are the various procedure 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 skill⁷.

Table IV: Comparative Results of Various Techniques of End-DCR.

Author	Procedure	Success %	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 dacryocystilluminator
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

In Hartikainen et al study the success rate of external DCR was compared with endonasal endoscopic DCR, they found that the success rate at one year after surgery was 75% for endonasal endoscopic DCR and 91% for external DCR⁸. In the present study the success rates of Diode Laser transcanalicular DCR without lacrimal tube intubation was 62.5% and with intubation it was

93.75%, this mean that the transcanalicular DCR is still an effective procedure for the treatment of chronic dacryocystitis due to nasolacrimal duct obstruction and need more refinement of the procedure and more surgeon experience.

In the present study the male were half, 11(31.35%) of the female, 25(68.75), the reason could be that the

sac problems are more in female than male⁹. An anatomical reason for female predominance is narrow lumen of the bony canal, which was found to be the commonest site of obstruction in female¹⁰. 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 Ali A¹¹, 92% of patients were operated under general anesthesia, while in the current study 93% of the patients were operated under general anesthesia. On the other hand, in Hurwitz study, a total of 120 patients, 98(81%) were operated under local anesthesia and 22(18.3%) were under general anesthesia¹².

In one of the study, soft tissue infection was found to occur in approximately 8% of the patients who did not receive systemic antibiotics after surgery¹³, so it was recommended to use systemic antibiotics to reduce the risk of infection. In our study all the patients were given amoxicillin-clavillanic acid for 7 days postoperatively.

In patients without intubation we performed syringing on the second post operative day to know about the patency of the lacrimal passage and in intubated patients after the removal of tube 6 months of surgery. It has been noted by other authors as well that syringing in the first week is recommended for the success of the procedure.

Eight (37.50%) out of the total 20(55.50%) of the nonintubated patients resulted into failure. Most of the failures were noticed during the first 2-3 months of the surgery.

Lacrimal tube prolapse is not unusual and some time it become difficult to reposit it¹⁸. This dislodgement might be because of unsecured tube or the patients in our community are repeatedly looking in the mirror and

pulling the lower lid to note the position of the tube which happened with 2 patients.

Hopkisson secured the tube with a sleeve and observed tube prolapse only in one case out of his 47 patients series¹⁹. 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 prolapse tube the reposition of the tube become difficult. In the two of the prolapse tube, it was removed and syringing showed the failure of the procedure and recurrence of symptoms. 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 dacryocystorhinostomy are obstruction of common canaliculi, closure of the osteotomy site, retained stent material and excessive scar formation within the rhinostomy^{14,15}. The failed cases were re-opened, it was found that the cause of failure was the closure of the osteotomy by the granulation tissue. In majority of the cases the canalicular system remained opened. Various techniques were used to reduce the chance of failure in dacryocystorhinostomies including the use of mitomycin C^{16,17}.

Conclusion

External dacryocystorhinostomy is still the most effective procedure for the patients with epiphora secondary to nasolacrimal duct obstruction.

Diode Laser Transcanalicular DCR is a newly evolving technique which provides the advantages of a quick, non-scar, almost bloodless surgery.

Intubation is recommended in case of nasolacrimal duct obstruction.

Syringing is recommended on the second postoperative day, provided inflammation has been subsided.

High incidence of failure needs a larger study group to be studied to assess the effectiveness and predictability of the procedure.

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