

ORIGINAL ARTICLE

Trans Canalicular Diode LASER DCR with 'Bari Device' in Pediatric Cases

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Abstract:

Epiphora due to Nasolacrimal duct obstruction (NLDO) is common in children. About 5% to 20% infants show evidence of congenital Nasolacrimal duct obstruction with symptoms^{1,2}. Most of them (95%) cured by conservative management. Majority of the remaining symptomatic patients are cured by probing, repeat probing, probing with intubation and Balloonplasty procedures. About 4% of the patients need surgical intervention. Conventional Dacryocystorhinostomy (DCR) is the main treatment of choice in these cases till to date. DCR means creation of an alternate pathway between lacrimal sac and nasal cavity to drain tear when nasolacrimal duct (NLD) is blocked. There are different surgical techniques available for DCR. These includes conventional or external DCR, endoscopic DCR, endoscopic Laser DCR, transcanalicular or endocanalicular Laser DCR. In adult DCR can be carried out comfortably by the conventional or newly developed endoscopic approach. Narrow space, inadequate development of anatomical landmark makes both the conventional & endoscopic DCR difficult in children. Long term success rate of External DCR in pediatric patients is less in comparison to adult due to vigorous growth of tissue in a child. Laser DCR has been tried but long term success rate is not up to the mark. Several observations like- primary osteum closure, cicatrix formation with middle turbinate and nasal septum, granulation tissue formation- all are more in children due to marked fibroblastic response. So Laser DCR is a challenge in pediatric patients.

Materials and method:

A prospective clinical cohort study was done to see the long term outcome of transcanalicular diode LASER DCR with 'Bari Device' in pediatric cases. Total 18 eyes of 15 pediatric patients under went LASER DCR with 'Bari Device' in this study, 3 patients had bilateral Nasolacrimal Duct Obstruction (NLDO). Their age range was 8 yrs to 15 yrs. All had congenital NLDO who underwent one or more

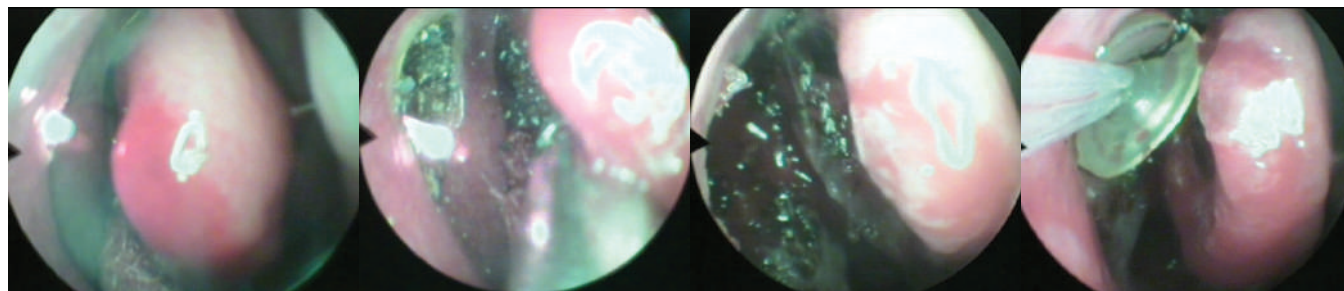
probing earlier but had persistent epiphora with discharge.

All patients under went LASER DCR under General Anesthesia (G/A) during the period of January 2010 and January 2016. Laser used- 980 nm wavelength diode LASER with both closed and bare Laser fibre. Both puncta were dilated under microscope.

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Malleable lacrimal probe was inserted through both the canaliculi up to hard stop felt. Then the LASER fiber inserted through the lower canaliculus and LASER beam observed endonasally by pediatric sinoscope. After proper positioning Laser was fired. Primary hole was enlarged making a round or oval opening as big as possible through both the canaliculi.

(average 4±1 week) after removal of ‘Bari Device’. In the 2nd endoscopic follow up (average 12±2 weeks) tube removed. Granulation tissue observed in 38.9% (n=7) patients. these granulation tissue were removed & topical cotton soaked MMC applied. 5 patients (27.22%) developed epiphora with discharge within 1 month of tube removal. Re-laser was done with total



Primary Hole

Enlarging the opening

Bari Device set

Figure-1 : Laser DCR procedure with Bari Device

Pediatric Lacrimal bone is very thin, maximum 2.5 watt power used. The area cleaned and cotton soaked Mitomycin-C (MMC) applied at the aperture margin for 3 minutes, silicon tube intubation done and ‘Bari Device’ set with the guidance of tube. Absorbing merocele pack given in the nasal cavity. Post-operative antibiotic (Both oral and eye drop), oral anti histamine, nasal decongestant and analgesic were given.

Nasal pack was removed after 7 days, the nasal cleaning advised with sodibicarb +Normal Saline solution everyday. ‘Bari Device’ removed after 3-4 weeks and silicon tube kept in position for 3 months, then removed. Main outcome parameters were absence of watering and discharge, negative fluorescein dye disappearance test, patent on syringing.

Results:

Out of 15 pediatric patients 10 were male (66.66%) and 5 female (33.33%), right sided epiphora was in 8 patients (53.33%), left sided epiphora in 4 patients (26.67%) and both sided epiphora in 3 patients (16.67%).

All the patients were asymptomatic in 1st follow up

previous procedure. There was no bony obstruction, only soft tissue closure of the ostium.

All the patients became asymptomatic at the end of 6 months after removal of tube. 2 patients developed epiphora after 18 months. They were advised for Re-laser but the parents denied.

Overall success was 88.89% (n=16) patients (including repeat Laser). 27.22% (n=5) required repeat LASER. 2 patients (11.11%) failed despite 2 times repetition.

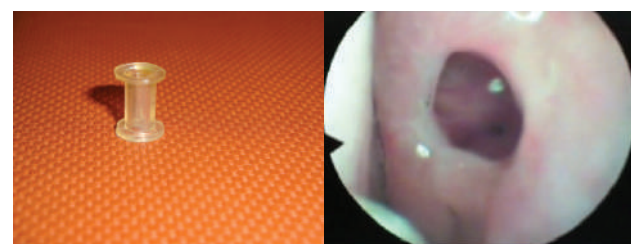


Figure-2: Long term Post operative Opening using Bari Device

All the procedures (primary, follow up & repeat procedures) are recorded and preserved. Every patient’s particulars, outcome and follow up findings (Soft copy and hard copy) were maintained with date.

Discussion:

Limited space in the nasal cavity, very thin nasal bone, sac and nasal mucosa make external and endoscopic DCR difficult in pediatric case. Hemorrhage makes the endoscopic procedure more difficult to properly locate the sac in such a narrow space³. In the procedure using pediatric sinoscope and Laser beam, lacrimal sac could be easily identified. There was minimal or negligible bleeding during the procedure as diode Laser coagulates⁴. So, the procedure was not difficult. Considerable space could be made by small nasal packs placing in required area by pushing the septum. A small number of studies on Pediatric Laser DCR with long term follow up is available. On adult Laser DCR reasonable number of studies is available. A few studies on endoscopic DCR in pediatric cases are available. Adequate number of studies on external procedure is present.

A Doyle et al showed 100% failure of LASER DCR in pediatric cases with long term follow up. In their study only silicon tube intubation was done⁵. Jones et al showed 76% success rate in endoscopic DCR³. Welham et al showed 93% success and Hakin et al showed 96% success in external DCR^{7,8}. Recent study by Seyeed mostafa et al. shows 71.4% success in endoscopic DCR⁶.

In our study 88.89% success rate of Laser DCR with 'Bari Device' in children with long term follow up (2 to 8 years) is definitely a significant outcome. Main challenges of laser DCR in pediatric patients in long term outcome is vigorous tissue growth (soft tissue specially fibroblast and nasal mucosa, bone growth)^{5,9}. Better outcome in this study is due to a) Use of 'Bari Device' (which is an invention of the Principal author.) b) Larger osteum formation with a specially designed Cannula.

Granulation tissue observed in 38.9% (n=7) patients despite Mitomycin-C (MM-C) application. This indicates Mitomycin-C is not highly effective in pediatric Nasal mucosa at usual concentration & duration. Increase in either concentration or duration or both may provide better result.

There was 27.22% recurrence after the first procedure. 60% became asymptomatic (3 out of 5) after the 2nd procedure. 2 patients developed epiphora thereafter and their parents denied to undergo further procedure. This means, before Laser DCR in a Pediatric case parents should be adequately counseled.

Conclusion:

Laser DCR with Bari Device is an effective and safe method to treat pediatric epiphora due to NLDO in required cases. Though the sample size of the study was small but the precision of post-DCR outcome was remarkable and highly recommendable.

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