

NASOLACRIMAL DUCT OBSTRUCTION IN INFANTS: A SIMPLE TECHNIQUE OF SILICON INTUBATION

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ABSTRACT

Background: The obstruction of the nasolacrimal duct leads to the blockage of lacrimal drainage. Congenital duct obstruction occurs in approximately 5% of normal newborn infants. There are many surgical techniques for its management. **Objective:** To study the efficacy of a new technique in the management of childhood nasolacrimal duct obstruction epiphora. **Subjects and Method:** Quasi experimental, interventional study, conducted from December 2001 to December 2008 at Eye department of Jinnah Postgraduate Medical Centre, Karachi and Eye Department Sheikh Zayed Medical College, Rahim Yar Khan. Fifty children between one to three years of age with epiphora due to nasolacrimal duct obstruction, in which at least previous one probing was done not less than three months back, were registered. Silicon intubation was done under general anaesthesia. **Results:** Forty (80%) cases were cured by the intubation in six months to one year follow up. Recurrent infection was noted in ten (20%) cases, which was managed medically. The severity of infection was much less than the one before intubation. All of the ten cases were planned for future dacryocystorhinostomy. Only a few treatable or insignificant complications were noted. **Conclusion:** This simple, easy and cost-effective technique of silicon intubation in nasolacrimal duct obstruction can be done in any operation theatre with general anaesthesia facilities.

Key words: Epiphora, Nasolacrimal duct, Silicon tube.

INTRODUCTION

In 1899, Rochon-Duvigneaud¹ described the variations in development of nasolacrimal duct in their original publication, and these variations were seen to result in obstruction and/or infection. The nasal opening of lacrimal drainage system can be single, double or even tripple. Moreover, the normal mucosal valve at this location can be rudimentary or absent altogether. Later on, Schaeffer² showed, after his extensive study, the presence of diverticulitis in nasolacrimal drainage system, which can retain infective material, pose difficulty in probing and even lead to formation of false passages. Campbell³ and his colleagues radiologically confirmed these developmental variations. Many scientists have worked on this topic. Busse et al⁴ and Grossman and Putz⁵ are worth mentioning here, as they provided photographic documentation of nasolacrimal duct opening into nasal cavity. Nasolacrimal duct may be longer than its lodging bony canal, so that its

inferior end may pass into the nasal cavity.⁶⁻⁹ Lacrimal drainage system of infant is quite different from that of an adults. The former may have a sharp angulation at the juncture between sac and duct. Moreover there is a deep bend in the duct just before it enters the nasal passage.^{4,10} These irregularities in the drainage system make infants prone to many pathologies and complications.

Chronic dacryocystitis secondary to irregular drainage system and/or congenital anomalies, is managed initially by hydrostatic pressure massage and probing. A dispute^{11,12} exists in the timing of probing, as some ophthalmologists prefer to wait till six months, while others delay till one year of age. Putter¹² however, recommends early probing, as this procedure can usually be done without general anaesthesia before the age of six months. Secondly, parents' nuisance is reduced by early opening of inferior obstruction. Thirdly, the persistent infection may result in scarring making essential the future dacryocystorhinostomy operation. This can be avoided by early probing. If probing needs to be repeated due to recurrence of dacryocystitis, it should be accompanied by placement of silastic tubing to prevent restenosis of lacrimal duct. Different silastic material with introducers and guide-wire are available in the market, which are expensive, quite tedious to use, and may even need endoscopic visualization to retrieve polypropylene thread guide from nasal cavity. A very simple method of intubation was applied in this study, which can be

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done in ordinary operation theatre with general anaesthesia facilities. The bicanalicular silicon tube, with or without polyvinyl pyrrolidone (PPV) coating, is used with long introducer (80 mm) in this technique.

SUBJECTS AND METHOD

We selected 50 children between the ages of 12 and 36 months from Eye OPD. First 25 subjects at JPMC Karachi and next 25 at SZMC, Rahim Yar Khan. All of them had epiphora due to nasolacrimal duct obstruction and history of at least one probing. Sixteen (23%) had undergone probing twice for treatment of epiphora.

In the acute phase, the patients were first managed with systemic and local antibiotics. Once inflammation subsided, they were operated under general anaesthesia and the throat properly packed. Procedure was done at least three months after the last probing. Commercially available dacryocystorhinostomy (DCR) silicon tubes with long introducers were passed by utilizing the technique mentioned below. Nasal pack from inferior turbinate were removed on the first postoperative day in 38 (76%) cases. In the rest of the 12 cases- who had excessive manipulation and bleeding during surgery- the pack was removed on second postoperative day.

TECHNIQUE OF SILICON INTUBATION OF NASO-LACRIMAL DUCT

1. Examine upper and lower puncti under microscope, and dilate them first with infant's dilator, then with adult's dilator.
2. Gently pass thin lacrimal probe in lacrimal canaliculi to check patency.
3. Examine nostrils, identify inferior turbinate and pack inferior meatus with ribbon gauze soaked in 1:20,000 adrenaline with plain dissecting forceps. Try to start as posteriorly as possible. In figure-I, inferior turbinate is visible through nostril. This should be followed with an instrument to reach the meatus underneath.
4. Wait for 10 minutes and perform probing as per routine.
5. Pass introducer of silicon tube through one punctum, preferably the upper one, and pass it deep down into the nasal cavity.
6. When the tip of the metallic introducer pierces the ribbon gauze, gently pull

the nasal pack. If resistance is felt, forcefully push it. This brings the metallic introducer out through the anterior nares. If metal scratches the floor of nose, it will not bleed much due to vasoconstriction as a result of applied adrenaline soaked pack.

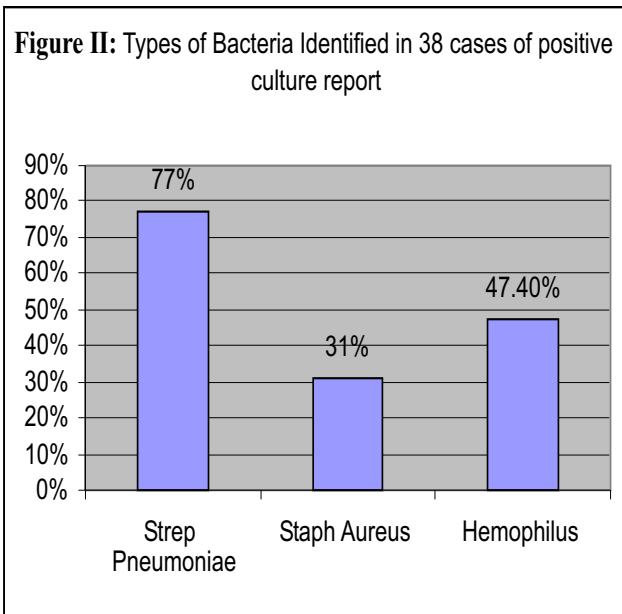


Figure I: Right nostril showing the prominent inferior meatus. (Artery forceps pointing on)

7. Metal can be pulled out with the help of artery forceps while simultaneously pushing the other end of metal down into the punctum.
8. Inferior turbinate is then repacked with 1:20,000 and again wait for five minutes.
9. Repeat same through inferior punctum.
10. Other instruments in ordinary cataract tray like Wire Victor, muscle hook, and curved artery forceps can gently be used within inferior turbinate to bring the introducer out.
11. Tie both tubes as high as possible in the nose. A good way of doing this is to take 6/0 prolene and tie one tube with single knot then pull the other tube to bring this tied tube as high as possible. Now, throw a knot across the second tube and tie it in the nose as high as possible using pointed instruments like needle holder and suture tying. Apply two or three more knots to secure it and cut the prolene.
12. At the end, confirm position of knot by separating the puncti and observing tube passing through both.
13. Cut the silicon tubing 3 mm above nasal opening. Inferior turbinate is packed with antibiotic paraffin soaked pack for 24 hours if surgery is uneventful and for 48 hours if there was extensive manipulation and bleeding during the procedure.

RESULTS

Ages of children was between 12 to 36 months, 22 of them were male and 28 female. Sixteen of the cases had previous two probings. Four children had bilateral involvement. Infective organisms were identified in 38 cases, while rest of the twelve showed no growth on culture for 48 hours. Causative organism was mostly *Streptococcus pneumoniae* (77%), *Staphylococcus* (31%) and *Haemo-philus* (47.4%) (Figure II). Eight of the children had external fistulae. Two of these had bilateral disease.



We found 40 (80%) cases were cured by the intubation (in six months to one year follow up) and tube was removed after six months. In 10 (20%) cases, there was recurrent infection and they were planned for future dacryocystorhinostomy. Their tubes were left in place and off and on medically managed. The severity of infection was less severe after intubation than observed previously.

Tube could not be passed by this technique, as the introducer was not traceable with all the efforts in four children. Two inferior chonchae were fractured by artery forceps in both of the children. Both of them did not have any recurrence of infection after this procedure.

Only few complications were encountered Five children had cheese wiring and enlargement (slit-like) of puncti due to tight silicon tube. Four children had opposite of this as their silicon tubes displaced laterally and rubbed cornea.

DISCUSSION

This procedure was done at least three months after previous probing. Although repeated probings give successful results in 80 % of cases,^{13, 14} we have to treat refractory cases not treatable with repeated probing by keeping a stent in their lacrimal drainage tract till proper dacryocystorhinostomy can be performed after the age of four years. Our technique was much more simple and cost effective as compared to the other techniques available like Balloon Catheter Dilatation,¹⁵ which has success rate between 53% to 95%,^{16,17} and use of guide wires and endoscopic visualization of nasal cavity. Tube could be passed easily by this technique in 40 (80%) cases. In 4 (8%) cases, tube could not be passed as the introducer was not traceable; this was probably due to congenital anomaly, as at times the duct is larger than the bony canal and inferior opening is beyond the nasal cavity, maybe in oropharynx.⁶⁻⁹ The disease was cured in both of them by this manipulation, their inferior turbinate was also fractured in the same sitting. Our study results are almost comparable with endoscopic dacryocystorhinostomy which ranges from 82% to 94%. Our results showed 80% success rate, however, it is worth mentioning that our study population was of younger age.^{18,19}

Nasal packs were removed after 48 hours in all those in whom excessive manipulation and bleeding were encountered per-operatively. Complications are due to level of knot of the two tubes in nasal cavity. If it was too high, it resulted in cheese wiring of medial punctual margin. Though this resulted in apparent deformity, it did not cause any significant clinical problem. If the knot is too low, it comes out from puncti and is laterally displaced to rub against cornea. The parents were reassured and explained. Their tubes were repositioned under general anaesthesia successfully. There were recurrent infections in 10 (20%) cases in six months to one-year follow up. Repeated attacks were less severe than the one before intubation. Their tubes were left in place and managed medically after culture and sensitivity test. All the five cases were planned for future dacryocystorhinostomy at the age of four years.

CONCLUSION

This technique of silicon intubation is easy, simple and cost-effective. This can be done in any operation theatre, equipped with general anaesthesia facilities, using ordinary eye instruments.

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