Simple Technique for Silicone Intubation in Congenital Nasolacrimal Duct Obstruction

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Objective : *To propose a simple and low cost technique of using the simple materials in the operating room for silicone intubation in case of nasolacrimal duct obstruction in children after failed probing.*
Method : *The study was a consecutive case series. Three patients with congenital nasolacrimal duct obstruction aged 42, 51 and 72 months were referred to the authors. Their symptoms persisted after probing twice with or without infracture inferior turbinate. The authors decided to insert a silicone tubing by using an 18-gauge, intravascular catheter as a channel to place a silicone tubing into the nasolacrimal system. Success was defined as a complete resolution of symptoms and signs (tearing, crusting, discharge, regurgitation on pressure over the lacrimal sac) after silicone intubation.*
Results : *All three patients were free of symptoms and signs after insertion of silicone tubing and an average 5.5 months (9, 6, 1.5 months) after removal of the silicone tubing. There were no intraoperative complications. No unplanned silicone tubing removal was needed and also no complications associated with silicone stent, such as punctal erosion, corneal erosion or granuloma formation occurred.*
Conclusion : *This simple and low cost technique using an intravascular catheter as a channel to place the silicone tubing into the nasolacrimal system in case of congenital nasolacrimal duct obstruction in children works well. This new technique is not only inexpensive but also effortless with no complications.*

Keywords : *Nasolacrimal duct obstruction, Silicone intubation, Intravascular catheter*

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Indications for intubation were persistent epiphora or recurrent dacryocystitis resulting from congenital nasolacrimal duct obstructions unrelieved by previous probings or acquired abnormalities of lacrimal system such as infections or traumatic disruptions of the passages. In all cases, the silicone tubing acted as a temporary stent in the obstructed duct, maintaining patency while the tissues around the stent healed. Huggert[1] was the first to use polyethylene tubes to intubate the nasolacrimal system, but he inserted the tubes through an open nasolacrimal sac. Sundmark[2] described instruments that allowed insertion of polyethylene tubes without opening the nasolacrimal sac. Quickert and Dryden[3] described intubation with silicone tubing and malleable stainless steel probes but had not been widely accepted due to its technical difficulty[4]. However, silicone tubing had become popular because it is nonirritating, flexible and easy to knot. Others had described modifications of the probes, tubing and techniques designed to improve the ease and success of silicone intubation[4-8].

At present, there are a lot of commercial forms of the silicone intubation system. The Crawford system allows a nasal retrieval of the silver-knobbed stainless steel wires that guide the silicone tubes through puncta, canaliculi, the sac, the duct and former obstructions in the region of the valve of Hasner. The conventional Crawford tube is passed through each ipsilateral canaliculi and secured in one nares with a knot in the silicone itself or in the indwelling silk thread[9]. The main difficulty with traditional rigid metal probes in the Crawford system is retrieval of the probes from the inferior meatus. The other system is the Ritleng lacrimal intubation set (model S1-1451, FCI Ophthalmics), which consists of silicone tubing firmly attached to a

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prolene monofilament leader to each end. The silicone tubing has an outer diameter of 0.64 mm and 300 mm long. The 2 prolene leaders are composed of a thicker dark blue initial portion 0.40 mm in diameter, followed by a thinner portion of the prolene, which can slip out of the open slit of the probe [10]. The Ritleng intubation system seems to be an effective treatment and easy to be retrieved. However, both systems are too expensive for the patients in a developing country.

This article proposes a new simple and low cost technique, using an intravascular catheter as a channel to place a silicone tubing into the lacrimal system in case of congenital nasolacrimal duct obstruction in children.

Patients and Method

Three patients with congenital nasolacrimal duct obstruction aged 42, 51 and 72 months were consecutively studied and underwent silicone intubation from February to October 2003. The diagnosis of congenital nasolacrimal duct obstruction was based on 1) ophthalmic history, which included the symptoms of epiphora, variable amounts of discharge and crusting; 2) ophthalmic examination, which showed an increase in tear meniscus, crusting, and, in some, reflux of discharge from the lacrimal sac; 3) a delay in the fluorescein dye disappearance.

All patients had previous unsuccessful lacrimal sac massage and topical antibiotic treatment and a simple lacrimal probing twice with or without infracture inferior turbinate. The exclusion criteria for this study included a history of trauma, facial surgery, radiotherapy or periocular neoplasm, tearing related to eyelid malposition and external eye diseases.

This simple technique for silicone intubation was performed with the patient under general anesthesia. The nasal passage was inspected with a pediatric nasal speculum. The inferior meatus was packed with cottonoid strips moistened with 1% ephedrine. The punctum was dilated with a dilator and opened 1-2 mm wide with surgical blade no.11 along the lid margin and then 18-gauge, intravascular catheter (65 mm in length, 1.3 mm in diameter) with a probe (23-gauge, McIntyre straight canula, 65 mm in length, Storz E 4395-2 or #00 Bowman probe) inside as a stent was inserted and passed into the lacrimal system. After passing the intravascular catheter with a stent into the lacrimal system and after the removal of the stent, the catheter would act as the channel for a silicone tubing (25 cm in length, 0.6 mm in diameter) to pass through until the silicone tubing appeared in the inferior meatus by using two non-toothed forceps. The assistant retrieved the silicone tubing in the nostril with a nasal speculum and alligator forcep. The authors did the same steps in both upper and lower puncta. The distal ends of a silicone tubing in the nostril were managed by tying the two ends into a knot and left in place for 3 months (Fig. 1-10).

Results

The surgeons successfully intubated all three lacrimal systems with this simple technique. Planned stent removal was performed under general anesthesia in 3/3 eyes three months after surgery. All patients had no tearing, crusting or discharge after silicone intubation and an average of 5.5 months (9, 6. 1.5 months)after removal of the silicone tubing.

The success rate of initial silicone intubation in relieving signs and symptoms of nasolacrimal duct obstruction in this series was 100% (3/3).

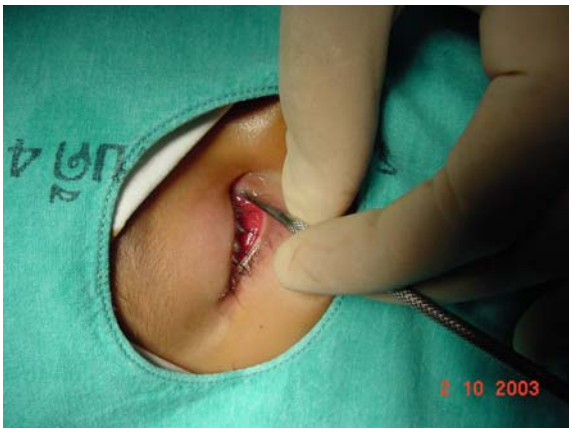

Fig. 1 The punctum was dilated with a dilator

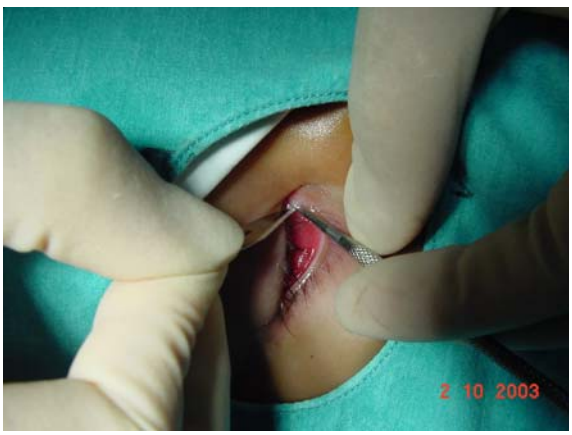

Fig. 2 The punctum was opened 1-2 mm wide with surgical blade No.11

Fig.3 A 18 gauge, intravascular catheter

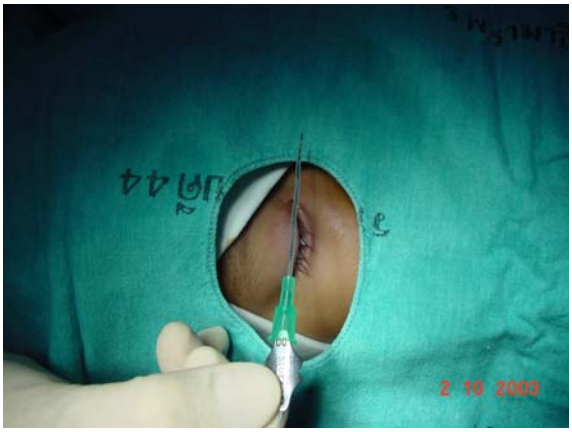

Fig. 4 An intravascular catheter with #00 Bowman probe inside as a stent

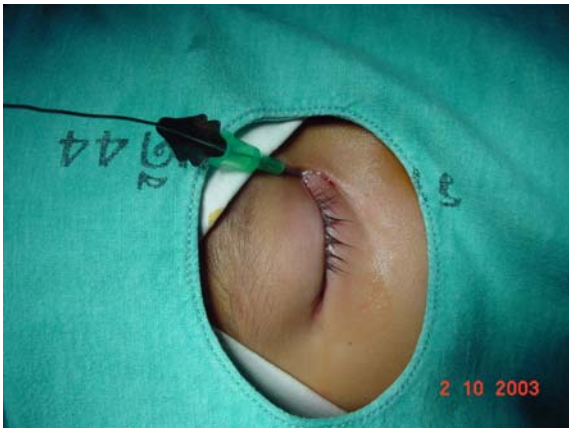

Fig. 5 An intravascular catheter with #00 Bowman probe was inserted and passed into the lacrimal system

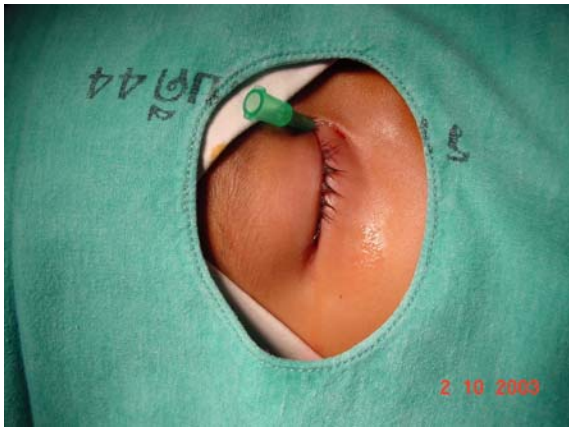

Fig. 6 After removal of the stent

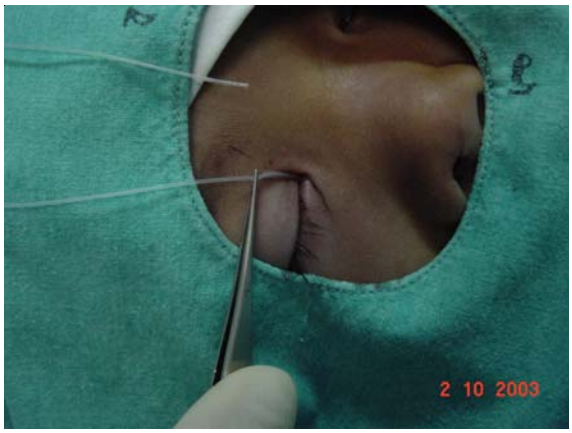

Fig. 7 The catheter acted as a channel for silicone tubing to pass through

Fig. 8 The assistant retrieved the silicone tubing in the nostril

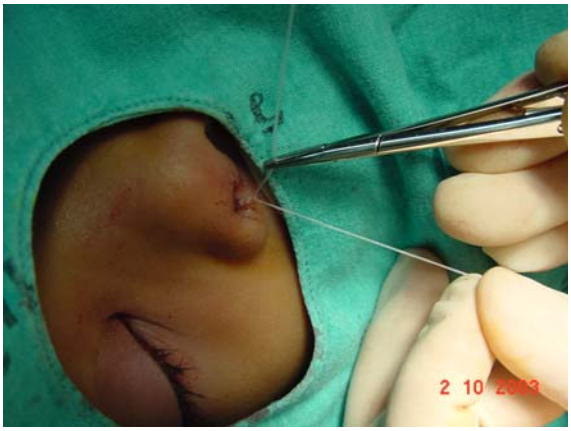

Fig. 9 The distal ends of a silicone tubing were managed by typing the two ends in a knot

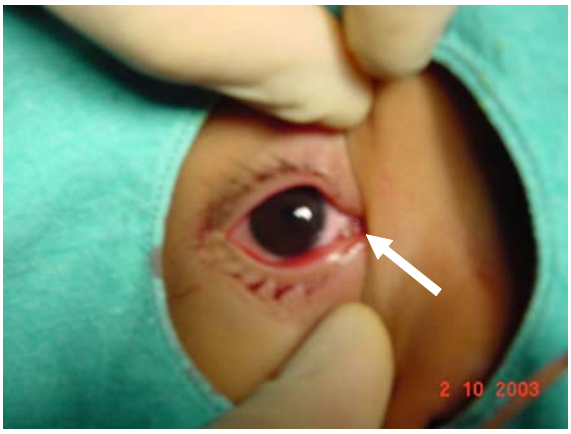

Fig. 10 A child with a silicone tubing in place

There were no intraoperative complications in the present study. No unplanned stent removal was needed and also no complications associated with the silicone stent, such as punctal erosion, corneal erosion or granuloma formation occurred.

Discussion

Silicone intubation is an effective treatment for congenital nasolacrimal duct obstruction in children who do not respond to conservative medical treatment and simple nasolacrimal duct probing. The silicone stent is thought to produce nasolacrimal duct patency by maintaining an opening as the edges of the membranes obstruction heal around the stent[11-12]. Silicone intubation generally avoids the need for dacryocystorhinostony which is a more extensive procedure and has a higher failure rate in infants and young children with congenital nasolacrimal duct obstruction. The success rate reported for silicone intubation ranged from 66% to 100% [11-17] and generally decreasing with age[15,17]. The authors success rate in this study can not compare to previously reported results because the sample size is too small. The reason there were only 3 cases in the study can be explained by a high success rate of nasolacrimal duct probing in children over 1 year of age. This agrees with Robb[18] who reported the overall cure rate in 252 patients was 92%, varying from 88.9% to 96.8% at different age intervals up to and beyond 3 years of age. Therefore, a further study in a large case series is needed to evaluate the success rate, pitfalls, problems and complications of this new technique.

For a developing country, cost is a significant consideration for the patients. This technique is not only inexpensive but also effortless. It costs only 1.5 dollars for one silicone tubing and two intravascular catheters. The authors hope this technique will be useful for ophthalmologists who want to save costs by using the simple materials in the operating room.

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วิธีการใส่ท่อซิลิโคนที่ทำได้ง่ายและราคาประหยัดในเด็กที่มีท่อน้ำตาตันตั้งแต่เกิด

อาภัทรสา เล็กสกุล, บุญเทียม เขมาภิรัตน์, ทวีกิจ นิ่มวรพันธุ์

วัตถุประสงค์ *: เพื่อเสนอวิธีการใส่ท่อซิลิโคนในเด็กที่มีท่อน้ำตาตันตั้งแต่เกิด และได้รับการแยงท่อน้ำตาแล้วแต่ไม่ประสบผลสำเร็จ ด้วยการใช้วัสดุอุปกรณ์ที่มีอยู่แล้วในห้องผ่าตัด*

วิธีการศึกษา *: เป็นการศึกษาแบบ consecutive case series ทำการศึกษาในผู้ป่วย 3 คน อายุ 42 51 และ 72 เดือน ที่ยังมีอาการของท่อน้ำตาอุดตันหลังแยงท่อน้ำตา (Probing) 2 ครั้ง ร่วมกับทำหรือไม่ทำ infracture inferior turbinate โดยใส่ท่อซิลิโคนด้วยการใช้ intravascular catheter เบอร์ 18 เป็นช่องนำทางในการวางท่อซิลิโคนในระบบท่อน้ำตา ผลสำเร็จของวิธีการนี้คือ ผู้ป่วยไม่มีอาการและอาการแสดงของภาวะท่อน้ำตาอุดตันอีกเลย หลังการใส่ท่อซิลิโคน*

ผลการศึกษา *: ผู้ป่วยทั้ง 3 คน ไม่มีอาการและอาการแสดงของภาวะท่อน้ำตาอุดตันอีก หลังใส่ท่อซิลิโคนและในการติดตามดูผู้ป่วยเฉลี่ย 5.5 เดือน (9, 6, 1.5 เดือน) หลังเอาท่อซิลิโคนออก ผู้ป่วยไม่มีภาวะแทรกซ้อนระหว่างการผ่าตัด ไม่มีความจำเป็นต้องเอาท่อซิลิโคนออกก่อนกำหนด และไม่มีผลข้างเคียงที่เกิดจากการใส่ท่อซิลิโคน เช่น punctal erosion, corneal erosion หรือ granuloma formation เกิดขึ้น*

สรุป *: วิธีการใส่ท่อซิลิโคน โดยใช้ intravascular catheter เป็นช่องนำทางในการวางท่อซิลิโคนในระบบท่อน้ำตาในเด็กที่มีท่อน้ำตาตันตั้งแต่เกิดนั้นใช้ได้ผลดีวิธีการใหม่นี้นอกจากราคาประหยัดแล้วยังเป็นวิธีที่ง่ายและไม่มีภาวะแทรกซ้อนอีกด้วย*