CONSERVATIVE VERSUS INVASIVE TREATMENT IN NASOLACRIMAL DUCT OBSTRUCTION IN CHILDREN

Roxana Calmuschi(Trinc)[1,2], Sorin Trinc[2], Afilon Jompan[3]

Abstract

In the literature there is no consensus between the benefits of conservative or interventional treatment in the NLDO, and in our country there has not been published a protocol for the diagnosis and treatment of this condition. Conservative treatment involves local application of ocular pharmacological preparations that treat inflammation and / or conjunctival secretion. Antibiotics are administered according to the susceptibility of germs presented by microscopic and bacteriological analysis of conjunctival secretions. An important factor in conservative treatment is the massage of the lacrimal sac and lacrimal canaliculi, hydrostatic massage, the principle of which is to increase the mechanical pressure at the level of the lacrimal ducts and to push a potential obstacle in the lower part of the tear duct. Treatment by lacrimal probing can be done from the age of 3-4 months, even in the ambulatory, without anesthesia or by instillation of local anesthetics. If the procedure fails, a silicon of lacrimal pathways can be done in collaboration witn ENT specialist, a dacriocistorinostomia, canaliculo cistorinostomia or conjunctivocistorinostomia, procedures that cannot be done in acute dacriocistitis. In this study we analised the cases treated in Ophtalmology Departament of SCJU Arad between 2016-2017 (115 patients, 135 eyes, patients aged between 0,5-36 months), diagnosed with NLDO and treated by different modaklities. We obtained best results by conservative treatment.

Keywords: nasolacrimal duct obstruction, nasolacrimal probing, massage, silicone intubation, dacriocistorinostomia.

Introduction

Approximately 40% of infants have symptoms of NLDO. It is usually caused by the persistence of a diaphragm in the lacrimal duct. Children have epiphora due to the blockage of the lacrimal duct and lacrimal purulent secretions caused by bacteria from normal skin flora. The infection of lacrimal secretions results from the bacterial proliferation in the lacrimal sac. By far the most common confusion is with infectious conjunctivitis, although in the case of the latter both bulbar and palpebral conjunctiva suffer obvious changes. Usually the general practitioner and the pediatrician recommend local antibiotics without specific NLDO treatment and some ophthalmologists ignore the importance of the conservative procedures by recommending invasive maneuvers.

Purpose

In the literature there is no consensus between the need for conservative or interventional treatment in NLDO (nasolacrimal duct obstruction), and in our country there has not been published a protocol for the diagnosis and treatment of this condition. In many cases the conservative treatment is more effective than interventional treatment and the latter is used in complicated cases, Also, the collaboration between the family doctor, ophthalmologist and ENT specialist is not well established in this cases. The aim of this study is to promote the elaboration of a treatment protocol in cases of NLDO in children and to analise our experience in treating this condition by conservative or invasives procedures.

Matherials and methods

In this study we analised the cases treated in Ophthalmology Department of Arad County Hospital between 1.01.2016-31.12.2017 (115 patients, 135 eyes), aged between 0,5—36 months, diagnosed with NLDO and treated by conservative or invasive modalities. Inclusion criteria were the lack of topical antibiotics administration or other ophthalmological treatment in the previous 14 days, the absence of other congenital or acquired ophthalmological affection. The consent of the Ethical Department of Faculty of Medicine, UVVG Arad was obtained.

Results

We treated NLDO by conservative methods wich involves topical instilment of ocular pharmacological preparations that treat inflammation and / or conjunctival discharge. Antibiotics were administered according to the susceptibility of germs present in the microscopic and bacteriological analysis of conjunctival mucopurulent material. Parents were warned that the application of antibiotics will not lead to the treatment and cure of NLDO, but will only reduce conjunctival discharge and alter its appearance. An important factor in conservative treatment was the massaging of the lacrimal sac and lacrimal canaliculi, also called hydrostatic massage, the principle of which is to increase the mechanical pressure at the level of the lacrimal ducts and to push a potential obstacle in the lower part of the tear duct.

[1]"Vasile Goldis" Western University, Arad, Romania. Department of Ophthalmology, PhD Student
[2]Clinical Hospital of Arad County
[3]"Vasile Goldis" Western University, Arad, Romania. Department of Family Medecine
E-mail: rcalmuschi@hotmail.com, ajompan@yahoo.com

The massage was done with the index finger after the administration of antibiotic drops into the conjunctival sac and consists of applying pressure on the lacrimal sac targeting on the lacrimal pathway. This technique was first described by Crieger in 1923. There are divergences in terms of duration of conservative treatment. Some authors (2), (3) recommend a short, even minimal period, in order to prevent the infection of the lacrimal ways and the fibrosis of the walls. Others (Olver, 2) support spontaneous permeability of lacrimal pathways at variable intervals during the first months after birth, with permeability results of 96% in the first year of life and 60% in the second year. According to Patriney and Anderson, 50-75% of cases show reperfusion with conservative treatment of 95% up to 3 months and 95% up to 8 months (3). Noda et al. published the release of lacrimal canaliculi in 2/3 of cases up to 2 months after birth and in 100% of cases conservatively treated up to 9 months (5). Nucci et al. reported 93% repermeabilization in the 1-12 month group with conservative treatment and 79% in the 13-24 month group. (6) Pettersen and Robb support spontaneous recovery in 89% of cases up to 12 months, and after (7) Katowitz recommends conservative treatment for at least 6 weeks and Anders at least 12 weeks (6). Young and co. show a possibility to continue conservative treatment in the second year of life with good results (9), and Takahashi and colleagues in the study "Wait and see" support very good results through conservative treatment in the first 12 months of life (10). Conservative treatment should be followed for at least 3-4 months after the onset of symptoms. We recommended conservative treatment in 102 patients with NLDO (75,5%).

Treatment by lacrimal probing can be done even in the ambulatory, without anesthesia or by instillation of local anesthetics. The children were fully immobilized, in a dorsal position, held by one or two persons or wrapped in a durable material. It was important to immobilize their head. At the tear point of the lower eyelid, a Bowman 2mm vertical probe was inserted after pre-dilatation so that laterally it is aligned parallel to the free edge of the lower eyelid, while the eyelid is laterally towed. On the tip of the probe methylcellulose can be applied for additional lubrication and to prevent tearing of the walls of the tear ducts. It is injected through a syringe attached to the physiological saline probe, and fluid pressure is designed to remove possible obstructions formed by secretions and thin membranes. During the procedure, resistance points could be encountered:

-12mm from the lacrimal points, at the border between the sac and the lacrimal canal;

-20mm from the tear points when meeting the wall of the nasal bone.

If the first probing procedure was unsuccessful due to the lack of lacrimal fluid washing at the level of nasal nostrils, a new approach was scheduled in 3-4 weeks and the second intervention had a lower success rate estimated at 70-80%(6). We recommended lacrimal probing in 31 cases of NLDO (22,9%), with second reintrevention in 6 cases (19%).

After this procedure, antibiotic and local steroids was administered for 5-7 days, combined with hydrostatic massage. If the second intervention proved to be unsuccessful, the patient still presenting symptomatology and the impermeability of the NLDO, the diagnosis was under the "congenital" category and the collaboration with the otorhinolaryngologist with endoscopic treatment through the nasal nostrils with fracture of the lateral nasal wall was essential. During nasal endoscopy when treating lacrimal canaliculi obstruction, situations can be encountered:

- endonasal probe locks in the mucosa that covers the lacrimal hole or is minimal in size;
- the probe remains under the endonasal mucosa;
- the probe does not penetrate the blockage.

If the NLDO symptoms persisted after the second probing, we intubated the lacrimal pathways. It is a maneuver that is carried out in the complex congenital diseases of the lacrimal pathways, in case of failure of the conservatory therapy or in unsuccessful repeated probing procedures. The efficiency of the method is 85-95%(8). The silicon tube inserted into the tear paths prevents stenosis, wound formation and allows the normal tear drainage. There are sets of mono or bicanalicular intubation. They are silicone tubes with a diameter of 0.6-0.9 mm. The intervention was performed under general or local anesthesia. Successful laceration of the lacrimal tract was performed and the probe insertion was executed endoscopically at the nasal fossa using a metallic guide wire which was withdrawn after placing the silicone tubes.

There are several types of intubation techniques for lacrimal pathways:

- Quickerta and Dryden technique which uses probes with a 12-14mm length, with a conical end, curved or straight. At the end of the probe there is a silicon wire used for the landmark;
- Crawford technique that uses a tear intubation set consisting of two metallic threads of 11.5-14 mm length linked to silicone fibers, requiring a special insertion hook.
- Bowman technique, when the tubular needle technique that uses a tubular needle with a 0.7 mm outer diameter, with a blunt end, two sleeves and silicone fibers, with a length of 3cm.

We performed silicone intubation in 2 patients with NLDO, (1,41%) - Quickerta and Dryden technique, with removal of the tubes in 3 months.

Silicone intubation of lacrimal pathways was maintained for several months, usually the fluorescein dye disappearance test (FDDT) was positive, and after removal of the probes, symptoms did not return. If the FDDT is negative while maintaining the probe, the stent can last for 6 months or longer. After the removal of the stent, antiseptic and antibiotic treatment combined with steroids for 5-7 days and hydrostatic massage are recommended.

-dilatation with balloon which is a recommended method in case of failure of conservative treatment, hydrostatic massage, and when there is suspicion of incomplete strictures of the tear ducts. A balloon catheter was introduced into the lacrimal pathways, and then inflated for 90 seconds at 8 atmospheres. These maneuvers can be

repeated after 60 seconds. After dilating the lacrimal pathways, FDDT was positive. The advantage of this method was simplicity and efficiency, and the disadvantage was related to the high cost of the balloon catheter.

Dacriocistorinostomia (DCR)

Unsuccessful intubation of the lacrimal pathways leads to DCR with positive functional outcomes in 85-99% of cases (4). Favorable results are particularly encountered if the obstacle is in the lacrimal sac or under the lacrimal sac. The basic condition for choosing DCR is the existence of at least one permeable upper tear path. The absolute contraindication is the presence of a malignant tumor of the lacrimal sac, in which case dacriocystectomy is selected and then canalicirinostomia or conjunctivorinostomia. The intervention is carried out in reverse Trendelenburg position, with the head being higher than the pelvis. Endoscopic examination of the nasal cavity and assessment of the condition of the lateral walls of the nasal septum are necessary. The location of the lacrimal sac is determined by translucency, the method in which the light optical fiber is inserted into the lacrimal channels, the lacrimal sac, and the visible endoscopic illumination in the nasal cavity indicates the position. Another method of determining the location of the lacrimal sac is to probe the lacrimal pathway and penetrate into the sac and on the other hand to make contact between the sac sample and a forceps inserted through the nasal cavity. After approximating the position of the lacrimal sac, a flap of the nasal mucosa is removed, a hole in the lateral nasal bone is re-opened, the lacrimal sac is highlighted and its suture is extracted from the endonasal mucosa. To increase the effectiveness of the DCR, the head of the middle cornet is resected. Anastomosis is cured in about 8 weeks. To reduce the amount of stenosis, silicone stents can be inserted into the lacrimal channels and in the lacrimal sac of anastomosis with the nasal mucosa, which can be removed after 2-4 months.

External Dacriorinocistostomia

It is a recommended procedure for children aged 3-4. It has multiple disadvantages to endonasal DCR: the risk of bleeding during surgery, increased duration of surgery and aesthetic disadvantages. There is lack of endonasal approach and lateral nasal bone wall is fractured after external exposure. Postoperative inflammation is intense and bloating in the post-operative period may lead to intense palpebral emphysema.

Laser Dacriorinocistostomia

It has a good coagulating effect. The approach consists of nasal endoscopy and use of laser Yag, Diode, Nd: Yag.

Canaliculocistorinostomia

It is a procedure that involves avoiding an intrasacular or subsacular blockage. The operation can only be done externally, and involves the connection of the lacrimal channels to the nasal mucosa.

Conjunctivocistorinostomia

It is an intervention that can be achieved in the case of a DCR or canaliculocistininostomy that is unsuccessful. It is performed in patients over 12 years of age and involves a tear drainage between the conjunctival sac and the nasal cavity. The contraindications are closure failure, early age, lack of motivation and patient compliance. The complications of conjunctivistinostomy are related to intraoperative bleeding and periocular granulation at the end of the silicone stent. Interventions involving anastomosis between the lacrimal pathways and the nasal mucosa are problematic in the case of acute dacriocytosis. According to some authors, this is not a contraindication to DCR (). Narrow nasal cavity in children is prone to postoperative adhesions, so intubation of the lacrimal canaliculi is mandatory, thus leading to unhealthy healing even under tissue inflammation. Welham and Huges describe 93% (12) and Nowinski et al 88% (13) cases with FDDT positive and symptomatology absent after DCR in case of acute dacriocystitis. In our study we did not recommended surgical invasive procedures in collaboration with the ENT specialists.

Discussions

In our ophthalmology department, the conservative technique for NLDO was used in 75,5% cases, while the interventional methods (probing and silicone tubes) was used in 22,9% cases. We started the treatment with conservative methods in all the patients, and in those with no therapeutic response we performed the lacrimal pathways probing or silicone intubations. We notice that in those patients with aqueous lacrimal secretions the conservative treatment was efficient in all cases, while in those patients with purulent secretions and late presentations after the onset of the lacrimal symptoms the lacrimal probing was indicated. The differentiation criterias are the aspects of the lacrimal secretions, the delay between the presentation and the onset of the lacrimal simpoms, and the age of the patient. Our results are comparable with similar studies from other countries. We did not used large surgical procedures in collaboration with ENT specialists, due to the fact that we did not have presentations in late stage of disease or children over 36 month of life, when the rate of complication is higher,

Conclusions

Most of the children with NLDO can be treated with conservative methods even in the general practice doctor's consultation rooms or in pediatrician ambulatory. We insist over the role of the recommendations given to the parents of the patients with NLDO. In incipient cases, the most efficient treatment is local saline solution washout and lacrimal duct pressure. In late presentations, the optimal therapeutic method is local lacrimal duct pressure with nasolacrimal probing, with or without antibiotic instillations. The nasolacrimal probing technique can be done in ophthalmology consultation room, but its benefits are inferior to its costs and trauma for the little patients.

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Correspondence to:

Calmuschi (Trinc) Roxana
Spitalul Clinic Judetean de Urgenta Arad,
Clinica de Oftalmologie,
Str Tudor Vladimirescu nr1 Arad.
E-mail: rcalmuschi@hotmail.com