



FOCUS ON: OPHTHALMIC ANAESTHESIA

Anaesthesia for dacryocystorhinostomy

Waleed Riad^{a,*}, Imtiaz A. Chaudhry^b^a Department of Anesthesia, King Khaled Eye Specialist Hospital, P.O. Box 7191, Riyadh 11462, Saudi Arabia^b Department of Ophthalmology, Oculoplastic division, King Khaled Eye Specialist Hospital, Riyadh, Saudi Arabia

S U M M A R Y

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Excessive tearing due to obstruction of the nasolacrimal duct is a common ophthalmic problem. Dacryocystorhinostomy (DCR) is the procedure designed to treat primary or secondary adult anatomical obstruction. External DCR is the traditional surgical approach, however endoscopic DCR can be done. In the past, general anaesthesia (GA) has been considered as the gold standard for DCR surgery; endotracheal intubation and throat pack offer an important function as protective mechanisms of the patient's airway against blood aspiration. Head up position, hypotensive anaesthesia, incision infiltration with lidocaine/epinephrine together with insertion of nasal pack soaked in decongestant solution are a routine measures to guard against intraoperative bleeding that may hinder surgical site visualization. Increase awareness of regional anaesthesia efficacy contemplated the surgeons towards the use of such techniques. The basic concept of local anaesthesia for DCR involves blockade of infratrochlear, infraorbital and anterior ethmoidal nerves either by separate injections or by local infiltration along with intranasal preparation. It has been found that DCR under regional anaesthesia minimizes intraoperative bleeding, inpatient stay and reduce health care expenditure. Further, many patients prefer regional anaesthesia due to less postoperative pain. These benefits are desirable particularly in elderly population in whom GA constitute a threat for their life.

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1. Background

Epiphora (overflow of tears) due to disruption in the balance between tear production and tear drainage is a common ophthalmic problem being faced by ophthalmic practitioners. It is a disease of pediatrics as well as adult population. The epiphora varies in its presentation from the occasionally inconvenient trickle to chronically continuous frustrating overflow. Ophthalmic examination can provide a clue to differentiate between over production or decrease drainage of the tears. Corneal, conjunctival and scleral foreign bodies, ingrown eyelashes (trichiasis), malposition or inflammation of the eyelid margins, and trigeminal nerve irritation may cause an abnormal increase in tear production otherwise diminish tear drainage is the cause for epiphora.

Tear drainage abnormalities can be either functional or anatomical. Functional failure is due to disturbance in the lacrimal pump function secondary to facial palsy, laxity of the eyelid, feeble orbicularis muscle and displaced punctum. Anatomical obstruction may be congenital or acquired which can be further subdivided into primary or secondary. Subclinical chronic inflammation of the

nasolacrimal sac (dacryocystitis) followed by fibrosis without any clear precipitating factor usually called primary acquired nasolacrimal duct obstruction (PANDO).¹ The condition is frequently seen in female patients because of significantly smaller dimensions in the lower nasolacrimal fossa and middle nasolacrimal duct.² Causes of secondary acquired nasolacrimal duct obstruction (SALDO) include bacteria, viruses, fungi, and parasites infection in addition to inflammatory conditions such as sarcoidosis, scleroderma and Wegener's granulomatosis. Some other possible causes may include malignant tumors originating from the lacrimal system itself or metastatic spread from adjacent tissues such as eyelid basal cell carcinoma. Additionally, traumatic injury to the lacrimal passageway and mechanical obstruction by intraluminal stone (dacryoliths) may also result in the nasolacrimal duct obstruction (NLDO).

2. Surgical treatment

The definitive treatment for tear drainage abnormalities is mainly surgical. Dacryocystorhinostomy (DCR) is the procedure designed to treat primary or secondary adult anatomical obstruction. Probing, nasolacrimal intubation and balloon catheter dilatation are some of the treatment of modalities in congenital anatomical obstruction; however DCR is used only in the presence

* Corresponding author. Tel.: +966 1 4821234 3215; fax: +966 1 4821234 3727.
E-mail address: waleed_riad@yahoo.com (W. Riad).

of epiphora in the face of stenotic or complete lacrimal system obstruction.

The gold standard surgical approach for dacryocystorhinostomy is external DCR (via the skin); however the procedure can also be done intranasal or transcanalicular without making any skin incision (endoscopic DCR). External DCR involves making a direct fistula from lacrimal sac to the nasal space as an alternative pathway to enable unobstructed drainage of lacrimal system secretion.³ In this procedure, a large bony rhinostomy is made through thick maxilla bone and thin lacrimal bone between the lacrimal sac and middle meatus of the nose. The lacrimal sac and nasal mucosa are approached through the skin incision. The history of standard external DCR started when Adei Toti at the beginning of the twentieth century punched out part of lacrimal sac, bone and nasal mucosa to make a passage for tear drainage.³ Numerous modifications have been made to the originally described procedure without altering the basic concept of creating a fistula between the eye adnexa and the nasal opening. The addition of a silicone tube intubation of the lacrimal drainage system following creation of fistula has greatly increased the success of the operation. In experienced hands, the success rates of the standard external DCR have been increased to approximately 90–95%.⁴

Advantages of external DCR include good exposure of the lacrimal sac, a larger rhinostomy and direct suturing of the lacrimal sac and nasal mucosal flap to create a larger fistula. These steps help to rule out any pathology and facilitate removal of dacryoliths and lacrimal sac tumors. Significant disadvantages of the procedure include intraoperative hemorrhage, corneal abrasion if cornea is not protected during the operation, canalicular stenosis from manipulation and intubation, visibility of facial scarring in varying proportion of patients and possible disruption of the medial canthal ligaments with resultant lacrimal pump dysfunction.⁵ Further, there may be a risk of sump syndrome which could be due to the residual nasolacrimal sac resulting in collection fluids when the rhinostomy is placed too high in relation to the lacrimal sac. There is a further risk of sterile abscess formation due to some suture materials used for skin closure after external DCR.

To overcome the disadvantages of external DCR, various attempts have been made to create a direct fistula without the use of skin incision. Endoscopic nasal DCR gains its popularity with the recent advances in the functional endoscopic nasal surgery for paranasal sinusitis over the past two decades. The development of mini-endoscopes has enabled endoscopy of the lacrimal drainage system via the lacrimal puncta to visualize the exact site of a stenosis.⁶ The technique involves localization of the medial wall of the lacrimal sac through placement of lacrimal probe or more commonly retinal light either through the lacrimal system or transcanalicular followed by endoscopic incision of the nasal mucosa anterior to the middle turbinate. Osteotomy is created by fracturing the thin lacrimal bone under endoscope guidance and further enlargement of the opening is performed using a drill. More recent, surgeons have been using various kind of laser system for ablation of the nasal mucosa and cutting of the bone. After creation of the bony osteotomy, incision of the medial wall lacrimal sac performed. In certain cases a bridge flap between the lacrimal sac as well as nasal mucosa is made after the placement of stent to prevent closure of the newly created ostium. Some surgeons advocate use of Mitomycin-C that inhibits fibroblast proliferation to prevent osteotomy closure.

Intranasal approach with or without the use of endoscope has many potential advantages over the standard external DCR through the skin incision approach. It has been reported that fewer incidences of tissue damage without any visible external skin scars take place with endonasal DCR. The approach contributes to a better cosmetic outcome and further, it provides easy control of nasal

mucosal bleeding together with preserving the pump function of the nasolacrimal system.⁷ Additionally, patients who undergo intranasal DCR are at a lower risk for developing intraoperative and postoperative surgical complications, and the postoperative recovery period is shortened with less pain.

3. Anesthetic management

General anaesthesia (GA) is considered as the gold standard for DCR surgery. Since the introduction of the procedure at the beginning of last century until very recently, most surgeons prefer to perform the surgery under GA. This form of anaesthesia offers an excellent operative condition which completely eliminates the surgical pain especially during periosteal elevation and creation of the osteotomy. The procedure itself can be classified as low risk surgery as it induce low disturbance of physiological functions but in many situations a GA may be extremely hazardous; for instance in elderly patients who may have associated extensive systemic and metabolic disorders.⁸ Such patients may require highly skilled anaesthesia team, well equipped surgical unit with possibility of hospital admission if needed along with presence of intensive care backup. Unfortunately, these facilities may not be available in many of the ophthalmic care facilities worldwide where these patients may be present for possible DCR.

In the recent era of increased awareness of the patient regarding the benefits of local anaesthesia and with advancement of surgical techniques, there has been emphasis on the use of local anaesthesia for most of the ocular or periocular procedures being performed by ophthalmologists. Various local anesthetic techniques have been advocated during external or endoscopic DCR in patients from different cultural backgrounds. The ability to do this procedure under local blockade may enable some patients an opportunity to have such procedure who otherwise would have been found unsuitable or unfit to stand the risk of GA.

Preoperative evaluation is a crucial element of the patient care. Preoperative visit should take place in advance of the procedure to allow ample time for necessary risk assessment. Formulation of an appropriate intraoperative plan is based on adequate assessment of the patient medical condition. The past medical, surgical, medication and family history should be elicited. In particular a history of failure of previous DCR may affect the choice of surgical and anesthetic techniques. The routine physical examination of the patient should include evaluation of the lacrimal system for presence of inflammation and/or mucocele over the medial canthal area. This may also alter the management plan. The laboratory investigations requested should be based on the retrieved data from the history and physical examination. Routine laboratory screening may unnecessarily increase the cost and staff workload. However it may not improve the patient care or outcome.⁹ The anesthetic plan based on the retrieved data should be discussed and agreed among the anaesthetist, surgeon and the patient.

4. General anaesthesia

The anesthetic plan should be tailored to physical condition of the patient in order to have a satisfactory and uncomplicated anesthetic course. Since the surgical treatment of DCR is not a life saving procedure, optimization of co-morbidity of the particular patient is mandatory before commencement of the surgery. General anaesthesia is the technique of choice upon patient request if his/her medical condition allows, for uncooperative patients, children, in presence of language barrier. Patients who reported allergy to local anesthetic solutions or previous complication to ophthalmic regional blockade should be performed under general anaesthesia.¹⁰

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