

# Simultaneous bilateral external dacryocystorhinostomy

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## ABSTRACT.

**Purpose:** To assess the outcome and complications of simultaneous bilateral external dacryocystorhinostomy (DCR) surgery.

**Methods:** The records of all patients who underwent bilateral external DCR in a single session between November 1999 and October 2005 were reviewed.

**Results:** The study cohort comprised 59 patients (50 females, nine males; age range: 6–72 years; mean age: 49 years). Nasolacrimal duct obstruction was acquired primarily in 54 patients, congenitally in three and secondary to sino-nasal surgery in two. Thirteen eyes of eight patients had a history of unsuccessful lacrimal surgery. The operation was performed under local anaesthesia plus sedation in 54 patients (92%). Total intraoperative haemorrhage varied from 3 mL to 200 mL (median: 17 mL; mean: 37 mL). Excessive intraoperative haemorrhage (= 100 mL) occurred in five patients (9%). Total duration of surgery varied between 70 and 140 min, with an average of 89 min. Postoperatively, early bleeding requiring intranasal tamponade developed in one patient (2%) and bilateral wound infection in one patient (2%). Surgical success rate was 95%. Mean follow-up time was 8.8 months (range: 3–38 months).

**Conclusion:** This study supports that the simultaneous bilateral external DCR surgery may not adversely affect surgical success and complication rates.

**Key words:** complications – dacryocystorhinostomy – nasolacrimal duct obstruction – surgical outcome

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## Introduction

The most effective method of treatment of acquired idiopathic nasolacrimal duct obstruction (NLDO) in adults is external dacryocystorhinostomy (DCR). In experienced hands, the success rate of external DCR is greater than 90% (Hurwitz & Rutherford 1986; Tarbet & Custer 1995). External DCR, like intraocular surgery, is usually performed on one side at a time. Acquired NLDO affects

both lacrimal drainage systems in many patients. In large series, the percentage of patients who have undergone bilateral DCR ranges between 9 and 18% (Hurwitz & Rutherford 1986; Tarbet & Custer 1995; Hanna et al. 1998; Vardy & Rose 2000; McNab & Simmie 2002; Dolman 2003). In patients with bilateral NLDO, performing DCR on both sides at the same session may be more practical and cost-effective than separate operations (Hurwitz & Mishkin

1989). However, simultaneous bilateral DCR should not carry risks for the patient's health and the success of the operation. In the present study, records of patients who underwent bilateral external DCR at the same session were reviewed, and surgery-related complications and surgical outcomes were assessed.

## Materials and Methods

We reviewed charts of 59 consecutive patients who underwent simultaneous bilateral external DCR between November 1999 and October 2005. Data included demographic information, aetiology of the obstruction, history of lacrimal surgery, type of anaesthesia, duration of surgery, amount of intraoperative haemorrhage, incidence of postoperative nasal bleeding and infection, surgical outcome and hospitalization and follow-up durations.

Before surgery, all patients underwent a routine lacrimal examination including evaluation of the eyelid and punctum, biomicroscopy and lacrimal irrigation. Dacryocystography and intranasal inspection were performed in some patients. Any pre-existing systemic diseases and medications that patients had been using were recorded. Patients taking aspirin, warfarin or non-steroid analgesics were instructed to discontinue these medications before surgery. Bilateral surgery was considered only if the obstruction was symptomatic on both sides and there were no concurrent systemic conditions such as chronic debilitating disease (heart failure, chronic obstructive pulmonary disease), history of myo-

cardial infarction, bleeding diathesis, immunodeficiency or immunosuppression. All patients were evaluated by an anaesthesiologist during the week before surgery. Informed consent was obtained from all patients.

### Surgical procedure

The surgery was performed under local anaesthesia with monitored intravenous sedation or general anaesthesia. Cefazolin sodium, 0.5–1.0 g, was injected intravenously before surgery for prophylaxis. Local anaesthesia was accomplished with infra-trochlear and infraorbital nerve blocks using 10–12 mL of a mixture of lidocaine 2% with adrenaline 1 : 100 000 and bupivacaine 0.5% in equal volumes. The same mixture was injected subcutaneously along the incision line and transconjunctivally to the posterior lacrimal crest region for haemostasis. Patients who had general anaesthesia received lidocaine with adrenalin injected to the incision site. A neurosurgical cottonoid tampon soaked with the same mixture was inserted into the middle meatus.

All operations were performed by one surgeon or under his direct supervision. A 20 mm vertical incision was made from the nasal aspect of the medial canthus. The subcutaneous tissues and the orbicularis muscle were separated with blunt dissection to the periosteum. The lower half of the medial canthal tendon was divided and the periosteum was stripped posteriorly. The lacrimal bone was perforated and a rectangular bony opening was created using a Kerrison punch. Bony window extended from the medial canthal tendon superiorly to the proximal part of the nasolacrimal duct inferiorly and posterior lacrimal crest posteriorly. The medial wall of the sac was opened from the fundus to the nasolacrimal canal and anterior and posterior flaps were constructed. Posterior flap was excised; widening incisions were made on superior and inferior margins of the anterior flap. With a U-shaped incision made on the nasal mucosa, a single and wide flap was constructed. Anterior turbinectomy was performed if necessary. Mitomycin-C was applied to the rhinostomy site at 0.5 mg/mL/5 min rate in 35 eyes of 28 patients. These were patients who

presented with a bilateral primary idiopathic NLDO (21 patients, 21 eyes) or who had a canalicular obstruction and/or a history of unsuccessful lacrimal intervention or surgery (seven patients). Silicone intubation was performed in 22 eyes of 15 patients. Silicone tube was used if there was a canalicular problem or a history of lacrimal operation.

A nasal tampon was used only if postoperative bleeding was a concern. A gauze pack impregnated with antibiotic ointment was placed transnasally in the rhinostomy site. Then, the anterior nasal and lacrimal flaps were joined with three separate 6.0 catgut sutures. The skin and the orbicularis layers were closed separately. The same operative procedure was then performed on the opposite side.

Total duration of the operation (initial skin incision to final skin suture) and the amount of blood collected in the suction container were recorded. A haemorrhage greater than or equal to 100 mL was defined as 'excessive haemorrhage'.

Patients were prescribed antibiotic and corticosteroid eyedrops for a week postoperatively. Oral antibiotics were given only if a nasal tamponade was employed and the nasal pack was removed 3–4 days after surgery. Patients were routinely seen at 1 week, 1 month, 3 months and 6 months postoperatively. Surgery was considered successful when the patient had no epiphora and the fluid passed freely into the nasopharynx on lacrimal irrigation.

## Results

Of 59 patients undergoing simultaneous bilateral external DCR, 50 were female and nine were male, with a mean age of 49 years (age range: 6–72 years). Three patients were younger than 14 years. The nasolacrimal obstruction was acquired primarily in 54, congenitally in three and secondary to sinonasal surgery in two patients. In five patients, NLDO was associated with blockage of the common canaliculus. Thirteen eyes of eight patients had a history of unsuccessful lacrimal intervention or surgery (balloon dilatation, nasolacrimal stent or DCR).

The surgery was performed in 54 patients (92%) under local anaesthesia with sedation, and in five patients (8%) under general anaesthesia. The total operative duration for consecutive surgery on the two sides ranged from 70 to 140 min, with a mean of 89 min. The total amount of intraoperative haemorrhage for both eyes was between 3 and 200 mL (median: 17 mL; mean: 37 mL). In five patients (8%), there was excessive intraoperative haemorrhage (= 100 mL). During the study period, surgery to the second eye was not cancelled in any patient.

One patient (2%) required nasal tamponade for early postoperative bleeding and one patient (2%) developed bilateral postoperative wound infection. Of 59 patients, 38 (64%) were discharged on the day of surgery and 20 patients (34%) the day after surgery. The patient who had postoperative nasal haemorrhage was discharged after 2 days of hospitalization. Twelve patients (20%) were admitted to the hospital for medical reasons such as systemic arterial hypertension, excessive intraoperative haemorrhage, postoperative epistaxis or the use of general anaesthesia. The others stayed in the hospital depending on their preferences.

Follow-up data were available in 56 patients, ranging from 3 to 38 months (mean: 8.8 months). Three patients who had a follow-up less than 3 months were not included in the analyses of surgical results. Bilateral simultaneous external DCR was successful in 106 of 112 eyes (95%) (54 patients). In six eyes (four patients) in which the outcome was unsuccessful, two had a history of unsuccessful DCR. The reasons for failure include early postoperative obstruction of common canaliculus (two eyes) or anastomosis (one eye) and late postoperative anastomosis blockage (three eyes). Revision DCR restored a successful outcome in three eyes.

## Discussion

There have been major advances in surgical techniques and anaesthesia in the last couple of decades. These advances have reflected themselves in many areas of ophthalmology as well as lacrimal surgery. In the past,

patients were admitted overnight after external DCR. Recently, there has been a shift towards surgery under local anaesthesia on an outpatient basis. Dacryocystorhinostomy on an outpatient basis is generally accepted as a safe procedure. Nausea and epistaxis were the most frequent complications that prompted patients to present to the hospital, and various studies have reported the incidence of such complications as 0.5–4.0% (Dresner et al. 1991; Hanna et al. 1998; Tsirbas & McNab 2002). A study conducted on 112 patients between the ages of 70 and 90 reported no serious complications following external DCR (Hurwitz et al. 2000).

The next step in this direction would be performing DCR bilaterally in the same session in suitable patients. Bilateral DCR may have medical, social and economic advantages for patients: faster recovery, lower need for medications, lower need for preoperative consultation and hospital visits and shorter operation time. If the patient needs general anaesthesia, simultaneous bilateral surgery can obviously decrease anaesthesia-related mortality and morbidity because the patient would receive anaesthesia only once. Some patients experience severe emotional and physical stress because of the surgery. Bilateral surgery prevents these patients from being subjected to a second stressful experience.

Bilateral DCR may provide economic benefits for patients because of the potential reduction in hospital costs, medical tests, hospitalization time and postoperative office visits. In our hospital, the operation fee constitutes approximately 48% of the estimated hospital cost for unilateral DCR. Simultaneous bilateral DCR provides savings in the hospital cost excluding the cost of the operation. For an uncomplicated case, a daytime bilateral DCR provides approximately 20% reduction in total hospital cost compared to sequential DCR performed in different days. Simultaneous bilateral surgery has social and indirect economic benefits that extend beyond the hospital cost. Patient, accompanying persons and medical staff spend less time in the overall process. There are fewer hospital visits, reduced administrative work, less

temporary disability and time off work.

Local anaesthesia is usually preferred during external DCR. In order to be able to perform bilateral DCR under local anaesthesia, patients' status should be well enough to tolerate prolonged sedation and the whole duration of the surgery. Sometimes, debilitating illnesses may make it difficult for a patient to lie comfortably in a supine position long enough for the surgical procedure to take place.

One of the most common and serious complications of DCR is haemorrhage. Bleeding during the operation not only hinders the procedures but also delays the operation and unfavourably affects the outcome (Walland & Rose 1994a). The most fundamental factor in haemorrhage is, without a doubt, the surgical technique. Several authors have defined in detail the procedures to minimize intraoperative haemorrhage (Jordan 1991; Caesar & McNab 2004). Patient-related factors that may result in bleeding are systemic hypertension, nasal mucosal diseases, use of anticoagulant drugs and bleeding diathesis. The amount of haemorrhage during external DCR has been reported in various studies to range between 4.5 and 250 mL (Hurwitz & Mishkin 1989; Meyer 2000; Caesar & McNab 2004). In the present study, this amount varied between 3 and 200 mL, with a median of 17 mL and a mean of 37 mL. Despite being warned, two patients had taken aspirin before surgery and bled more than 100 mL during surgery. Should haemorrhage or another complication develop on one side, surgery on the other side may then be cancelled.

Serious nasal haemorrhage can be encountered during as well as after DCR. In our study, postoperative epistaxis requiring a nasal tamponade developed in one patient (2%). Several series reported secondary haemorrhage in 0.5–3.9% of DCR cases (Dresner et al. 1991; Walland & Rose 1994a; Tarbet & Custer 1995; Tsirbas & McNab 2002). A nasal tampon can be used to prevent postoperative haemorrhage, especially in patients in whom excessive bleeding occurred during the surgery. However, according to Walland & Rose (1994a), intranasal tamponade may increase the risk of postoperative infection.

It would be beneficial to perform DCR bilaterally, especially in children, in order to avoid a second general anaesthesia. However, children are more susceptible to blood loss because of their low blood volume. In our study there were three patients under the age of 14. Intraoperative haemorrhage did not cause any serious problems in these patients.

The incidence of soft tissue infection at the site of incision after DCR surgery ranges between 1 and 18% (Walland & Rose 1994b; Vardy & Rose 2000; Yazici & Meyer 2002). Bilateral simultaneous DCR may increase the risk of postoperative infection. Controversy surrounds the use of prophylactic antibiotic before DCR. We administered prophylactic intravenous antibiotic before bilateral DCR, which may have contributed to relatively low wound infection (2%) in the present study. As in cataract surgery, use of two separate sets of surgical equipments and new surgical gloves may decrease the risk of postoperative infection.

Duration of the operation is an important factor with respect to bilateral external DCR. Especially when local anaesthesia is used, the duration of the operation should be short enough to be well tolerated by the patients. Otherwise, the amount of anaesthetic and sedative drug used would be higher. External DCR is a short operation, typically lasting less than an hour: Tarbet & Custer (1995) and Malhotra et al. (2003) reported mean operative durations of 53 and 41 min, respectively. In the present study, the mean duration was 89 min for bilateral external DCR. Performing the operation synchronously on both sides may reduce the total operative duration significantly.

In accordance with the protocol of ongoing research, we applied mitomycin-C to the rhinostomy site during surgery in 35 of 118 eyes (30%, 28 patients). The contribution of mitomycin-C to the outcome of DCR has not been established (Kao et al. 1997; Roozitalab et al. 2004). The surgical success rate of external DCR is generally 90% or higher. In a previous study (Hurwitz & Mishkin 1989), success rate of bilateral simultaneous DCR was 94%. Our success rate (95%) lies within this range. We conclude that performing external

DCR bilaterally and simultaneously in suitable patients would not result in adverse effects on the surgical outcome. It would be valuable to perform a controlled study to estimate the cost effectiveness and social benefits of simultaneous bilateral DCR compared to non-simultaneous bilateral DCR.

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