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Original Article

Outcomes of External Dacryocystorhinostomy under General and Local Anesthetics in a Tertiary Clinic

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Abstract

Objectives: In our clinic, although we prefer to perform dacryocystorhinostomy (DCR) under general anesthetics, we also perform it under local anesthetics for patients with a high risk of general anesthesia. Herein this study, we aimed to present our experiences in external DCR under both general and local anesthetics in a tertiary clinic.

Methods: Medical records of the patients who had epiphora, were followed up in the oculoplastic section between January 2014 and December 2020 were collected. Patients who underwent external DCR were included in the study. Patients were divided into two groups: local and general anesthesia. All demographic characteristics of patients, previous DCR, history of dacryocystitis, surgery time, perioperative complications, and the American Society of Anaesthesiology (ASA) physical status score were recorded.

Results: A total of 106 eyes from 82 patients were included in the study. The mean age of the patients was 57±24 years (range 18–89) and the median age was 56. Of 82 patients, 49 were female and 33 were male. 24 patients underwent bilateral external DCR. The mean surgery time for the general group and the local group was 66±12 min and 52±7 min, respectively. A significant difference was observed between the general and local groups in terms of the duration of the surgery (p=0.03). Of these, 11 patients underwent revision DCR during the follow-ups, and 7 patients were in the general group and 3 patients were in the local group. The overall success rate was 90%.

Conclusion: External DCR surgery with both general and local anesthesia is a very effective technique for the treatment of nasolacrimal duct obstruction. In addition, local anesthesia may be brought to mind as an option considering less bleeding, shorter discharge time, and cost-effectivity and also to avoid perioperative and postoperative systemic complications for patients with high risks of general anesthesia.

Keywords: Epiphora, external DCR, nasolacrimal duct obstruction

Introduction

Epiphora occurs mainly due to either overproduction of tears or an obstruction across the nasolacrimal drainage system, which begins at the punctum and ends at the inferior meatus. The etiology of epiphora determines the treatment options. Dacryocystorhinostomy (DCR), first introduced in 1904 by Toti (1), is the standard treatment for a blockage of the nasolacrimal drainage system. DCR is commonly performed under a general anesthetic, and few studies have reported the outcomes of DCR under a local anesthetic (2–6). Local anesthesia can reduce the risks associated with general anesthesia, and some authors highlight how it involves a shorter surgery time and faster recovery (7–10). We have observed that since the beginning of the COVID-19 pandemic, outpatient surgery, shorter surgery times, shorter

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hospitalizations, and shorter discharge times have become inevitable. In our clinic, even though we prefer to perform DCR under general anesthetic, we also perform under local anesthetic given the necessity for patients with high risk from general anesthesia. This study aims at presenting our 6 years of experience of external DCR, under both general and local anesthetics, in a tertiary clinic.

Methods

Patients

This study was approved by the institutional review board and ethical committee, and the study was conducted under the Declaration of Helsinki. Informed consent of all patients was obtained before surgical intervention. Medical records were collected of the epiphora patients followed up in the oculoplastic section between January 2014 and December 2020. Files of 254 epiphora patients were reviewed. A total of 106 eyes of 82 patients who underwent external DCR were included in the study. Patients with a nasolacrimal drainage system obstruction causing epiphora, aged over 7 years old, and having undergone a previously failed DCR were included in the study. Patients with reflex tearing, eyelid malpositions, and punctal and canalicular stenosis, as well as those who were followed up in less than 3 months or had undergone eyelid surgery, were excluded from the study. The patients were divided into two groups: general and local anesthesia. Patient details were recorded, including demographic characteristics, previous DCR, history of dacryocystitis, surgery time, perioperative complications, and the American Society of Anesthesiologists (ASA) physical status score. The duration between the beginning of the anesthesia and the skin closure was determined as the duration of the operation. Patients with systemic disorders and those using medications were informed about the surgery process, and they were instructed not to stop their medications before the surgery. Blood pressure and blood sugar of the patients in the local anesthesia group were controlled and recorded before the surgery.

Surgical Method

The external DCR procedure was performed as first described by Toti (1), and it was applied step by step in accordance with the very detailed notes in the study by Ekin et al. (11). Infratrochlear and anterior ethmoidal nerve blocks were applied externally, and the external branch of the infraorbital nerve block was applied using an intranasal approach. Commercially available 2% lidocaine and 1:100,000 epinephrine consisting of local anesthetic were used to provide local anesthesia, with 50% diluted 1:100,000 epinephrine-impregnated cottonoid pads placed in the middle meatus. No sedation was applied to the local anesthesia group.

A 1.5 cm skin incision was made at an 8-mm distance from the punctum. The periosteum overlying the lacrimal fossa was exposed using blunt dissection. Following lacrimal sac detachment, approximately 10 × 10 mm of the bony ostium was opened. U-shaped lacrimal sac and nasal mucosal flaps were prepared, and silicone tube intubation flaps were sutured with a 6/0 vicryl suture. If needed, flaps were suspended under the skin with an extra suture. None of the patients in either group had analgesic agents after the surgery. The skin was closed with 6/0 vicryl, and sutures were removed at the first-week control. Nasal decongestant and topical steroid–antibiotic combinations were given to all patients postoperatively for 1 week.

Postoperative follow-up was done at the first postoperative day, the first week, the first month, the third month, and the sixth month. The silicone tube was removed after 4–6 months. Anatomical success was assessed with lacrimal irrigation, and functional success was assessed with the relief of epiphora according to the patient's statement. Silicone tubes were extracted at a mean of 20±6 weeks after the surgery.

Statistical Analysis

SPSS version 16.0 for Windows (IBM Corporation, Armonk, NY) was used to analyze the collected data. The normal distribution of the data was assessed with Shapiro–Wilk and Kolmogorov–Smirnov tests. Descriptive analyses were presented using means and standard deviations for normally distributed variables. Following the normality tests, parametric and nonparametric tests were used to analyze the variables. If the variables were distributed normally, the unpaired t-test was used to compare the variables of two independent groups. If the variables did not distribute normally, the Mann–Whitney U test was used. Chi-squared test was used to evaluate categorical variables. A p-value less than 0.05 was accepted as statistically significant.

Results

A total of 106 eyes of 82 patients were included in the study. The mean age of the patients was 57±24 years (range 18–89) and the median age was 56 years. Of the 82 patients, 49 were female and 33 were male. A total of 24 patients underwent bilateral external DCR, with 74 eyes operated on under general anesthetic and 32 eyes operated on under local anesthetic. Demographics and surgical characteristics of the general and local groups are shown in Table 1. The ASA physical status score was ASA-3 plus the possible need for intensive care after the operation for all patients in the local group. The coexistence of uncontrolled diabetes mellitus and hypertension was the most commonly seen etiologic risk factor for patients with ASA-3. At least one acute dacryocystitis episode was noted in 53% (n=57) of 106 eyes,

Table 1. Demographics and surgical characteristics of general and local groups

	General group (n=74)	Local group (n=32)
Age	48±15 years	72±19 years
Gender		
Female	60% (n=32)	62% (n=17)
Male	40% (n=22)	38% (n=11)
Dacryocystitis	34% (n=25)	100% (n=32)
Bilateral	20	4

and 28% of (n=30) of the eyes had a previous failed DCR history. Characteristics of the patients with failed DCR were demonstrated in Table 2. The mean surgery time was 66±12 min for the general group and 52±7 min for the local group. A significant difference was observed between the general and local groups in terms of the duration of the surgery (p=0.03). All patients in the local group were discharged after the operation, and the patients in the general group were discharged on the first postoperative day. The average duration of hospital stay of the patients in the general anesthesia group was significantly higher than that of the patients in the local anesthesia group (p<0.001). The mean surgery time and hospital stay of the patients in the general and local anesthesia groups are shown in Table 3. Ten patients underwent revision DCR during the follow-ups, with 7 patients from the general group and 3 patients from the local group. The success of the surgery was defined as anatomic and functional. Anatomic success was described as the patency of the nasolacrimal drainage system, and functional success was described as no complaint of epiphora. The overall anatomic and functional success rate was 90%; it was 91% for the general group and 90% for the local group. There was no significant difference between the groups in terms of anatomic and functional success (p=0.65). Success rates of the patients evaluated by categorical variables are shown in Table 4. Early silicone tube loss was noted in 2 patients.

Discussion

Currently, because of the COVID-19 pandemics, which is affecting professional health care priorities and customs, the significance of the outpatient surgery has been more prominent than before. Therefore, this study aimed to report our experiences with patients who underwent external DCR under both general and local anesthetics. Investigators reported the success rates of external DCR in a range between 71% and 98.4% (12, 13). Success rates for this study were consistent with the published literature, at 91% for the general group and 90% for the local group. The overall success rate of the study group was 90%. However, it is crucial to highlight that 28% (n=30) of the patients had a previously failed DCR in this study. Studies have reported the etiology of failed DCR surgery as inadequate ostium size, excessive scar formation, and inappropriate ostium localization (11, 14, 15). In our study, 24 patients in the general group and 6 patients in the local group had previously failed DCR surgery. We detected inadequate ostium size in 70% of the patients with previously failed DCR, thus representing the

Table 2. Characteristics of genera and local groups with previously failed DCR

	General anesthesia group	Local anesthesia group
Previous surgery		
External DCR	9 (28%)	4 (12%)
Endoscopic DCR	12 (42%)	2 (8%)
Endolaser DCR	3 (10%)	–
Etiology		
Inadequate ostium size	16 (50%)	4 (20%)
Excessive scar	6 (16%)	1 (4%)
Inappropriate ostium location	2 (7%)	1 (3%)

Table 3. Mean surgery time and hospital stay of the patients in general and local anesthesia groups

	General group	Local group	P
Mean surgery time	66±12 min	52±7 min	p^a=0.03
Hospital stay	2.6±1.4 days	0.35±0.15 days	p^b<0.001

p^a=Mann–Whitney U test; p^b=Unpaired t-test.

Table 4. Comparison of the success rates of the patients by categorical characteristics

	Success rates	p[a]
Anesthesia (n=106)		
General (n=74)	91% (n=67)	0.65
Local (n=32)	90% (n=29)	
Gender		
Female (n=49)	91.4% (n=45)	0.55
Male (n=33)	90% (n=29)	
Dacryocystitis		
Positive (n=67)	89.5% (n=60)	0,22
Negative (n=39)	91% (n=35)	

[a]Chi-squared test.

most causative etiology in this study. The other causative factors were excessive scar formation in 20% of the patients and inappropriate ostium localization in the remaining 10% of the patients. Regarding the technique of the surgery in the previously failed DCR group, endoscopic DCR was the most common, at a rate of 50% (n=15), followed by external DCR, at a rate of 40% (n=12), in this study.

DCR is conventionally performed under general anesthetic as a gold standard treatment for nasolacrimal duct obstruction, with few studies reporting the outcomes of DCR under local anesthetic. Among the surgeries performed under local anesthetic, patients tended to be elderly (7, 16), with the exception of the study by Ciftci et al. (2). The authors declared that the tendency of performing DCR on elderly patients under local anesthetic was due to their poor health, with the potential for the use of a cocaine package being contraindicated for the elderly (7, 16). The ASA physical status score, which is used to predict operative risk for patients (17), was not mentioned in these studies. It provides predictions including pneumonia, cardiac complications, venous thromboembolism, urinary tract infection, and mortality within 30 postoperative days. In this study, the score for 65% of the patients in the general anesthesia group was ASA-1, 30% had ASA-2 (patient with mild diseases), and 5% had ASA-3 (patient with severe disease). All patients in the local group had ASA-3 in addition to the possible postoperative need for intensive care. The coexistence of uncontrolled diabetes mellitus (60%) and hypertension (36%) was the most commonly seen etiologic risk factors for the patients who had ASA-3, and the others were as follows: chronic kidney failure (1%), cardiac pacemaker (1%), and chronic obstructive lung disease (1%). In this study, in addition to high ASA physical status scores, local group patients were significant in the elderly population, similar to the previous studies (7, 16).

Regarding the duration of the surgery, prolonged surgery under general anesthetic and shorter surgery time under local anesthetic were reported in the previous studies (2–4). In this study, we observed a significant difference between the two groups while comparing the surgery time. Local anesthesia provided a shorter surgery time in this study. We suggest that the determination of the duration of operation, which was the duration between the beginning of the anesthesia and skin closure, is one of the reasons that can be responsible for the longer duration of the surgery for the general anesthesia group. In addition, the age of the patient also affects the duration of the operation. In elderly patients, the opening of the bone ostium is faster due to osteoporosis. This also shortens the processing time. The average age of the patients in the local anesthesia group was higher than the general anesthesia group. In addition to shorter surgery time, the authors reported significantly less bleeding under local anesthetic as compared to general anesthetic (3, 4). Bleeding under general anesthetic was attributed to venous engorgement and vasodilation in one particular study (16). The extent of bleeding was not recorded quantitatively in this study, and thus we do not have the data to support or contradict the previous studies. However, as a subjective observation, we observed notable bleeding only in two patients in the general group, and none of the patients in the local group had unusual bleeding.

In one study, the authors selected patients with bilateral dacryocystitis, who needed bilateral DCR surgery (18). They operated on a single patient with bilateral dacryocystitis under both general and local anesthetics to compare the pain levels for the same single patient. The authors reported that of 50 patients who underwent bilateral external DCR, with one side under general anesthetic and the other side under local anesthetic, 47 patients preferred to have surgery under local anesthesia (18). In this study, we did not evaluate the pain levels of patients. However, none of the patients in either group needed any analgesic agent, and we did not observe any patient complaining of pain. In addition, none of the patients needed sedation in the local group, and we withheld sedation for this group because we believed that the cooperation of the patient would be diminished. Local anesthetic is known to cause regional and systemic toxicity in a wide spectrum, from periocular myotoxic effects to systemic toxicity, which may result in cardiovascular arrest (19, 20). In this study, we did not observe local or systemic toxicity of the local anesthetic in any patients of the local group.

According to our literature search, DCR surgery under local anesthetic has advantages in terms of less bleeding (3) and short discharge time (2). In this study, all patients in the local group were discharged on the same day of the surgery, and we did not observe excessive or unusual bleeding. Re-

garding less bleeding, shorter discharge time, and cost-effectivity, local anesthesia may be a reasonable option for both the patient and the surgeon. However, clinical efficacy, patient preference, and satisfaction should not be disregarded.

There are a few limitations of this study. Because of its retrospective nature, randomization of the groups was not homogenous, as is needed. Even if the distribution of the groups let us analyze the statistics with parametric tests, the size and distribution of the groups were not optimal. The mean age of the groups was significantly different given the elderly patients with high ASA physical status scores who had to undergo surgery under local anesthetic.

In conclusion, we did not observe a significant difference between the general and local groups in terms of success. According to our experiences, external DCR surgery, with both general and local anesthesia, is a very effective technique for the treatment of nasolacrimal duct obstruction. In addition, local anesthesia may be considered as an option to avoid perioperative and postoperative systemic complications for patients with high risks from general anesthesia. However, randomized-control trials are needed to demonstrate the safety and effectiveness of external DCR surgery under local anesthetic.

Disclosures

Ethics Committee Approval: University of Health Sciences Tepecik Training and Research Hospital Clinical Research Ethics Committee. Decision no: 2021/01-11 - Date: 25/01/2021.

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Conflict of Interest: None declared.

Authorship Contributions: Involved in design and conduct of the study (HA, EA); preparation and review of the study (HA, EA); data collection (HA, MAD, EA); and statistical analysis (HA, MAD, EA).

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