



Impact of the interval after endoscopic dacryocystorhinostomy on the outcomes of intraocular surgery: a 4-year retrospective study

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Background: Patients with dacryocystitis should be treated for their infection by endoscopic dacryocystorhinostomy (EN-DCR) before any intraocular surgery. However, there is no unified standard for the specific time interval between the two surgeries. This study aimed to determine the appropriate interval for intraocular surgery in patients with previous EN-DCR for chronic dacryocystitis.

Methods: The medical files of all patients who underwent intraocular surgery after EN-DCR surgery in our hospital from 2016 to 2019 were reviewed. The EN-DCR data of patients undergoing intraocular surgery at different time intervals and the incidence of endophthalmitis after intraocular surgery were compared.

Results: A total of 116 patients (92 females and 24 males, mean age 64.06 ± 7.78 years) underwent EN-DCR and intraocular surgery met the inclusion criteria. The interval between EN-DCR and intraocular surgery varied from 5–475 days. The number of patients undergoing cataract surgery after EN-DCR is the largest (75, 64.7%). All patients (100%) who had previously undergone EN-DCR did not develop endophthalmitis infection after intraocular surgery at a follow-up of 12 months.

Conclusions: For patients with dacryocystitis who have undergone EN-DCR surgery, there is no time limit when choosing the timing of intraocular surgery. For patients requiring intraocular surgery, operation can be arranged as soon as possible to solve their problems as long as the patients had patency on lacrimal passage irrigation and no secretions.

Keywords: Dacryocystitis; intraocular surgery; endophthalmitis; endoscopic dacryocystorhinostomy (EN-DCR); interval

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Introduction

Dacryocystitis results from bacterial overgrowth in the stagnant tear pool of the lacrimal sac and is characterized by regurgitation of mucoid or mucopurulent discharge on

the application of pressure over the lacrimal sac area, with or without other signs of infection. Dacryocystitis, though itself a relatively benign condition, is known to alter the conjunctival flora of affected eyes. The altered flora can form the nidus for vision-threatening infections following

intraocular surgery or any other breach in ocular surface (1). Nasolacrimal duct obstruction (NLDO) is a significant risk factor for postoperative endophthalmitis (2). Not only chronic dacryocystitis, acute dacryocystitis also sometimes occurs clinically. Several bacterial species may be involved in the pathogenesis of chronic or acute dacryocystitis in adults, in order to avoid serious complications such as endophthalmitis, all of the patients should be treated for their infection before any intraocular surgery because of the potential risk of infection (3). Therefore, dacryocystitis limits the opportunity of intraocular surgery by affecting the efficacy and safety. It is very important to dealing with dacryocystitis to prepare conditions for intraocular surgery. Evaluate the success of surgery can be taken about one year after endoscopic dacryocystorhinostomy (EN-DCR) (4). Moreover, it has been indicated that even one year after EN-DCR, conjunctival bacterial isolation rate increased compared with the normal fellow eyes, EN-DCR may be considered as a local risk factor for developing postoperative endophthalmitis (5). However, retinal detachment, angle-closure glaucoma, corneal perforation and other relatively urgent conditions, we should pay attention to when is the right time for intraocular surgery after dacryocystitis surgery. Moreover, until currently, only literature on the duration of intraocular surgery after EN-DCR for dacryocystitis has been conceptual. Our study presents a series of patients who underwent intraocular surgery like cataract surgery, glaucoma surgery, retinal reattachment surgery and silicone oil removal surgery, in different periods after EN-DCR for chronic dacryocystitis and compares their preoperative characteristics, postoperative outcomes, and the interval between two operations. We present the following article in accordance with the STROBE reporting checklist (available at <http://dx.doi.org/10.21037/aes-21-16>).

Methods

This retrospective review was conducted on inpatients who went through intraocular surgery with previous EN-DCR for dacryocystitis at the Zhongshan Ophthalmic Center, Guangzhou, from January 2016 to December 2019. We did not obtain patient consent because of the retrospective nature of the study and the anonymous of the data analysis. This study was performed in compliance with the principles of the Declaration of Helsinki (as revised in 2013) and was approved by the Institutional Ethics Committee of Zhongshan Ophthalmic Center, Sun Yat-sen University

(approval No. 2021KYPJ100). The extracted data included patients' demographics, indication for surgery, previous EN-DCR, interval between EN-DCR and intraocular surgery, postoperative complications, and endophthalmitis after intraocular surgery. The intraocular surgeries were performed by surgeons with good training.

The inclusion criteria are patients who underwent intraocular surgery after EN-DCR surgery for dacryocystitis from January 2016 to December 2019. All the patients have evaluated preoperative examination before EN-DCR, they were all not predisposing to infectious diseases. Preoperative diabetes aims to keep a target glucose range for the perioperative period of 80 to 180 mg/dL (4.4 to 10 mmol/L). All patients had patency on lacrimal passage irrigation before intraocular surgeries. Post operation regime for these patients was the same as compared with those cases without dacryocystitis/ En-DCR. They all had a complete postoperative follow up of at least 6 months. The exclusion criteria involved patients who underwent EN-DCR and evolve with obstruction, those underwent external eye surgery after EN-DCR, and those with inadequate follow up. Impact of EN-DCR on intraocular surgery was determined by postoperative infectious endophthalmitis during 12 months after intraocular surgery. Endophthalmitis was diagnosed as described previously (6). Nearly all endophthalmitis patients present with decreased vision, and some also have eye pain. Eye examination usually reveals a hypopyon and intraocular inflammation. Diagnosis is clinical, supported by cultures of the vitreous and/or aqueous or by blood cultures in some endogenous cases. Molecular diagnostic techniques have been used in research laboratories for pathogen identification in endophthalmitis and offer the possibility of rapid diagnosis, including in culture-negative cases.

Statistical analysis was performed using Excel and SPSS. The selected variables were compared between the two patient groups. Fisher's exact test and χ^2 analysis were used for comparison between categorical variables, and a *t*-test was used for comparing continuous variables. A P value of 0.05 was considered significant.

Results

During the study period, 134 patients underwent ocular surgery after EN-DCR and 116 of them met the inclusion criteria. The others underwent external eye surgery after EN-DCR, the patients' age ranged from 6 to 83 years (mean age: 64.06±7.78 years). Ninety-two patients (79.31%) are

female, and the most common type of intraocular surgery is cataract surgery (Table 1).

Microbial culture results obtained from the conjunctival sac of patients with dacryocystitis are shown in Table 2. Of the 116 surgical eyes, 37 eyes were examined by conjunctival sac bacterial culture, and 18 eyes (48.64%) were positive for bacterial growth. The Gram-positive bacteria accounted for 94.44% (17 eyes) of the overall isolates cultured. The most common Gram-positive bacteria were *Staphylococcus epidermidis* which represented 52.94% (9 eyes) of Gram-positive isolates. The most common isolate was the same

with the postoperative endophthalmitis isolate in the previous studies from our hospital (7).

During the study period, 116 patients underwent intraocular surgery after EN-DCR in different duration (5–475 day), and the most common type was cataract surgery, followed by retinal reattachment surgery. The intraocular surgery type and property intervals was shown in Table 3. It is reported that almost 3–8 weeks after successful EN-DCR, conjunctival flora changed to normal status (8). We divided the patients who underwent intraocular surgery after EN-DCR into two groups according the different intervals. Most of the intraocular surgeries were performed within 8 weeks (86 of the 116 eyes). All of the intraocular surgeries did not cause ocular infection after EN-DCR at a follow-up of 12 months, no matter how long the interval is.

Table 1 Basic clinical data

	Number of operative eyes	Percentage
Gender		
Female	24	20.69%
Male	92	79.31%
Age		
64.06 ± 7.78 years	116	100.0%
Type of intraocular surgery		
Cataract surgery	75	64.66%
Glaucoma surgery	15	12.93%
Retinal reattachment surgery	23	19.83%
Silicone oil removal surgery	3	2.58%

Discussion

Previous study has reported that dacryocystitis often affects adults above 30 years old, especially among female population (9). In our study, old women make up the majority. Dacryocystitis, cataract, diabetic retinopathy, DME was prevalent eye problems in old people (10,11). NLDO is a significant risk factor for postoperative endophthalmitis (2). Therefore, these people need to undergo EN-DCR before intraocular surgery. During the past decades there have been only a few studies on effects of dacryocystitis surgery on the intraocular surgery. In the present study, we reported the occurrence of

Table 2 Bacteriology of most common microorganisms before EN-DCR

Microorganisms isolated	No. of isolates	Percentage	
		Overall	Within group
Gram positive			
<i>Staphylococcus epidermidis</i>	9	50.00	52.94
<i>Propionibacterium acnes</i>	3	16.67	17.65
<i>Staphylococcus haemolyticus</i>	2	11.11	11.76
<i>Staphylococcus caprae</i>	1	5.56	5.89
<i>Staphylococcus lugdunensis</i>	1	5.56	5.89
<i>Streptococcus anginosus</i>	1	5.56	5.89
Gram-negative			
<i>Sphingomonas paucimobilis</i>	1	5.56	100

Overall: percentage of all the positive for bacterial growth; Within group: percentage of the Gram positive/ Gram-negative group. EN-DCR, endoscopic dacryocystorhinostomy.

Table 3 Intraocular surgery type and the intervals in the present study

Type of intraocular surgery	Interval between EN-DCR and intraocular surgery		Mean intervals \pm SD (days)
	1 day–8 weeks	>8 weeks	
Cataract	51	24	63.81 \pm 80.95
Glaucoma	12	3	33.40 \pm 24.76
Retinal reattachment surgery	20	3	35.87 \pm 50.28
Silicone oil removal surgery	3	0	21.33 \pm 5.86
Total	86	30	–

EN-DCR, endoscopic dacryocystorhinostomy.

endophthalmitis of patients with dacryocystitis and other intraocular problems simultaneously who were treated at a major tertiary medical center in China over the past 4 years.

Recent research indicated that after successful EN-DCR surgery, a waiting period of 4 weeks (12) or 7 weeks (13) is needed for conjunctival bacterial cultures to become negative or reach the level of the normal eyes, in the fellow eyes of patients with unilateral NLDO. It is found that most surgeons prefer to perform a DCR in cases of NLDO and wait for 4 weeks before intraocular surgery in the Indian survey on practice patterns of lacrimal & eyelid disorders (14). In the present study, 37 eyes were examined by conjunctival sac bacterial culture, and a total of 18 (48.64%) culture positive isolates were identified from the 37 cases. The culture-positive rates were not high, because patients had been using antibiotics before they came to see the doctor. The long-term use of antibacterial eye drops may lead to the emergence of drug-resistant bacteria, once these bacteria cause endophthalmitis will result in serious event, compared with the eyes without EN-DCR. In our study, we found that although the interval between intraocular surgery and EN-DCR was different, there was no endophthalmitis after intraocular surgery. Postoperative endophthalmitis is a severe complication that can lead to blindness even with treatment (15). In the previous study from our hospital, patients postoperative endophthalmitis most commonly occurred after cataract surgery (7). In our study, 75 of the 116 patients underwent cataract surgery after EN-DCR, both of doctors and patients wondered the appropriate interval for intraocular surgery after EN-DCR for dacryocystitis, as dacryocystitis is a constant threat to cornea and orbital soft tissue and a potential source of endophthalmitis following intraocular surgery (16). Our research found that there is no increasing incidence of

ocular infection in patients with intraocular surgery from 5 to 475 days after EN-DCR at a follow-up of 12 months. Presently there is no unified standard for the specific time interval between the two surgeries. However, some disease such as acute glaucoma, retinal detachment, which will damage the visual function seriously, intraocular surgery is urgently needed, we proposed that intraocular surgery could be performed as soon as possible after EN-DCR. For some of the congenital cataracts patients, who were diagnosed dacryocystitis simultaneously several days or months after birth, we may consider combined surgery for their dacryocyst and cataracts after confirming the patency on lacrimal passage irrigation, so as to reduce the number of general anesthesia operations for the little patients.

The limitations of our study include its retrospective design, and there is no direct comparison group as dacryocystitis is a significant risk factor for postoperative endophthalmitis of the intraocular surgery. Further studies investigating the impact of EN-DCR on the outcome of intraocular surgery are required.

We speculate that the interval between intraocular surgery and ED-DCR did not increase the risk of endophthalmitis after intraocular surgery as long as the patients had patency on lacrimal passage irrigation and no secretions, but the results need to be confirmed by future larger studies.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at <http://dx.doi.org/10.21037/aes-21-16>

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was performed in compliance with the principles of the Declaration of Helsinki (as revised in 2013) and was approved by the Institutional Ethics Committee of Zhongshan Ophthalmic Center, Sun Yat-sen University (approval No.2021KYPJ100). We did not obtain patient consent because of the retrospective nature of the study and the anonymous of the data analysis.

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