

## Incidence of Nasolacrimal Duct Obstruction after Cataract Surgery

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Original Article

### Abstract

**Background:** Nasolacrimal duct obstruction (NLDO) can occur after cataract surgery, causing epiphora and infection. The incidence and risk factors after cataract surgery have not been well defined.

**Objective:** This study aimed to determine the incidence of NLDO and associated components after cataract surgery.

**Methods:** We retrospectively reviewed the records of 8,500 patients who underwent cataract surgery from January 2016 to June 2022. Data on postoperative diagnosis of NLDO were identified, as well as demographics, clinical features, and solutions to treatment issues.

**Results:** The NLDO rate was 2.4% (201/8500). 65.2% of cases were female. The right and left eyes were similarly involved (35.3% vs. 38.8%), with a bilateral NLDO of 25.9%. The most common comorbidity was allergic conjunctivitis (8.5%). The majority of patients (91%) were treated with conservative techniques. Syringing and probing used to treat the remaining 7.5%. Only 1.5% underwent dacryocystorhinostomy surgery. There were no differences in age, sex, or duration of symptoms among treatment groups. Majority of glaucoma patients did not respond to conservative treatment in contrast to patients with other eye conditions like blepharitis.

**Conclusions:** A low but consistent rate of NLDO was observed after cataract surgery, which was successfully treated without intervention in 91% of the cases. It appears to affect women and those with allergic eye diseases disproportionately. Further studies should examine NLDO risk factors and revise guidelines after cataract surgery.

**Keywords:** nasolacrimal duct obstruction, cataract surgery, retrospective study, incidence.

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## **1. INTRODUCTION**

Nasolacrimal duct obstruction (NLDO) is a prevalent disorder that impacts the tear drainage system of the ocular region. The phenomenon arises when the nasolacrimal duct, a diminutive conduit responsible for the drainage of tears from the eye to the nasal cavity, experiences obstruction (1). The nasolacrimal duct is of utmost importance in preserving the integrity and functionality of the ocular surface by facilitating the appropriate drainage of tears into the nasal cavity. However, like any body system, nasal hygiene is susceptible to many ailments, including obstruction (2). This particular medical disorder can manifest in a number of symptoms, including excessive tear production, mucopurulent discharge, decreased vision and these symptoms can affect a person's well-being and quality of life all in a negative way (3). Achieving comprehensive knowledge of the frequency of nasolacrimal duct obstruction holds significant importance within the domain of ophthalmology, as it not only delivers insights into the happening of this particular condition but also facilitates the formulation of productive approaches for its care. Cataract surgery is a medically good and efficacious intervention aimed at extracting a visually obstructive lens from the visual region and substituting it with an artificial lens that offers enhanced clarity (4). Cataract surgery is recognized as the most common surgical procedure worldwide, and individuals with glaucoma have a significantly higher incidence of cataracts. The incidence of nasolacrimal duct obstruction after cataract surgery exhibits variability depending on multiple factors, including the surgical technique used, specific patient characteristics, and surgical definition of obstruction (5). In the context of cataract surgery, the incidence of nasolacrimal duct obstruction is generally considered to be relatively low, although it is not infrequent. Cataracts manifest in around 37.5% of individuals diagnosed with nasolacrimal duct blockage (6). In these instances, bacterial stasis in the lacrimal sac due to chronic nasolacrimal duct obstruction may contribute to the occurrence of postoperative endophthalmitis following cataract surgery (7). Nasolacrimal duct obstruction (NLDO) has been identified by irrigation and macrodacryocystography in individuals with incident endophthalmitis. This finding confirms the hypothesis that tears play a significant role as a risk factor for endophthalmitis after cataract surgery is true (8). Several significant factors determine the incidence of nasolacrimal duct occlusion following cataract surgery including the selection of surgical methods, patient-specific characteristics, and criteria for defining and diagnosing obstruction (9). In the context of cataract

surgery, it is generally observed that the incidence of nasolacrimal duct obstruction is very infrequent. However, it is not an uncommon occurrence. Phacoemulsification, the favored surgical approach owing to its minimally invasive characteristics, exhibits a reduced likelihood of complications, such as duct obstruction, in contrast to traditional procedures. Certain patients may be at an increased risk for lacrimal duct difficulties due to factors such as age and medical history of this condition (10). It is crucial to acknowledge that the stated incidence of a particular phenomenon may exhibit variability according to the precise diagnostic criteria utilized and the tactics employed for postoperative care. Furthermore, it is essential to note that transient tearing and discomfort may present similar symptoms to nasolacrimal duct obstruction. This underscores the significance of conducting a thorough assessment and considering the various elements involved in the post-cataract surgical care process. Despite the evident potential for simultaneous occurrence of nasolacrimal duct obstruction and cataract, and the impact of this link as a risk factor for endophthalmitis, there are still numerous instances when these cases go unnoticed before the removal of the cataract (11). The objective of this study was to investigate the incidence of nasolacrimal duct obstruction after some type of surgery like cataract surgery. The primary objective of this research is to offer a thorough comprehension of the occurrence and correlated risk factors of nasolacrimal duct obstruction among individuals who have undergone cataract surgery. The ultimate goal is to enhance patient care by facilitating early detection and implementing effective management strategies within the field of ophthalmology.

## **2. PATIENTS and METHODS**

**Study design and setting:** A total of 201 out of 8500 cases developed nasolacrimal duct obstruction after cataract surgery, the current study design was retrospective cross-sectional study. The researchers examined hospital records to identify risk factors associated with the incidence and discuss the available treatment modalities of nasolacrimal duct obstruction after cataract surgery. The study conducted at North eye center, Erbil, Kurdistan region of Iraq and carried out from the beginning of January 2016 till the end of June 2022.

**Data collection:** The study was conducted at North Eye Center in Erbil city. A total of 8500 patients underwent cataract surgery at the center, among them 201 cases of NLDO were diagnosed. Data collected utilizing an explicit English questionnaire designed and provided information about sociodemographic characteristics comprising name, age, gender and site in

addition to time of presentation, assessment and management plan. The researcher used old files and medical records to obtain the data and presentation was done during 2 weeks to 6 months after the surgery. Data were collected on the incidence and the risk factors that affect the incidence of the disease were obtained to provide us with efficient and accurate statistics.

**Data management and statistical analysis:**

The data recorded on a specially designed questionnaire, collected and entered in the computer via Microsoft Excel worksheet (Excel 2016) and then analyzed using appropriate data system which is called Statistical Package for Social Sciences (SPSS) version 28 and the results were compared between patients with different variables, with a statistical significance level of  $\leq 0.05$ . The results presented as rates, ratio, frequencies, percentages in tables and figures and analyzed using t-test, and Chi square tests.

**Inclusion criteria:** The survey was performed enrolling all cases admitted to hospital and patients older than 45 and younger than 80 regardless of their gender and all cases who had history of cataract in one or both eyes and underwent cataract surgery were included in the study.

**Exclusion criteria:** Patients with nasolacrimal duct obstruction prior to the surgery and participants less than 45 years and more than 80 years were excluded in the study.

**Ethical considerations:** This study was submitted to the Ethics and Scientific committees of Ophthalmology Council of the Kurdistan Higher council of Medical Specialties for scientific and ethical approval. This study was explained and a verbal consent was obtained from each patient. Confidentiality and anonymity of data were ensured.

### **3. RESULTS**

Out of the total 8500 cataract operations performed in our center, 201 of cases developed nasolacrimal duct obstruction, making the incidence of NDLO among cataract surgery cases 2.4%. Most (65.2%) of cases were female following by 38.8% of them had left NLDO and 35.3% of them had right NLDO, 8.5% of patients had allergic conjunctivitis, only 1% of them experienced glaucoma, majority (85.1%) of them had no disease at all, majority (91%) responded to conservative treatment, syringing and probing treatment was done to 7.5% and finally 1.5% of them faced dacryocystorhinostomy (DCR) (**Table 1**). The majority (91%) of cases responded to conservative treatment and 83.3% of the remaining responded to syringing and probing (**Table 2**).

The mean age of patients was  $66.37 \pm 7.408$  years, mean time of presentation of participants was  $8.94 \pm 4.759$  weeks (**Table 3**). There was a statistically non-significant difference between age and treatment plans, oldest cases were in DCR group with (mean of 68.67 years) compared to syringing and probing treatment cases had (mean of 66.53 years) while conservative treatment group were at youngest age category with (mean of 66.32 years) and p-value was 0.860. There was non-significant statistical difference between time of presentation and treatment plans and ANOVA test was done and p-value was 0.556 (**Table 4**).

There was no significant statistical association between management plans and gender and site of NLDO and p-value was  $> 0.05$ . There was a statistically significant association between management plan and presence of diseases, all (100%) of conservative group had blepharitis while none (0%) of syringing and probing had blepharitis, majority (88.2%) of conservative treatment cases were diagnosed with allergic conjunctivitis while 11.8% of syringing and probing experienced allergic conjunctivitis, most (66.7%) of syringing and probing had glaucoma while one third (33.3%) of conservative cases were diagnosed with glaucoma. Chi square test accomplished and p-value was 0.003 (**Table 5**).

Table 1. Gender, NLDO site, presence of diseases and type of treatments (N=201).

Variables	Categories	No.	%
Gender	Male	70	34.8
	Female	131	65.2
Site of NLDO	Right	71	35.3
	Left	78	38.8
	Bilateral	52	25.9
Presence of diseases	No any disease	171	85.1
	Blepharitis	8	4.0
	Allergic conjunctivitis	17	8.5
	Glaucoma	3	1.5
	Eyelid malposition disorders	2	1.0
Management plan	Conservative treatment	183	91.0
	Syringing and Probing	15	7.5
	Dacryocystorhinostomy (DCR)	3	1.5

Table 2. Types of response to NLDO

Variables	Categories	No.	%
Response to conservative treatment	Yes	183	91.0
	No	18	9.0
Response to syringing and probing	Yes	15	83.3
	No	3	16.7

Table 3. Mean age and presentation time of participants (N=201)

Variable	Mean	SD	Range
Age in years	66.37	7.408	45-80
Time of presentation in weeks	8.94	4.759	2 - 24

SD: standard deviation

Table 4. Difference in age and time of presentation among various treatment plans

Variable		No.	Mean	SD	P. value
Age in years	Conservative treatment	183	66.32	7.593	0.860
	Syringing and Probing	15	66.53	5.566	
	Dacryocystorhinostomy	3	68.67	4.041	
Time of presentation in weeks	Conservative treatment	183	8.91	4.810	0.556
	Syringing and Probing	15	9.80	4.411	
	Dacryocystorhinostomy	3	6.67	3.055	

SD: standard deviation

Table 5. Association between management plan and gender, site of NLDO and presence of diseases.

Variable	Categories	Management plan				P. value
		Conservative treatment		Syringing and Probing		
		No.	%	No.	%	
Gender	Male	63	90	5	7.1	0.673
	Female	120	91.6	10	7.6	
Site of NLDO	Right	64	90.1	5	7	0.866
	Left	71	91	6	7.7	
	Bilateral	48	92.3	4	7.7	
Presence of diseases	No any disease	158	92.4	11	6.4	0.003
	Blepharitis	8	100.0	0	0.0	
	Allergic conjunctivitis	15	88.2	2	11.8	
	Glaucoma	1	33.3	2	66.7	
	Eyelid malposition disorders	1	50	0	0	
Total		183	91	15	7.5	

#### 4. DISCUSSION

The incidence of NLDO in this study was 2.4% among cataract surgery patients, comparable to the 2% reported in previous studies (12). Regarding gender distribution, females showed a prevalence of 65.2%, while males had a higher rate of 34.8%. These female ratios have been reported in the past, with some studies showing female-to-male ratios ranging from 1.56:1 to 2:1 (13,14). The reasons for this gender difference are unclear, but hormonal and physiological factors have been suggested as possible causes (15). The location of NLDO was almost identical between the right (35.3%) and left (38.8%) eyes, whereas bilateral involvement was seen in 25.9% of cases. These laterality rates are consistent with previously reported rates (16). The most familiar concomitant eye condition was allergic conjunctivitis (8.5%), followed by blepharitis (4%). Only 1.5% had coexisting glaucoma, and 1% had eyelid diseases. While NLDO may occur in isolation, inflammatory conditions such as blepharitis and allergic conjunctivitis may play a supporting role (17).

Most cases (91%) responded to conservative treatment with lid hygiene and warm pressure. Only 7.5% required syringing/probing, while 1.5% of unresolved cases required dacryocystorhinostomy (DCR). The high response rate to no operative treatment agrees with previous reports and supports conservative treatment as the first line in most cases (18). Syringing/probing resolved signs in 83.3% of those treated. The literature reports a 70-95% success rate for syringing/probing, depending on the cause (19). There weren't significant differences in age or duration of symptoms and type of treatment required. This means that the severity of the disease is not related to the patient's age or the duration of symptoms (20). No gender differences were found in the type of treatment required. Contrary to previous reports (21), this suggests that the female gender in NLDO does not increase disease severity or limit conservative treatment response. The coexistence of ophthalmic/eye conditions did influence severity and treatment. All cases with blepharitis responded to conservative treatment only, while two-thirds of those with glaucoma required syringing/probing. Among the total cataract surgery cases, three of them required DCR. This emphasizes the role of coexisting diseases in predicting responses and implementing guidelines (17).

## **5. CONCLUSIONS**

In conclusion, this retrospective study reported a nasolacrimal duct obstruction (NLDO) rate of 2.4% in 8,500 patients undergoing cataract surgery over a 6.5-year period, and 65.2% of NLDO cases were female. The right and left eyes were blocked equally, with bilateral involvement in 25.9% of cases. Most (91%) of NLDO cases are resolved with conservative treatment consisting of lid hygiene and warm eye compression. Syringing and probing successfully treated 7.5% of patients. Only 1.5% required dacryocystorhinostomy (DCR) surgery. There were no significant differences related to age, sex, or duration of symptoms predicting treatment outcome. However, patients with inflammatory conditions such as blepharitis were more likely than those with glaucoma to respond to dysfunctional techniques. In summary, this study confirms low but consistent levels of NLDO after cataract surgery. Most cases can be successfully managed non-surgically. The coexistence of ocular diseases can affect severity and treatment outcome. Further research is needed to understand the risk factors for NLDO after cataract surgery and to optimize prevention and management guidelines.

**Ethical Clearance:**

All Ethical issues were approved by the authors in accordance with the World Medical Association (WMA) declaration of Helsinki

**Conflict of interest:** Authors declared none

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