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ORIGINAL ARTICLE

Preoperative Radiological Findings Prior Endoscopic Dacryocystorhinostomy in Patients with Nasolacrimal Duct Obstruction

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ABSTRACT

Background: Epiphora is a common condition brought on by blockage of the nasolacrimal duct. In order to diagnose and treat these patients, it is critical to evaluate their lacrimal drainage system. This study aimed to identify and analyze the role of preoperative computed tomography (CT) in patients with epiphora due to nasolacrimal duct obstruction (NLDO).

Methods: We retrospectively reviewed the medical records and CT results on 60 patients who complained of epiphora due to NLDO between January 2023 and December 2024. All patients were recruited from Zagazig University Hospital's outpatient clinic and assessed by clinical history, endoscopic nasal examination, and CT to evaluate nasal, paranasal pathology, and lacrimal drainage pathway. All preoperative CT findings were further reviewed.

Results: CT was performed on 60 patients (average age, 35.2 ± 10.2 years). All of them had endoscopic Dacryocystorhinostomy. Soft tissue opacity of the NLD was the most common finding. 10 patients had bilateral NLDO, 50 had unilateral NLDO. 13 patients had dacryocystocele, 8 patients showed paranasal sinus opacity. Other CT findings included septal deviations (18 patients), presence of gar nasi cell (20 patients).

Conclusions: Nasolacrimal drainage and surrounding anatomical features can both be evaluated using preoperative CT imaging. Planning surgical procedures and managing NLDO will benefit from this knowledge.

Key Words: Endoscopic dacryocystorhinostomy; Nasolacrimal duct obstruction; Preoperative computed tomography.

INTRODUCTION

Since nasolacrimal duct blockage (NLDO) is the most common cause of epiphora, patients who have complained of recurrent episodes of the condition should have their nasolacrimal drainage system evaluated. If there are clear causes of obstruction, such as prior trauma, infection, inflammatory conditions like sarcoidosis and Wegener's granulomatosis, or cancer, the location of obstruction or stenosis can be accurately determined [1,2]. However, as the majority of NLDO cases have unclear causes, computed tomography (CT) imaging has been used in numerous recent studies to assess nasolacrimal drainage system and periocular pathology [3-5].

When the reason of obstruction is unknown, CT is advised as a diagnostic method for NLDO [6–8]. Surgical interventions such as balloon catheter dilatation, silicone intubation, and external or endoscopic dacryocystorhinostomy (DCR) are the mainstay of treatment for NLDO. Because endoscopy greatly improves sight in the operating field and advances in local anesthetics, endoscopic DCR has become a common routine method performed for NLDO. Endoscopic DCR has a faster recovery period than external DCR and does not require a facial incision that could impair the orbicularis oculi muscle's pumping activity [9].

We think that NLDO can be adequately assessed by comprehensive clinical evaluations that include taking a history of any sinus or nasal conditions, performing a regurgitation test, syringing the lacrimal sac, and using contrast dacryocystography (DCG). The proper lacrimal operation may also be

ensured by further preoperative nasal endoscopy. CT is a helpful diagnostic technique even though it is not a standard examination for watery eyes since it can easily identify limiting factors like obstructive masses, mucosal edema, bone abnormalities, and secretion retention. Because of this, otolaryngologists who do functional endoscopic sinus surgery typically always get a CT scan beforehand to assess the patient's mucous membranes and precise bony features. The outcome of endoscopic DCR may be impacted by the numerous reported reports of anomalies in the sinuses, orbital walls, and lacrimal sacs [7,10-13]. Even though incorrect anatomic discoveries are uncommon, being aware of the precise condition of the lacrimal drainage system's surrounding components can help patients receive the right care and minimize surprises following surgery. **Since Francis et al. [6]** reported on the effectiveness of CT imaging in patients with symptoms of lacrimal drainage obstruction, there have been few studies regarding the utility of preoperative CT on patients with NLDO. Thus, we assessed the function of preoperative CT in NLDO patients.

METHODS

We retrospectively reviewed the medical records and CT results on 60 patients who complained of tearing symptoms due to primary acquired NLDO who were planned to undergo endoscopic DCR surgery between January 2023 and December 2024. All patients were selected from the outpatient clinic at Zagazig University Hospital, and NLDO was diagnosed clinically using the fluorescein dye disappearance test, syringing, and probing.

In order to evaluate the lacrimal drainage system and any nasal or paranasal diseases, a CT nasal paranasal sinus was ordered for each patient's radiological evaluation. Following surgery, patients were consistently checked on at one week, one month, three months, six months, and twelve months. At each follow-up visit, the neo-ostium's patency was evaluated by syringing the lacrimal passages. To determine the size of the neo-ostium, endoscopic assessment was performed on each patient. A Siemens Somatom Spirit dual-slice CT scanner (Siemens, Munich, Germany) was used to perform supine axial imaging on 60 patients, with images taken at 1.0 mm intervals.

The ENT surgeon examined the radiologist's interpretation of each patient's CT scan to check for anomalies in the orbit, nose, and paranasal sinus, as well as the presence of air in the nasolacrimal drainage system.

We examined the demographics of the patients as well as the radiologic features on CT scans, such as anomalies in the orbit, nose, paranasal sinus, and other facial structures. Every patient's preoperative CT result, both normal and abnormal, was further examined.

Additionally, we examined the CT imaging differences between eyes with blockage (for which endoscopic DCR was performed) and eyes without obstruction (the contralateral healthy eyes).

Approval was taken from the research ethical committee and the institutional review board (IRB#1349-13/5-2025) of Zagazig University's Faculty of Medicine. Every patient gave their consent to take part in the trial. The work was carried out in accordance with the 1964 Declaration of Helsinki, the World Medical Association's Code of Ethics, and its later unifications for research involving human participants.

Statistical analysis

SPSS ver.12.0, a commercial software program (SPSS Inc., Chicago, IL, USA), was used to analyze the data. Linear by linear association was used to assess the differences in values between eyes with and without NLDO. P-values below 0.05 were regarded as significant.

RESULTS

60 individuals (range: 15–65 years; average age: 35.2 ± 10.2 years) had CT scans. 58 women (96.6%) and 2 men (3.3%) were present. 100% of the patients underwent endoscopic DCR. Ten patients (16.6%) had bilateral epiphora, 19 patients (31.6%) had left side epiphora, and 31 patients (51.6%) had right side epiphora. Table 1 provides a summary of patient demographics.

We did endoscopic DCR on every patient. Syringing and endoscopic examination of the rhinostomy site, which showed excellent passage with patent opening, were used to evaluate postoperative success. With the exception of a small number of patients who experienced complications such a polypoidal reaction that blocked the neo-ostium and was resolved with nasal corticosteroid spray, nearly all patients were satisfied following surgery. After surgery, intranasal adhesion was found in a small number of patients, but it was entirely removed with a dissector. No additional significant issues have been found.

Soft tissue opacity, which revealed no air and reflected mucosal thickening within the NLD and secretion retention, was the most frequent aberrant CT finding. Every patient who had endoscopic DCR had their CT scans examined for soft tissue opacity in both the axial and coronal planes. Ten patients (figures 1A and 1B) had bilateral NLDO, fifty had unilateral NLDO (figure 2), thirty-one had right NLDO, and nineteen had left NLDO.

Dacryocystocele was the second most frequent abnormal CT finding. This condition was in 13 cases. It shows up as a swollen lacrimal sac on the CT scan (figure 3).

Chronic rhinosinusitis (CRS), which manifests as sinus opacity on CT, was the third most frequent abnormal CT result (figure 4). Eight patients (13.3%) had paranasal sinus opacity on their CT scans. Antibiotics were frequently administered both before and after endoscopic DCR surgery for patients with rhinosinusitis. Following surgery, they were monitored more often at our clinic.

Septal deviation was present in 18 cases (30%) (figure 5). Of these 18 patients, 8 had mild deviation and underwent DCR without septoplasty, whereas 10 had substantial deviation and needed septoplasty prior to DCR.

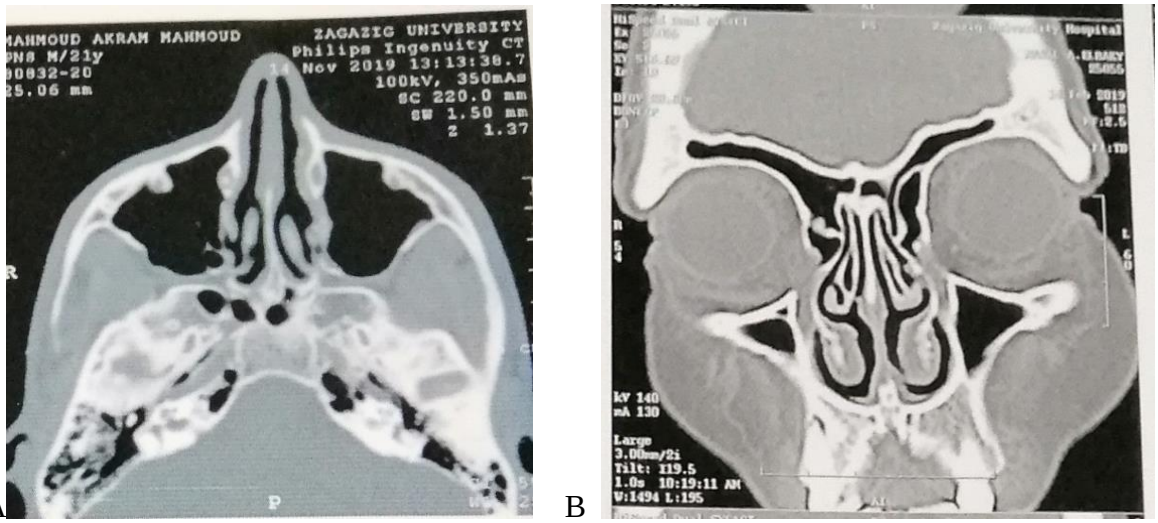
Agar nasi air cells were a normal anatomical variant in 20 patients (33.3%) (figure 6). For individuals with agar nasi cells who have endoscopic DCR, opening the cell during the procedure is necessary for improved outcomes. Table 2 provides a summary of the CT findings and patient count.

Table 1: Demographic and clinical data of the patients.

Data	Value
No. of patients	60
Mean age (yr)	35.2 ± 10.2
Male: female	2: 58
Side (unilateral, bilateral)	50:10

Table 2: Summary of computed tomography findings.

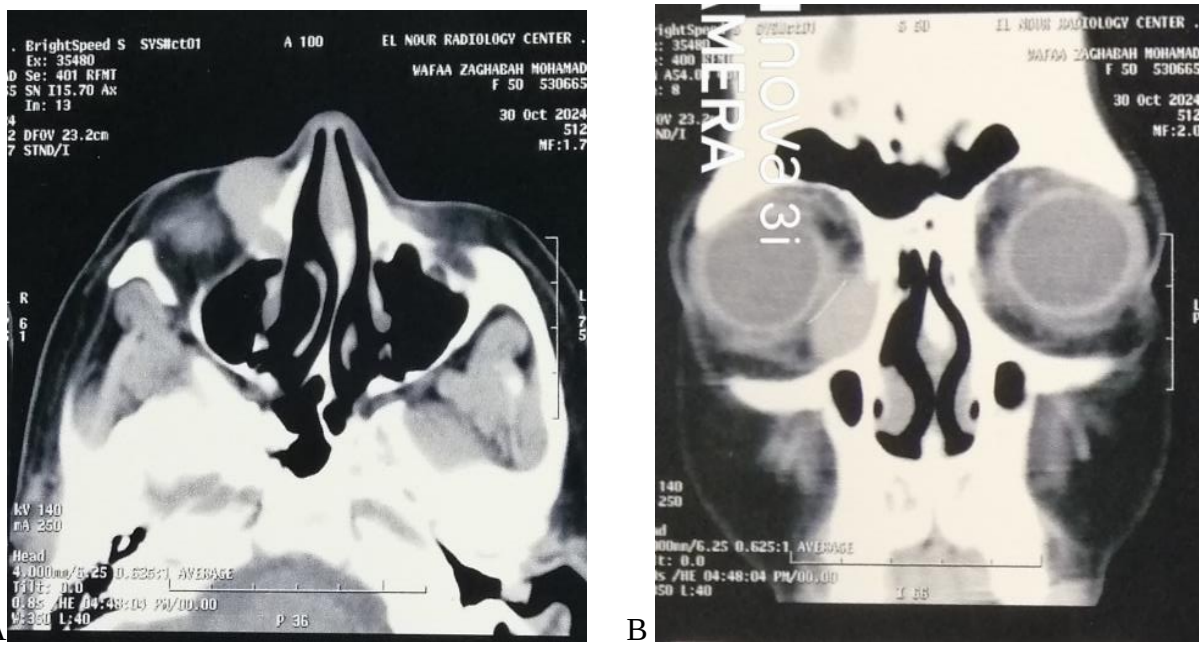
Computed tomography findings	No. of patients (%)
Unilateral NLDO	50(83.3)
Bilateral NLDO	10(16.6)
Dacryocystocele	13 (21.6)
CRS (paranasal sinus opacity)	8 (13.3)
Deviated septum	18 (30)
Agar nasi cell	20(33.3)



A B

Figure 1: Ct nose paranasal sinus :(A) axial view, (B) coronal view of the same patient shows bilateral NLDO .

Figure 2: Ct nose paranasal sinus axial view shows unilateral NLDO (right side)



A B

Figure 3: CT nose paranasal sinus. (A) axial view, (B)coronal view shows right dacryocystocele.

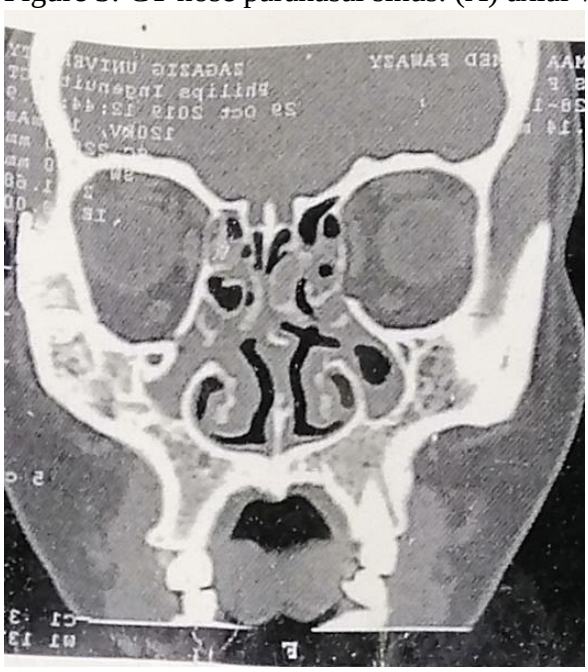


Figure 4: CT nose paranasal sinus coronal view shows paranasal sinus opacity.

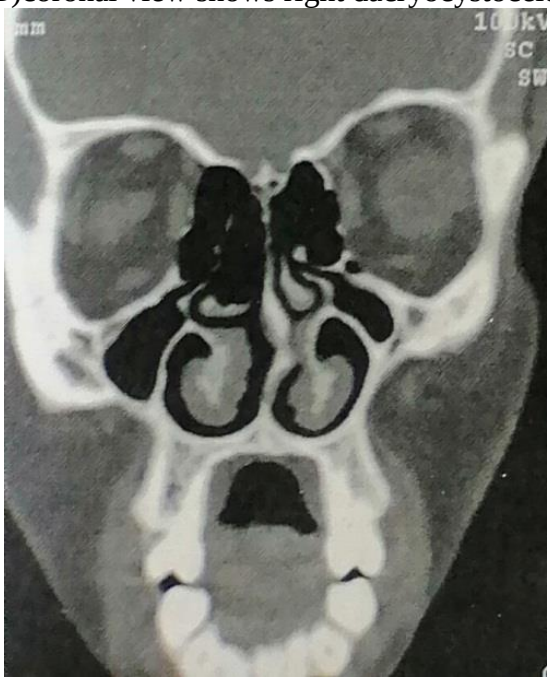


Figure 5: CT nose paranasal sinus coronal view shows a deviated nasal septum to the left side

DISCUSSION

Since CT imaging is helpful in assessing intranasal pathologies and the lacrimal passages, numerous studies have employed it to assess the anatomy of the nasolacrimal drainage system and its relationship to epiphora [3-6].

For the 60 patients who complained of epiphora as a result of NLDO, we did CT scans; the results were crucial to the management and therapy strategies.

According to research by Choi et al., the most frequent (85.9%) aberrant CT finding in NLD was soft tissue opacity. [14], and it supports the findings of our investigation because every CT scan revealed NLDO.

It is crucial for ENT surgeons to evaluate the nasal cavity in order to inspect the nasal septum and rule out nasal pathologic features that could negatively impact the surgical results, especially since endonasal DCR is commonly utilized and has emerged as the gold standard treatment for cases of

NLDO. Additionally, having adequate room for operation is crucial for successful results. Because of this, ten of the patients in our research who had severe septal deviation had septoplasty prior to DCR. DCR without septoplasty was performed on the eight patients with mild septal deviation.

Thirty percent of the cases in our investigation had a deviated septum, which was similar to the findings of studies by Kallman et al. (39%) [15] but lower than those of Habesoglu et al., Se et al., and Yazici et al. (64.6%, 65%, and 70%, respectively) [16, 17] . However, the Choi et al. and Kaplama et al. studies had lower rates of individuals with nasal septal deviation (11.9% and 27.4%, respectively) than the current study [14, 18] .

A significant factor influencing surgical outcomes and complication rates is preoperative CRS. According to Shams and Selva [19], CRS can increase the chance of developing acute rhinosinusitis after surgery. Eight individuals in our study had preoperative CRS; these patients were treated with antibiotics and steroid nasal spray, and FESS was performed before endoscopic DCR for those patients who did not improve.

During endoscopic DCR, the dacryocystocele in 18 of our patients was totally drained.

In this study, agar nasi cells were found in 20 patients; this is a radiological finding that should be taken into account while doing surgery. According to our research, this cell should be opened during endoscopic DCR in order to produce a wide and patent neo-ostium following surgery. Some studies have identified closed agger nasi in unsuccessful DCRs (20, 21, 22), which should indirectly indicate that the anterosuperior portion of UP needs to be removed for better results.

CONCLUSION

Preoperative CT imaging is considered a helpful method for evaluating nasolacrimal drainage and surrounding anatomical components. It is a very important tool for diagnosing and managing patients with NLDO.

Conflict of interest: The authors declare no conflict of interest.

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REFERENCES

1. **Dalgleish R.** Idiopathic acquired lacrimal drainage obstruction. *Br J Ophthalmol* 1967; 51: 463–8.
2. **Linberg JV, McCormick SA.** Primary acquired nasolacrimal duct obstruction: a clinicopathologic report and biopsy technique. *Ophthalmology* 1986; 93: 1055–63.
3. **Czyz CN, Bacon TS, Stacey AW, Alabiad CR, Miller D, Hurwitz JJ et al.** Nasolacrimal system aeration on computed tomographic imaging: sex and age variation. *Ophthal Plast Reconstr Surg* 2016; 32: 11–6.
4. **Czyz CN, Bacon TS, Stacey AW, Alabiad CR, Miller D, Hurwitz JJ et al.** Nasolacrimal system aeration on computed tomographic imaging: effects of patient positioning and scan orientation. *Clin Ophthalmol* 2015; 9: 469–73.
5. **Loftus WK, Kew J, Metreweli C.** Nasolacrimal duct opacity on CT. *Br J Radiol* 1996; 69: 630–1.
6. **Francis IC, Kappagoda MB, Cole IE, Paver R, Shepherd J, Smith JE et al.** Computed tomography of the lacrimal drainage system: retrospective study of 107 cases of dacryostenosis. *Ophthal Plast Reconstr Surg* 1999; 15: 217–26.
7. **Lee KH, Han SH, Yoon JS.** Case reports of lacrimal sac tumors discovered in patients with persistent epiphora following dacryocystorhinostomy. *Korean J Ophthalmol* 2015; 29: 66–7
8. **Nagi KS, Meyer DR.** Utilization patterns for diagnostic imaging in the evaluation of epiphora due to lacrimal obstruction: a national survey. *Ophthal Plast Reconstr Surg* 2010; 26: 168–71.
9. **Ibrahim HA, Batterbury M, Banhegyi G, McGalliard J.** Endonasal laser dacryocystorhinostomy and external dacryocystorhinostomy outcome profile in a general ophthalmic service unit: a comparative retrospective study. *Ophthalmic Surg Lasers* 2001; 32: 220–7.
10. **Elner VM, Burnstine MA, Goodman ML, Dortzbach RK.** Inverted papillomas that invade the orbit. *Arch Ophthalmol* 1995; 113: 1178–83.
11. **Jung JH, Shin DH, Cho KS, Choi HY.** Nasolacrimal duct obstruction caused by oncocytic carcinoma. *Korean J Ophthalmol* 2013; 27: 126–9.
12. **Roth SI, August CZ, Lissner GS, O'Grady RB.** Hemangiopericytoma of the lacrimal sac. *Ophthalmology* 1991; 98: 925–7.
13. **Stefanyszyn MA, Hidayat AA, Pe'er JJ, Flanagan JC.** Lacrimal sac tumors. *Ophthal Plast Reconstr Surg* 1994; 10: 169–84.
14. **Choi SC, Lee S, Choi HS, Jang JW, Kim SJ, Lee JH.** Preoperative computed tomography findings for patients with nasolacrimal duct obstruction or stenosis. *Korean J Ophthalmol* 2016; 30: 243
15. **Kallman JE, Foster JA, Wulc AE, Yousem DM, Kennedy DW.** Computed tomography in

lacrimal outflow obstruction. *Ophthalmology* 1997; 104: 676–82.
16. **Habesoglu M, Eriman M, Habesoglu TE, Kinis V, Surmeli M; Deveci I.** Co-occurrence and possible role of sinonasal anomalies in primary acquired nasolacrimal duct obstruction. *J Craniofac Surg* 2013; 24: 497–500.
17. **Yazici H, Bulbul E, Yazici A, Kaymakci M, Tiskaoglu N, Yanik B et al.** Primary acquired nasolacrimal duct obstruction: is it really related to paranasal abnormalities? *Surg Radiol Anat* 2015; 37: 579–84.
18. **Kaplama ME, Ak S, Doblan A**. Primary endoscopic dacryocystorhinostomy: concomitant sinonasal pathologies, either cause of disease or cause of recurrence. *Allergy* 2020; 3: 59–63.
19. **Shams PN, Selva D.** Acute post-operative rhinosinusitis following endonasal dacryocystorhinostomy. *Eye (Lond)* 2013; 27: 1130–6.
20. **Liang J, Hur K, Merbs SL, Lane AP.** Surgical and anatomic considerations in endoscopic revision of failed external dacryocystorhinostomy. *Otolaryngol Head Neck Surg* 2014; 150: 901–5.
21. **Lin GC, Brook CD, Hatton MP, Metson R.** Causes of dacryocystorhinostomy failure: external versus endoscopic approach. *Am J Rhinol Allergy* 2017; 31: 181–5.
22. **Gökçek A, Argin MA, Altintas AK.** Comparison of failed and successful dacryocystorhinostomy by using computed tomographic dacryocystography findings. *Eur J Ophthalmol* 2005; 15: 523–9.

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