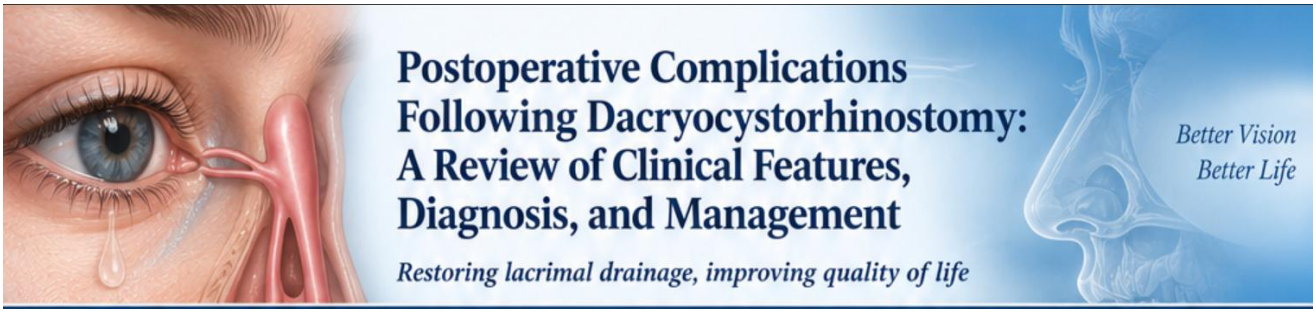
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Abstract

Background. Dacryocystorhinostomy (DCR) is one of the principal surgical procedures used to treat obstruction of the lacrimal drainage system, chronic dacryocystitis, and persistent epiphora. Although modern external and endoscopic techniques demonstrate high clinical effectiveness, postoperative complications may occur and can compromise the patency of the newly created lacrimal drainage pathway.

Objective. To systematize the principal early and late complications occurring after dacryocystorhinostomy and to describe their clinical manifestations, possible mechanisms, diagnostic approaches, and preventive principles.

Materials and Methods. A review of contemporary literature concerning lacrimal drainage surgery, external and endoscopic dacryocystorhinostomy, and postoperative complications was performed. Complications were classified according to the time of onset and presumed mechanism. Particular attention was paid to epistaxis, postoperative edema, infection, granulation tissue, cicatricial stenosis of the rhinostomy, synechiae, silicone stent-related complications, persistent epiphora, and recurrent dacryocystitis.

Results. The principal causes of an unsatisfactory postoperative result are associated with impaired patency of the rhinostomy, excessive granulation, cicatricial narrowing, synechiae, and selected stent-related problems. Persistent or recurrent epiphora requires differential assessment because it does not necessarily indicate complete anatomical closure of the rhinostomy. Endoscopic follow-up is important for early identification of granulation tissue, synechiae, scar formation, and abnormalities of the silicone stent.

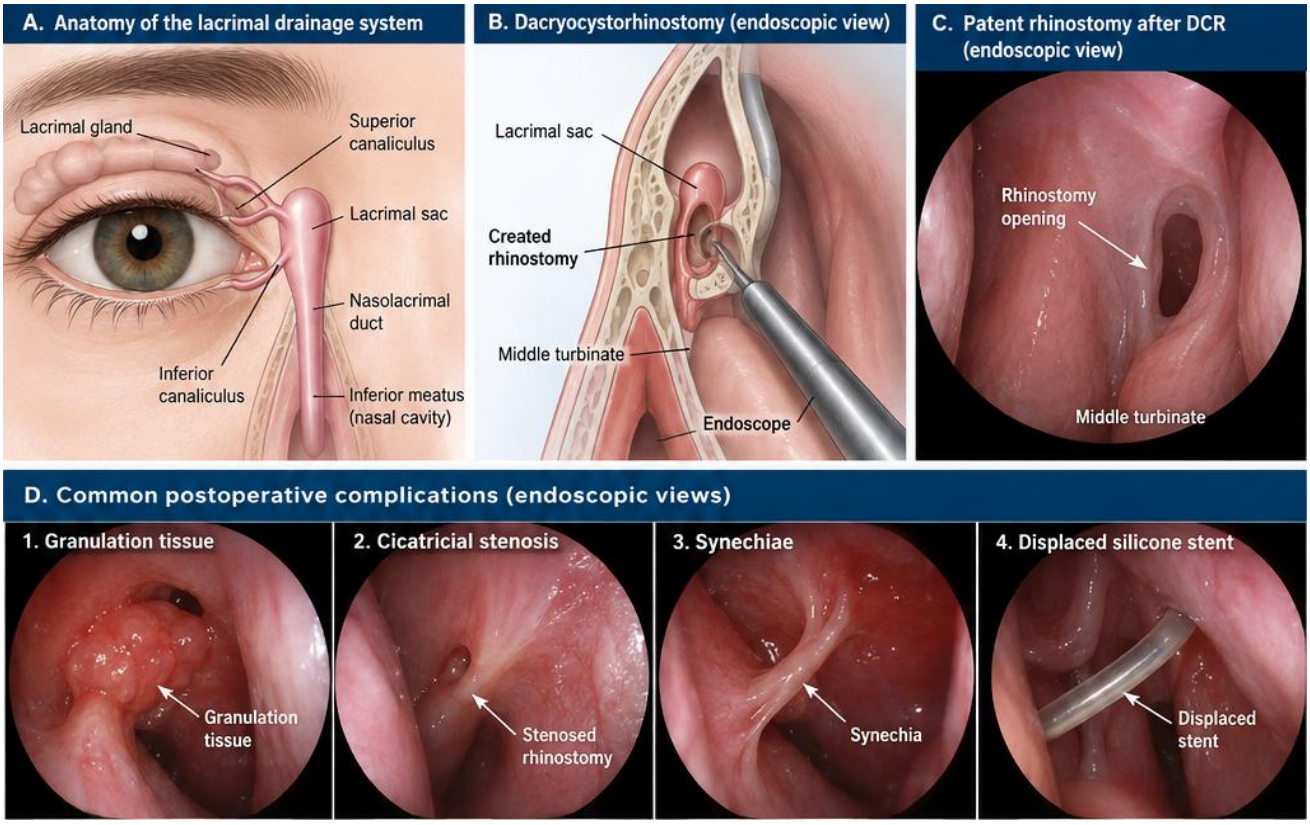
Conclusion. Early recognition of postoperative complications and structured ophthalmological and otorhinolaryngological follow-up may facilitate timely intervention and help preserve the functional outcome of dacryocystorhinostomy.

Keywords: dacryocystorhinostomy, dacryocystitis, lacrimal drainage system, epiphora, nasolacrimal duct, rhinostomy, granulation tissue, cicatricial stenosis, silicone stent, endoscopic surgery.

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Introduction

The lacrimal drainage system is a complex anatomical and functional structure responsible for the removal of tears from the ocular surface into the nasal cavity. It consists of the upper and lower lacrimal puncta, canaliculi, common canaliculus, lacrimal sac, and nasolacrimal duct. Obstruction at any level may result in impaired tear drainage, clinically manifested by epiphora, mucous or purulent discharge, discomfort, and recurrent inflammation.



Dacryocystorhinostomy creates a new communication between the lacrimal sac and the nasal cavity, bypassing the obstructed portion of the nasolacrimal duct. External and endoscopic endonasal DCR are currently established approaches. Endoscopic surgery provides direct visualization of the lateral nasal wall and lacrimal sac region but requires accurate knowledge of the relevant anatomy.

Despite technical advances, postoperative complications may occur. They include bleeding, edema, infection, granulation tissue, synechiae, scar formation, rhinostomy stenosis, silicone stent displacement, and persistent or recurrent epiphora. Understanding these complications is important for postoperative surveillance and timely management.

Objective

To characterize the main early and late complications following dacryocystorhinostomy, describe their clinical manifestations and possible mechanisms, and summarize approaches to diagnosis and prevention.

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Materials and Methods

A narrative review of contemporary scientific literature concerning postoperative complications of dacryocystorhinostomy was performed. Publications addressing external and endoscopic DCR, lacrimal sac anatomy, rhinostomy formation, postoperative healing, granulation, scar formation, and causes of surgical failure were considered.

Complications were categorized as early, late, anatomical, functional, and silicone-intubation-related. Because reported complication rates vary according to surgical technique, patient population, follow-up duration, and diagnostic criteria, numerical rates from individual studies should not be generalized without appropriate qualification.

Results and Discussion

1. Classification of postoperative complications

Table 1. Principal complications following dacryocystorhinostomy

Category	Complication	Possible mechanism
Early	Epistaxis	Mucosal or vascular trauma
Early	Postoperative edema	Surgical trauma and inflammation
Early	Pain and discomfort	Local postoperative inflammatory response
Early	Infection	Bacterial inflammatory process
Early	Hematoma	Vascular injury
Late	Granulation tissue	Excessive reparative response
Late	Cicatricial rhinostomy stenosis	Fibrosis and scar formation
Late	Synechiae	Adhesion between mucosal surfaces
Late	Persistent/recurrent epiphora	Impaired tear drainage
Late	Recurrent dacryocystitis	Re-obstruction and/or infection
Stent-related	Stent displacement	Mechanical displacement or inadequate fixation
Stent-related	Stent extrusion	Partial or complete migration
Stent-related	Peri-stent granulation	Chronic local irritation
Anatomical	Rhinostomy closure	Granulation, synechiae, and scarring
Functional	Persistent tearing	Functional impairment of tear drainage

2. Epistaxis

Minor blood-stained nasal discharge may occur during the early postoperative period and is generally related to manipulation of the nasal mucosa and local vascular structures. Most mild episodes are transient. Persistent or substantial bleeding requires clinical assessment and identification of the bleeding source.

Potential clinical manifestations include bloody nasal discharge, posterior pharyngeal blood drainage, nasal obstruction, and, in severe cases, clinically significant blood loss.

3. Postoperative edema and inflammatory response

Edema of the nasal mucosa and soft tissues around the medial canthus may occur during the first postoperative days. Mild tenderness and discomfort can reflect normal tissue response to surgery.

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Progressive swelling, marked erythema, purulent discharge, fever, or worsening pain should prompt evaluation for infection or another complication.

4. Granulation tissue at the rhinostomy

Granulation tissue is an important potential cause of postoperative rhinostomy narrowing. Excessive granulation may partially or completely obstruct the newly created communication between the lacrimal sac and nasal cavity. Its development may be influenced by local inflammation, mucosal trauma, healing characteristics, and prolonged mechanical irritation.

Table 2. Clinical features associated with rhinostomy granulation

Clinical finding	Typical manifestation
Epiphora	Persistent or recurrent tearing
Endoscopic appearance	Hyperemic or proliferative tissue at the rhinostomy
Reduced drainage	Reduced passage of tears into the nasal cavity
Discharge	Mucous or mucopurulent secretion
Inflammatory symptoms	Possible recurrence of local inflammation

5. Cicatricial stenosis of the rhinostomy

Cicatricial narrowing or closure of the rhinostomy is one of the most clinically important late complications. During healing, excessive fibroblast activity and connective-tissue deposition may progressively reduce the diameter of the newly created drainage opening.

A simplified pathogenic sequence can be described as: surgical trauma → inflammatory response → granulation tissue → fibrosis → scar formation → rhinostomy stenosis → impaired tear drainage → epiphora.

6. Intranasal synechiae

Synechiae are abnormal adhesions between mucosal surfaces within the nasal cavity. Following endonasal DCR, they may develop near the surgical site and interfere with the rhinostomy. Endoscopic examination is useful for identifying such adhesions and assessing their relationship to the drainage opening.

7. Silicone stent-related complications

Temporary silicone intubation is used in selected DCR procedures. Although intended to support patency during healing, a stent may itself be associated with displacement, extrusion, mucosal irritation, granulation tissue, foreign-body sensation, or local inflammation.

Table 3. Silicone stent-related complications

Complication	Clinical manifestation	Assessment
Displacement	Change in stent position	Endoscopic examination
Extrusion	Partial or complete migration	Assessment of position and need for intervention
Mucosal irritation	Discomfort or local inflammation	Clinical and endoscopic examination
Granulation	Tissue proliferation around the stent	Endoscopic assessment
Obstruction	Reduced tear drainage	Assessment of lacrimal patency

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8. Persistent or recurrent epiphora

Epiphora is an important symptom after DCR, but its persistence does not necessarily indicate anatomical failure. Differential assessment should include the patency of the rhinostomy, the lacrimal sac, canaliculi, the presence of granulation or synechiae, nasal mucosal disease, and functional abnormalities of tear drainage.

Therefore, patients with persistent or recurrent tearing should undergo structured clinical and, when indicated, endoscopic evaluation rather than being classified solely on the basis of symptoms.

9. Recurrent dacryocystitis

Recurrent inflammation may occur when effective drainage of the lacrimal sac has not been restored or when the rhinostomy becomes obstructed. Possible manifestations include medial canthal tenderness, erythema, swelling, mucopurulent discharge, and epiphora. Recurrent symptoms should prompt assessment for stenosis, granulation, synechiae, stent-related problems, and other causes of impaired drainage.

10. Causes of an unsatisfactory DCR outcome

Table 4. Potential causes of an unsatisfactory outcome after DCR

Potential factor	Possible mechanism
Incomplete exposure of the lacrimal sac	Incomplete or suboptimal rhinostomy
Insufficient bony opening	Restricted drainage pathway
Granulation tissue	Mechanical obstruction
Scar formation	Rhinostomy stenosis
Synechiae	Mechanical obstruction of the surgical area
Stent displacement	Loss of intended support or irritation
Infection	Inflammation followed by scarring
Canalicular disease	Persistent epiphora despite an open rhinostomy
Intranasal pathology	Impaired functional drainage

11. Diagnosis of postoperative complications

Table 5. Diagnostic methods for postoperative complications

Diagnostic method	Main information obtained
Clinical examination	Medial canthal and ocular findings
Lacrimal sac palpation	Tenderness and expressed discharge
Lacrimal irrigation	Patency of the drainage system
Dacryoendoscopy	Internal condition of lacrimal pathways
Nasal endoscopy	Rhinostomy, granulation, synechiae, stent position
Dacryocystography	Anatomical level and pattern of obstruction
Computed tomography	Bony anatomy and sinonasal relationships
Ophthalmological assessment	Functional status of the lacrimal system

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12. Prevention of postoperative complications

Prevention begins with appropriate preoperative assessment. The nasal cavity, lacrimal drainage system, level of obstruction, and relevant anatomical variations should be evaluated. During surgery, accurate identification of the lacrimal sac and adequate creation of the rhinostomy are essential.

After surgery, scheduled clinical and endoscopic follow-up can facilitate early detection of granulation tissue, synechiae, scar formation, and stent abnormalities. Postoperative management should be individualized according to the surgical technique and the patient's clinical status.

Table 6. Principal preventive measures

Stage	Preventive measure
Preoperative	Complete ophthalmological assessment
Preoperative	Evaluation of nasal cavity
Preoperative	Determination of obstruction level
Intraoperative	Accurate localization of the lacrimal sac
Intraoperative	Adequate rhinostomy creation
Postoperative	Assessment of mucosal healing
Postoperative	Endoscopic follow-up when indicated
Postoperative	Monitoring of stent position when used
Long-term	Assessment of epiphora and lacrimal patency

Conclusion

Dacryocystorhinostomy is an established surgical procedure for restoring tear drainage in patients with obstructive lacrimal disease. Nevertheless, postoperative complications may occur even after technically successful surgery. The most clinically relevant complications include granulation tissue, cicatricial stenosis of the rhinostomy, intranasal synechiae, silicone stent-related problems, infection, and persistent or recurrent epiphora. Early recognition is particularly important because some complications can be managed before complete obstruction develops. A structured postoperative surveillance strategy involving ophthalmological assessment and, when appropriate, nasal endoscopy may contribute to preservation of rhinostomy patency and reduction of recurrent symptoms. Accurate anatomical localization, adequate surgical exposure, and individualized postoperative care remain important components of successful DCR.

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