

Laser-Assisted Endoscopic Dacryocystorhinostomy in Recurrent Chronic Dacryocystitis: A Case Report

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Abstract

Introduction: Recurrent chronic dacryocystitis represents a complex inflammatory condition frequently associated with failure of previous surgical interventions and persistent mechanical obstruction of the lacrimal drainage system.

Objective: To present a case of recurrent chronic dacryocystitis after multiple unsuccessful surgical procedures and to highlight the role of laser-assisted endoscopic dacryocystorhinostomy as a revision technique.

Materials and Methods: We report the case of a patient with recurrent symptoms following two previous endoscopic dacryocystorhinostomies with nasolacrimal stent placement. Clinical examination, computed tomography of the paranasal sinuses, endoscopic findings, surgical management, and postoperative course were analyzed.

Results: Imaging revealed rhinostomy stenosis associated with lacrimal sac lithiasis, representing a persistent mechanical cause of obstruction. Laser-assisted endoscopic dacryocystorhinostomy using a diode laser was performed without stent placement, allowing precise removal of fibrotic tissue and obstructive material. The postoperative course was favorable, with complete resolution of epiphora, absence of purulent discharge, and maintained rhinostomy patency at 3-month follow-up.

Conclusions: Laser-assisted endoscopic dacryocystorhinostomy may represent an effective revision strategy in recurrent chronic dacryocystitis caused by persistent mechanical obstruction. Accurate identification of the underlying mechanism of surgical failure is essential for achieving durable functional outcomes.

Keywords: recurrent chronic dacryocystitis; laser-assisted dacryocystorhinostomy; lacrimal sac lithiasis; rhinostomy stenosis

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INTRODUCTION

Chronic dacryocystitis is a persistent inflammatory disorder of the lacrimal sac, most commonly secondary to obstruction of the nasolacrimal drainage system. From a pathophysiological perspective, this condition is closely linked to primary acquired nasolacrimal duct obstruction (PANDO), a multifactorial process involving chronic inflammation, epithelial metaplasia, submucosal fibrosis, and progressive luminal narrowing of the nasolacrimal duct. These mechanisms ultimately impair physiological tear drainage and predispose to recurrent infection of the lacrimal sac. According to contemporary classifications, chronic dacryocystitis may present as a primary condition or as a recurrent disorder after surgical treatment, the latter posing a significant therapeutic challenge¹⁻³.

In recurrent or atypical cases, secondary causes of obstruction, including neoplastic lesions of the medial canthal region, must be excluded. Cutaneous malignancies of the head and neck may involve periocular structures, including the medial canthus, due to chronic ultraviolet exposure. Such lesions can produce epiphora and clinical features mimicking chronic dacryocystitis through compression or infiltration of the lacrimal sac and nasolacrimal duct, emphasizing the importance of careful preoperative evaluation and imaging⁴.

Recurrent chronic dacryocystitis is increasingly recognized as a complex disease entity in which surgical failure cannot be attributed solely to technical factors. Current evidence highlights the role of excessive cicatricial response, persistent intraluminal or extraluminal mechanical obstruction, and ongoing inflammatory stimuli arising from the sinonasal cavity. These factors contribute to restenosis of the rhinostomy and compromise long-term surgical success, particularly in revision cases⁵⁻⁶. In this context, identifying the specific etiological mechanisms underlying recurrence is essential for selecting an appropriate revision strategy.

Dacryocystorhinostomy (DCR) remains the gold standard surgical procedure for restoring lacrimal drainage in patients with nasolacrimal duct obstruction. Both external and endonasal endoscopic approaches have demonstrated high primary success rates; however, failure rates ranging from 5% to 20% have been reported, particularly in complex or recurrent cases. The most frequently cited causes of failure include inadequate rhinostomy size, postoperative fibrosis, intranasal synechiae, and unrecognized mechanical obstructions, such as dacryolithiasis of the lacrimal sac^{2,7-9}.

Lacrimal sac lithiasis (dacryolithiasis) represents a relatively rare but clinically significant cause of persistent or recurrent obstruction of the lacrimal drainage system. Dacryoliths may act as a nidus for chronic inflammation and infection, perpetuating symptoms despite technically adequate surgical intervention. Histopathological and compositional analyses suggest that dacryolith formation is associated with chronic stasis, bacterial colonization, and inflammatory debris, underscoring its role as a mechanical and biological contributor to surgical failure¹⁰⁻¹³. Importantly, dacryolithiasis may be overlooked during initial interventions, particularly when preoperative imaging or endoscopic assessment is limited.

Over the last two decades, the endoscopic endonasal otorhinolaryngological approach has gained prominence in the management of lacrimal drainage disorders. This approach offers several advantages, including direct visualization of the lateral nasal wall, precise identification of the rhinostomy site, simultaneous correction of associated sinonasal pathology, and the possibility of postoperative endoscopic surveillance. These features are particularly valuable in revision surgery, where altered anatomy and fibrotic changes are frequently encountered^{2,3,7,8}.

Laser-assisted endoscopic dacryocystorhinostomy has been introduced as an alternative or adjunctive technique in selected cases, particularly in recurrent or complex diseases. The use of laser technology allows controlled and precise ablation of fibrotic tissue and mechanical obstructions, with minimal collateral tissue damage and effective hemostatic control. Several studies have reported favorable outcomes using laser-assisted techniques, especially in revision settings^{8,10}.

Against this background, the present case report aims to illustrate the clinical course, diagnostic challenges, and surgical management of a patient with recurrent chronic dacryocystitis complicated by lacrimal sac lithiasis. By integrating clinical findings with current evidence from the literature, this report seeks to highlight the role of laser-assisted endoscopic dacryocystorhinostomy as a viable revision strategy in carefully selected cases.

MATERIALS AND METHODS

This paper presents a clinical case of recurrent chronic dacryocystitis managed in a tertiary otorhinolaryngology department. Clinical data, imaging investigations

(computed tomography of the paranasal sinuses – CT PNS), nasal endoscopic examinations, details of surgical management, and postoperative outcomes were analyzed. The study adhered to ethical principles, the patient's data were fully anonymized, and written informed consent for publication was obtained.

CASE PRESENTATION

A 25-year-old woman presented on April 1, 2024, with complaints of nasal obstruction, headache, epiphora, and purulent discharge from the right eye.

Computed tomography (CT) of the paranasal sinuses (PNS) revealed dilatation and opacification of the right lacrimal sac, nasal septal deviation, right-sided concha bullosa, and hypertrophy of the inferior nasal turbinate mucosa. The patient was hospitalized with a diagnosis of primary chronic dacryocystitis of the right eye associated with nasal septal deviation, right concha bullosa, and chronic rhinitis.

First Surgical Intervention

Endoscopic surgical treatment was performed, consisting of endoscopic dacryocystorhinostomy with placement of a right nasolacrimal stent, endoscopic septoplasty, resection of the hyperaerated portion of the right middle turbinate, and cauterization of the inferior nasal turbinates. The postoperative course was initially favorable.

Clinical Evolution and Second Surgical Intervention

On October 22, 2024, the patient returned with recurrent epiphora of the right eye and discomfort over the lacrimal sac region. Repeated nasolacrimal duct irrigations proved ineffective.

A repeat CT PNS examination demonstrated dilatation and opacification of the lacrimal sac with hyperdense inclusions suggestive of lacrimal sac lithiasis, resulting in obstruction of the lacrimal sac and nasolacrimal duct. Based on clinical and imaging findings, a diagnosis of recurrent chronic dacryocystitis of the right eye due to rhinostomy stenosis was established.

Revision surgery was performed, consisting of enlargement of the dacryocystorhinostomy and reinsertion of the nasolacrimal stent. Despite surgical revision, the patient subsequently developed further recurrence.

Third Surgical Intervention

On October 27, 2025, the patient presented for the third time with similar symptoms, characterized by recurrent

epiphora and local discomfort. Imaging investigations confirmed recurrence of lacrimal sac lithiasis associated with obstruction of the rhinostomy.

A laser-assisted endoscopic dacryocystorhinostomy using a diode laser was performed without placement of a nasolacrimal stent. The procedure was carried out via an endonasal endoscopic approach, allowing precise identification of the stenotic rhinostomy site. Peristomal fibrotic tissue and obstructive material were removed using controlled laser ablation, resulting in enlargement of the rhinostomy and restoration of communication between the lacrimal sac and the nasal cavity.

The use of the diode laser allowed precise ablation of pathological tissues with minimal tissue trauma and effective hemostatic control. Stent placement was avoided due to the increased risk of postoperative fibrosis and recurrent stenosis associated with previous surgical interventions.

RESULTS

Postoperatively, the patient had a favorable clinical course and was discharged on the third postoperative day with recommendations for outpatient treatment, including oral antibiotic therapy, nasal spray, and ophthalmic drops. The patient subsequently attended regular otorhinolaryngological follow-up visits at 4-week intervals.

During these evaluations, endoscopic endonasal examination demonstrated a patent rhinostomy, with no signs of restenosis or recurrent infection. At the 3-month postoperative assessment, the clinical outcome remained favorable, with complete resolution of epiphora and absence of purulent ocular discharge. The patient remains under regular otorhinolaryngological follow-up.

DISCUSSION

Recurrent chronic dacryocystitis remains a significant therapeutic challenge, particularly in patients with previous surgical failure. While primary dacryocystorhinostomy generally yields high success rates, recurrence highlights the multifactorial nature of lacrimal drainage obstruction, extending beyond purely technical factors. Current evidence emphasizes that restenosis of the rhinostomy is frequently driven by a combination of excessive fibrotic response, persistent inflammation, and unrecognized mechanical obstruction, rather than by inadequate surgical technique alone^{5,7,10,13}.

In revision cases, the pathophysiology of failure is often complex. Chronic inflammation of the lacrimal sac and nasolacrimal duct leads to epithelial remodeling, subepithelial fibrosis, and progressive narrowing of the drainage pathway. These changes may be further exacerbated by ongoing sinonasal pathology, which serves as a continuous inflammatory stimulus. Consequently, comprehensive endoscopic evaluation of the lateral nasal wall and rhinostomy site is essential for identifying contributory intranasal factors and tailoring the revision strategy accordingly^{3,6,7}.

This case illustrates these considerations. The coexistence of nasal septal deviation, concha bullosa, and turbinate hypertrophy supports the concept that lacrimal drainage disorders should be approached as part of a broader sinonasal disease spectrum. The endoscopic otorhinolaryngological approach enables simultaneous correction of these anatomical abnormalities, which may otherwise compromise postoperative rhinostomy patency and predispose to recurrence^{2,6}.

A particularly relevant aspect of this case is the presence of lacrimal sac lithiasis as a persistent mechanical cause of obstruction. Although dacryolithiasis is considered relatively uncommon, clinical series and reviews suggest that dacryoliths may be underdiagnosed, especially in recurrent or atypical cases. Dacryoliths act not only as physical obstructions but also as reservoirs for bacterial colonization and chronic inflammation, thereby perpetuating disease despite apparently adequate surgical intervention¹⁰⁻¹³. Their identification is therefore critical in revision surgery and should prompt reconsideration of both surgical technique and postoperative management.

The recurrence observed after two conventional endoscopic dacryocystorhinostomies with stent placement in the present case underscores the limitations of standard techniques in the setting of persistent mechanical obstruction and fibrotic tissue. Although silicone stenting is widely used to maintain rhinostomy patency, its routine use — especially in revision settings — remains debated and should be individualized based on local findings and the mechanism of failure².

Laser-assisted endoscopic dacryocystorhinostomy offers several theoretical and practical advantages in revision settings. The use of laser energy allows precise and controlled ablation of fibrotic tissue and obstructive material, with minimal collateral damage to surrounding mucosa. Effective hemostatic control facilitates optimal visualization, which is particularly important

in anatomically distorted revision cases. Clinical studies evaluating laser-assisted techniques have reported variable success rates; however, favorable outcomes are described in selected patients, particularly when used as an adjunct or in revision settings⁸⁻¹⁰.

In the present case, laser-assisted endoscopic dacryocystorhinostomy enabled targeted removal of peristomal fibrosis and dacryolith-related obstruction, resulting in durable rhinostomy patency and complete symptom resolution at short-term follow-up. The absence of restenosis despite omission of a nasolacrimal stent supports the hypothesis that adequate removal of mechanical and fibrotic barriers may be more critical to long-term success than routine stenting in selected revision cases.

Taken together, this case supports a tailored, mechanism-oriented approach to recurrent chronic dacryocystitis. Rather than relying on uniform revision strategies, surgical planning should be guided by detailed endoscopic and imaging assessment, identification of specific causes of failure, and judicious selection of adjunctive techniques such as laser-assisted ablation. Such an individualized approach aligns with contemporary evidence-based recommendations and may improve outcomes in complex and recalcitrant cases.

CONCLUSIONS

Recurrent chronic dacryocystitis is a complex pathological condition in which surgical failure is frequently the result of multifactorial mechanisms, including persistent inflammation, excessive fibrotic response, associated sinonasal pathology, and unrecognized mechanical obstruction of the lacrimal drainage system. As demonstrated in the present case, repeated failure of conventional endoscopic dacryocystorhinostomy may occur despite technically adequate procedures when the underlying cause of recurrence is not fully addressed.

The endoscopic otorhinolaryngological approach plays a pivotal role in the management of recurrent disease, as it allows comprehensive evaluation of the rhinostomy, precise identification of intranasal and peristomal factors contributing to obstruction, and simultaneous correction of associated sinonasal abnormalities. In revision settings, such an approach is essential for understanding the true mechanism of surgical failure and for selecting an appropriate, individualized therapeutic strategy.

Lacrimal sac lithiasis should be considered a clinically relevant cause of persistent or recurrent obstruction, particularly in patients with repeated surgical failure. Its mechanical and inflammatory impact may significantly compromise long-term outcomes if not specifically identified and removed. The present case highlights the importance of targeted diagnostic assessment and mechanism-oriented surgical planning in recurrent dacryocystitis.

Laser-assisted endoscopic dacryocystorhinostomy using a diode laser represents a valuable adjunctive technique in selected revision cases. By enabling precise ablation of fibrotic tissue and mechanical obstructions with minimal collateral damage and effective hemostatic control, this approach may facilitate durable rhinostomy patency without the routine need for nasolacrimal stenting. The favorable clinical outcome observed in the present case supports the role of laser-assisted techniques as an effective option in carefully selected patients with recurrent chronic dacryocystitis.

Ultimately, successful management of recurrent dacryocystitis requires an individualized, evidence-based approach that integrates detailed endoscopic assessment, understanding of disease pathophysiology, and judicious selection of surgical techniques. Such a strategy is particularly relevant in complex revision cases and aligns with contemporary principles of modern lacrimal and otorhinolaryngological surgery.

Ethics Statement and Conflict of Interest Disclosures

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