Submandibular distal sialolithiasis complicated by acute sialadenitis: emergency surgical management. A case report.

ABSTRACT

Background

Submandibular sialolithiasis is the most common obstructive disorder of the major salivary glands, with a strong predilection for the submandibular gland. While minimally invasive techniques such as sialendoscopy are currently preferred, acute infectious scenarios may require immediate surgical intervention.

Methods

We report the case of a 64-year-old female presenting with acute submandibular sialadenitis secondary to a distal sialolith. Clinical examination and intraoral findings guided diagnosis and management. Emergency transoral surgical removal of the calculus was performed under local anesthesia.

Results

A 1.5 cm sialolith was successfully removed through a transoral approach, achieving immediate decompression and drainage. The patient received antibiotic therapy and supportive measures. At 7-day follow-up, complete resolution of symptoms and restoration of salivary flow were observed.

Conclusion

In cases of large, distal, and infected sialolithiasis, emergency transoral surgical management remains a safe and effective treatment, allowing rapid resolution while preserving gland function.

INTRODUCTION

Sialolithiasis is the most common obstructive disorder of the major salivary glands, accounting for approximately 50–80% of these conditions, with a marked predilection for the submandibular gland (1,2). This distribution is explained by the anatomical and physiological characteristics of this gland, including a long, ascending, and tortuous Wharton's duct, as well as the production of more viscous, alkaline, and calcium-rich saliva, which favors stone formation (2,3).

Sialolith formation begins with an organic nidus composed of mucins, cellular debris, or bacteria, upon which calcium salts—primarily calcium phosphate and calcium carbonate—are progressively deposited (3). The resulting obstruction leads to salivary stasis, increased intraductal pressure, and altered glandular flow, predisposing to the development of secondary sialadenitis (4,5).

Clinically, sialolithiasis typically presents with pain and glandular swelling, which are exacerbated during food intake, whereas sialadenitis is associated with signs of active infection, including erythema, swelling, purulent discharge, and, in some cases, systemic involvement (4–6). Diagnosis is primarily clinical, supported by imaging studies such as radiographs, ultrasound, or computed tomography, which allow determination of the location and size of the calculus and guide therapeutic decision-making (6).

Currently, the management of sialolithiasis has evolved toward minimally invasive techniques, such as sialendoscopy, which allow resolution of the condition while preserving gland function (7–9). However, in scenarios of acute infection or in the presence of large or distally located calculi, transoral surgical management remains a valid and effective therapeutic alternative (8,9).

The aim of this study is to present a case of distal submandibular sialolithiasis complicated by acute sialadenitis, managed through an emergency surgical approach, and to discuss its management in light of current evidence.

CASE REPORT

A 64-year-old female patient with no relevant medical history presented to the Dental and Maxillofacial Emergency Service of the Complejo Asistencial Dr. Sótero del Río with a 48-hour history of right sublingual pain. The pain was described as pulsatile, of moderate intensity (VAS 6/10), and exacerbated during food intake.

Extraoral physical examination revealed no abnormalities. Intraoral examination showed swelling in the region of the right sublingual caruncle, associated with erythema, tenderness on palpation, and the presence of purulent discharge upon ductal expression. Bimanual palpation revealed a hard structure consistent with a salivary calculus (Figure 1).

A diagnosis of distal submandibular sialolithiasis complicated by acute sialadenitis was established.

Given the presence of active infection with ductal involvement, immediate surgical management under local anesthesia was performed in a procedure room. A linear incision of approximately 1 cm was made lateral to the sublingual caruncle, followed by blunt dissection using a Kelly clamp, achieving drainage of purulent content (Figure 2A). During the procedure, a salivary stone measuring approximately 1.5 cm in greatest diameter was identified and removed (Figure 2B).

Subsequently, copious irrigation with saline solution was performed to restore patency of Wharton's duct, with evidence of normal salivary flow. An intraductal drain was placed and secured with absorbable suture (Vicryl 4-0) (Figure 2C–D).

General measures were indicated, including hydration, gland massage, and the use of sialogogues, along with pharmacological treatment consisting of amoxicillin 1 g every 12 hours for 7 days, analgesia with paracetamol, and nonsteroidal anti-inflammatory drugs.

At the 7-day follow-up, the patient showed favorable clinical evolution, with resolution of pain and inflammation, no evidence of purulent discharge, and preserved salivary flow.

DISCUSSION

Submandibular sialolithiasis remains a prevalent cause of salivary obstruction and recurrent sialadenitis; however, the current therapeutic paradigm is consistently gland-preserving and stepwise, based on clinical and anatomical factors (7,8). In contemporary treatment algorithms, the historically high rate of gland resection (40–50%) has been reduced to <10%, and even <5% in centers employing minimally invasive approaches, due to the combined use of sialendoscopy, transoral duct surgery (TDS), and lithotripsy (extra- or intraductal) in selected cases (8).

Diagnostic evaluation should aim to confirm obstruction, localize the calculus, and identify infectious complications. High-resolution ultrasound is considered a useful first-line modality for determining stone size and location, with high diagnostic accuracy reported in algorithm-based reviews. Computed tomography (CT) or cone-beam CT (CBCT) provides additional value when detailed anatomical

planning is required or when proximal/intraglandular involvement or complications are suspected (6,8).

Regarding treatment, accumulated evidence supports that sialendoscopy is highly effective in obstructive salivary gland disease, particularly when gland preservation is the primary goal. A recent meta-analysis reported a pooled success rate of approximately 80.9% for sialendoscopy in obstructive conditions; in the subgroup of sialolithiasis, the success rate was approximately 89.6%, and specifically 88.3% for the submandibular gland (10). These findings support endoscopic extraction (basket/forceps) as a reasonable first-line option when the stone is small, mobile, and accessible. Technical reports and reviews consistently indicate that small calculi (approximately 3–4 mm) are suitable for simple endoscopic removal, whereas increasing size or impaction requires adjunctive techniques such as fragmentation or combined approaches (7,8).

Intraductal lithotripsy has gained relevance as a salvage technique for stones accessible to endoscopy but not removable due to size or impaction. Laser-assisted lithotripsy under sialendoscopic guidance has demonstrated high success rates (71–100%, mean ~87.3%) and high gland preservation (~97%), although complications such as ductal perforation have been reported in some series (up to ~13%), and the need for sialadenectomy after treatment failure is approximately 2.5% overall in systematic reviews (9,11). Similarly, pneumatic intraductal lithotripsy has shown excellent outcomes in recent series, with complete fragmentation rates of approximately 98.7%, “stone-free” rates of ~90.3%, and 100% “symptom-free” rates in early experiences, with relatively low complication rates (~4.84%) (12). However, both techniques require specialized equipment, appropriate endoscopes, and a significant learning curve.

When stones are large or located in the hilar or intraglandular region, the literature supports combined approaches. A meta-analysis of sialendoscopy-assisted surgery reported an overall success rate of approximately 95.5%, with complication rates around 8% and sialadenectomy rates of approximately 2% as salvage treatment. Despite heterogeneity among studies, the overall evidence supports combined approaches as the standard of care for large or inaccessible stones (13).

Conventional transoral surgery (non-robotic) continues to play a central role, particularly for distal, palpable submandibular stones, and as a cost-effective alternative when advanced sialendoscopy or lithotripsy is not available. A recent meta-analysis comparing robotic versus conventional transoral approaches reported success rates of approximately 92.6% and 95.7%, respectively, with transient lingual nerve paresthesia more frequently observed in robotic procedures, and no permanent lingual nerve injury reported in the included studies (14). Additionally, clinical audits in oral and maxillofacial surgery have reported successful stone removal rates of approximately 94% in large cohorts, with complications including permanent paresthesia in a minority of cases and events such as ranula or ductal stenosis, reinforcing that minimally invasive intraoral surgery is effective and avoids cervical morbidity (15).

In contrast, extracorporeal shock wave lithotripsy (ESWL), although gland-preserving, shows more variable outcomes that are highly dependent on stone size, with better performance in the parotid gland than in the submandibular gland. In a prospective controlled study, complete success (resolution of both stone and symptoms) was approximately 47.15% overall; for submandibular stones, success was approximately 35.9%, with partial success rates of approximately 37.2% and failure rates of approximately 26.9%, again highlighting stone size as the dominant predictor of outcome (16). Therefore, ESWL is more appropriate for small to moderate stones, particularly when they are inaccessible or intraglandular and when the technology is available; its utility in large submandibular stones is limited and often requires combination with other techniques (8,16).

In the present case, a distal stone measuring approximately 1.5 cm was associated with active purulent sialadenitis. In this scenario, the immediate objective is not solely to achieve a “stone-free”

state, but also to control infection and achieve decompression. The presence of purulent discharge and local inflammatory signs suggests bacterial infection and necessitates prioritization of antibiotic therapy, analgesia, and hydration, along with decompressive measures (drainage) to reduce intraductal pressure and prevent disease progression (4,5).

Given the stone size (>10 mm), simple sialendoscopic extraction using a basket or forceps is unlikely to be effective as a standalone technique. Minimally invasive high-technology alternatives would include (i) intraductal lithotripsy (laser or pneumatic) followed by sequential fragment removal, or (ii) a combined sialendoscopy-assisted approach (8,12,13). However, in the emergency setting with active purulent infection and a distal, palpable stone, transoral surgical removal with drainage offers clear practical advantages: immediate resolution of obstruction, effective infection control, reduced dependence on specialized equipment, and high success rates in modern series for submandibular stones, with preservation of gland function (13–15).

CONCLUSIONS

Submandibular sialolithiasis complicated by acute infection requires prompt diagnosis and management. Although minimally invasive techniques are preferred in elective settings, emergency transoral surgical removal remains a reliable and effective approach for large, distal, and infected calculi, ensuring rapid symptom resolution and preservation of glandular function.

ETHICS STATEMENT

This study was conducted in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from the patient for publication of this case report and accompanying images.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

All authors contributed to the conception, design, clinical management, and writing of this manuscript. All authors have read and approved the final version.

ACKNOWLEDGMENTS

The authors would like to thank the staff of the Emergency Dental and Maxillofacial Service at Complejo Asistencial Dr. Sótero del Río for their support in the management of this case.

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FIGURES AND CAPTIONS

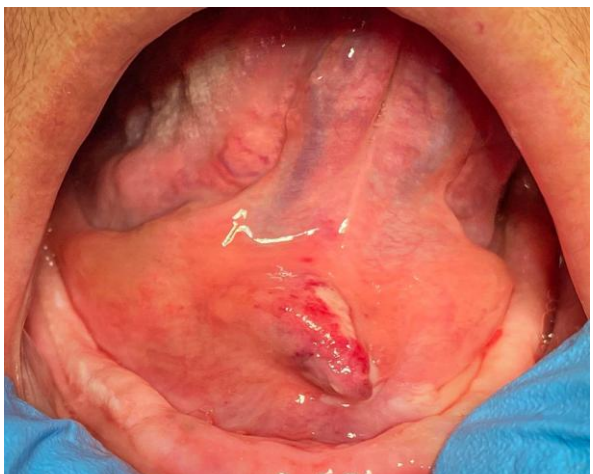

Figure 1: Initial intraoral examination. Sublingual swelling in the region of the right caruncle, erythematous, associated with purulent discharge.

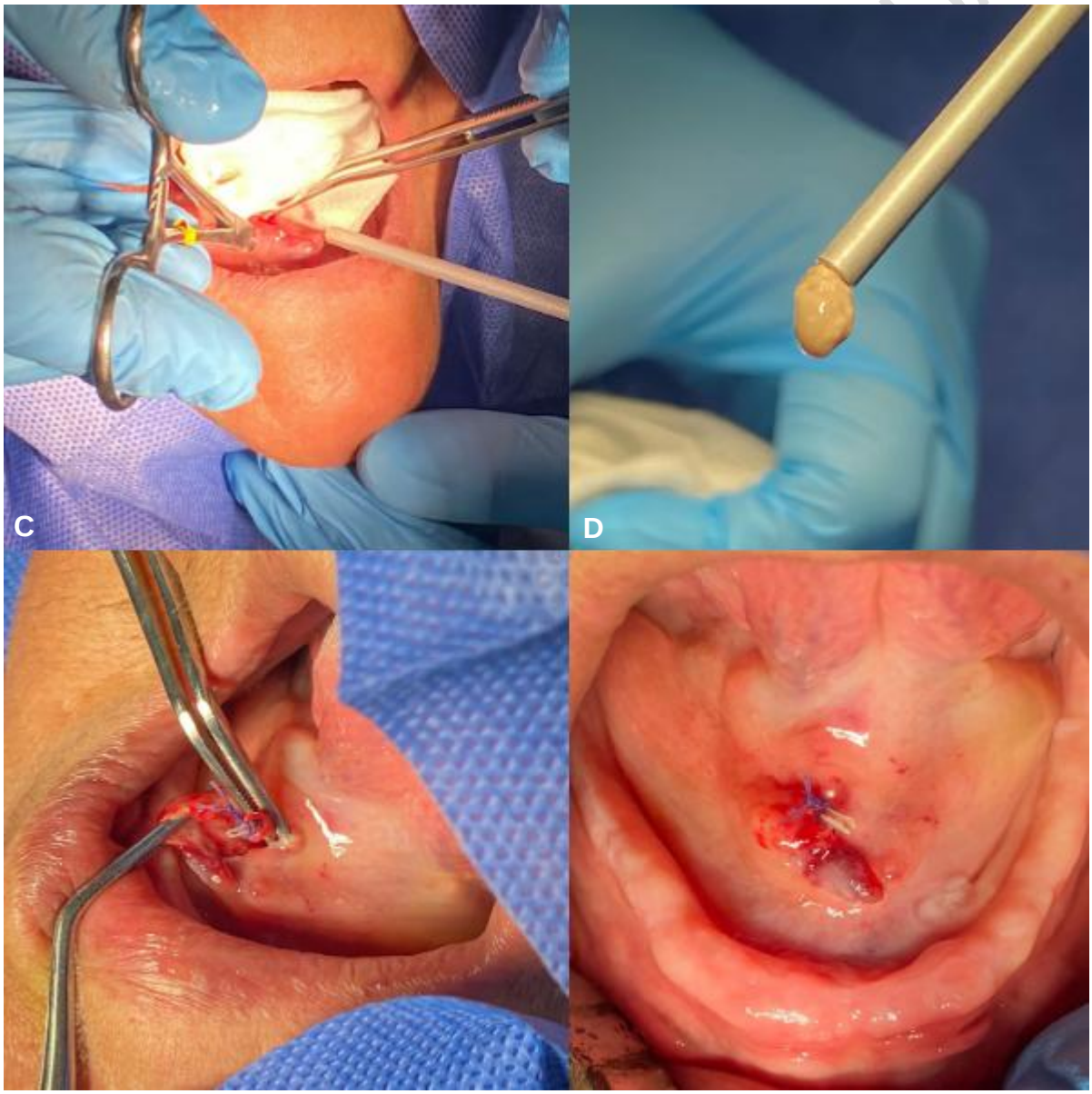

Figure 2 (A-D):A: Incision and drainage **B:** Sialolith removal **C:** Distal submandibular duct recanalization **D:** Immediate postoperative view