Permanent intramural stenting with a polyethylene catheter to resolve parotid salivary duct stenosis secondary to sialolithiasis

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ABSTRACT

Background: Parotid sialolithiasis and septic sialadenitis are uncommon in horses. Chronic obstruction may lead to duct fibrosis and stenosis, for which gland-preserving treatment options are limited.

Case: A 19-year-old Warmblood gelding with a six-year history of recurrent unilateral parotid swelling was diagnosed with a 4 × 3 cm sialolith, septic sialadenitis and peri-ductal fibrosis. Following antimicrobial treatment and transcutaneous sialolith removal, postoperative sialography disclosed focal duct stenosis. Foley balloon dilation produced only partial, transient improvement. An 8 Fr radiopaque polyethylene catheter was placed through the oral papilla to the gland and retained as a permanent intramural stent.

Outcome: A partial catheter fenestration obstruction at two months resolved after two extracorporeal shockwave sessions. At 12 months, salivary drainage remained effective, no progressive duct-wall changes were detected, and the horse had an excellent cosmetic and functional outcome.

Clinical relevance: Permanent polyethylene stenting may offer a practical, affordable, gland-preserving option for equine parotid duct stenosis when balloon dilation is unsuccessful. Long-term safety requires further investigation.

Keywords: horse; parotid duct; sialolithiasis; sialadenitis; stenosis; polyethylene stent; sialography.

INTRODUCTION

Septic sialadenitis is an uncommon equine salivary disorder and may occur secondary to duct obstruction by a sialolith (Baskett et al., 1995; Jones & Smith, 2009). Chronic obstruction can result in recurrent gland distension, peri-ductal fibrosis and luminal stenosis. Temporary stenting has been described after equine parotid duct injury or reconstruction (Newton et al., 1997; Lempe et al., 2012), but permanent intramural stenting for stenosis secondary to sialolithiasis has not previously been reported. This report describes diagnosis, treatment and 12-month outcome after placement of a radiopaque polyethylene catheter.

CASE PRESENTATION

A 19-year-old showjumper Warmblood gelding was referred for severe painful swelling of the right parotid gland, pyrexia and mild colic signs. Comparable episodes had occurred for six years, especially in summer, and had temporarily improved with trimethoprim–sulfonamide. On admission, the horse was quiet and alert, with tachycardia (60 beats/min), tachypnoea (20 breaths/min), pyrexia (39°C), reduced gastrointestinal borborygmi, halitosis and a firm mass over the caudal right mandible. Blood analysis showed mild leucocytosis (13.92 K/µL), neutrophilia (12.5 K/µL) and lymphopenia (1.3 K/µL); biochemistry was unremarkable.

Oral examination identified sanguinolent discharge from the parotid duct papilla at the level of tooth 107. Radiography demonstrated a 4 × 3 cm mineral opacity within the soft tissues of the right mandible, associated mandibular remodelling and surrounding oedema (Appendix Figure A1). Ultrasonography confirmed a 4 cm hyperechoic intraductal structure, fibrosis surrounding the duct caudal to the sialolith and heterogeneous fluid within the enlarged gland. Endoscopy showed compression of the lateral compartment of the right guttural pouch. Ultrasound-guided aspiration of the parotic gland yielded serosanguineous saliva; culture grew *Prevotella heparinolytica*.

TREATMENT

Septic sialadenitis was treated for five days with potassium penicillin (22,000 IU/kg IV q6h), gentamicin (6.6 mg/kg IV q24h) and metronidazole (20 mg/kg PO q8h). Two weeks later, the sialolith was removed under general anaesthesia using a transcutaneous approach. The duct was opened longitudinally, the sialolith exteriorised and a 3.3 mm urinary catheter advanced through the oral papilla to confirm patency and support closure. The duct was sutured in a continuous Cushing pattern with 3-0 poliglecaprone.

Within 24 hours, recurrent gland distension prompted contrast sialography. This showed a normal rostral duct, dilation at the former sialolith site, an abrupt stenosis corresponding to the ultrasonographic fibrotic region and mandibular remodelling, and moderate upstream duct dilation. The chronic history and pre-existing fibrosis supported a longstanding stenosis rather than an iatrogenic lesion. Dilation was attempted using an 8 Fr Foley catheter positioned radiographically at the stenosis. Drainage improved, but the horse removed the catheter after 48 hours. Repeat

sialography showed only partial improvement, and replacement was unsuccessful. Manual massage maintained drainage briefly but became progressively ineffective. An 8 Fr radiopaque polyethylene catheter (Pleurocath®, 40 cm × 2.7 mm) was subsequently advanced from the oral papilla to the parotid gland. Its smaller diameter and relative stiffness facilitated intraoral placement. Radiography and ultrasonography confirmed position, and immediate drainage was excellent. The distal end was secured to gingival mucosa rostral to tooth 107 with two simple interrupted monofilament polyamide sutures (Appendix Figure A2). On day 7, the horse chewed the exposed distal end, preventing nonsurgical removal. Because drainage remained effective and clinical signs had improved substantially, the catheter was retained as a permanent intramural stent. Serial radiography and ultrasonography during two further weeks of hospitalisation showed no obstruction, duct inflammation, progressive stenosis or luminal change.

OUTCOME

Two months after discharge, mild gland distension recurred. Ultrasonography identified echogenic material obstructing one of the catheter's three fenestrations. Two extracorporeal shockwave treatments (1.5 Hz, 0.15 mJ, 1,000 pulses/session) were administered with the intention of fragmenting debris or mineral aggregates. Salivary accumulation resolved and did not recur. At 12 months, the catheter remained functional, duct-wall thickness and peri-ductal fibrosis were unchanged, gland enlargement had substantially regressed, and the horse had returned to its previous performance level with reduced head-shy behaviour and an excellent cosmetic result (Appendix Figure A3).

DISCUSSION

This case demonstrates successful permanent intramural stenting of an equine parotid duct after chronic sialolithiasis-associated stenosis. Septic sialadenitis is an uncommon condition of the salivary gland in the horse (Baskett et al., 1995). The sterile saliva sample confirmed a growth of *Prevotella heparinolytica* was isolated, which is a strict anaerobic commensal bacterium of the oral cavity of the mammals (Madura, 2017). Predisposing causes of septic sialadenitis may include salivary duct obstruction due to sialolithiasis (Jones & Smith, 2009). In the case, sialolithiasis was diagnosed by palpation and confirmed by radiographic and ultrasonographic examination of the caudal aspect of the mandible. Initial catheter passage during surgery confirmed patency but failed to delineate the focal narrowing; contrast sialography performed from the rostral duct identified the lesion. Earlier sialography, or sialoendoscopy where suitable equipment is available, may improve presurgical definition of the duct lumen (Prutton et al., 2016). It has been reported that water--soluble contrast material might stop glandular secretions, and care should be taken when using contrast as it may lead to damage of the salivary tissue (Schmotzer et al., 1991; Schumacher & Schumacher, 1995). Therefore, ducts should be drained and thoroughly lavaged after contrast sialography. (Dixon & Reardon, 2021) Further studies evaluating the histologic changes produced by water-soluble contrast material in salivary glands are needed.

Balloon dilation is used for strictures in several organs and can improve salivary duct stenosis in people, although recurrence is common (Drage et al., 2002; Kim et al., 2008). The Foley catheter used here was difficult to retain because its distal end remained outside the oral cavity. A dedicated pressure-rated balloon dilator might have achieved more controlled dilation.

The polyethylene catheter was selected because it was smaller, relatively stiff, radiopaque and readily placed intraorally. Continuous drainage preserved gland function and avoided chemical involution or surgical ablation, procedures associated with potentially severe complications (Newton et al., 1997; Schmotzer et al., 1991; Zetterström et al., 2022).

The tissue response and degradation time of a permanent polyethylene salivary stent remain unknown. Biodegradable poly-L-lactide salivary stents have shown favourable mechanical properties in vitro but are not commercially available for this application (Ding et al., 2019). Water-soluble contrast may also impair salivary secretion; drainage and lavage after sialography should be considered (Schmotzer et al., 1991; Dixon & Reardon, 2021). In the present case, no progressive duct-wall change was identified during 12 months of follow-up. However, interpretation is limited by the single case, absence of objective gland-volume measurements and uncertainty regarding the contribution of shockwave treatment to resolution of the partial obstruction.

CONCLUSION

Permanent intramural placement of a radiopaque polyethylene catheter restored salivary drainage and preserved parotid gland function after failed balloon dilation. The favourable 12-month outcome supports consideration of this technique in selected equine cases, with careful imaging follow-up for obstruction, migration, infection, fibrosis and material degradation.

APPENDIX

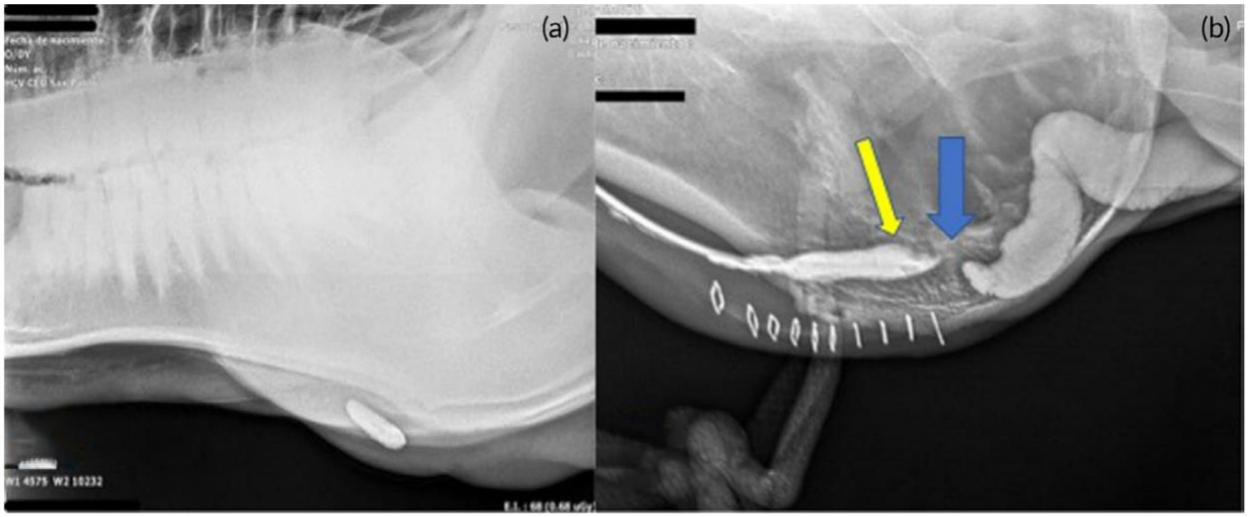


Figure A1. (a) Laterolateral radiograph showing the mineralised sialolith. (b) Postoperative sialogram showing dilation at the previous sialolith site (yellow arrow), followed by focal duct stenosis (blue arrow) and proximal duct enlargement.

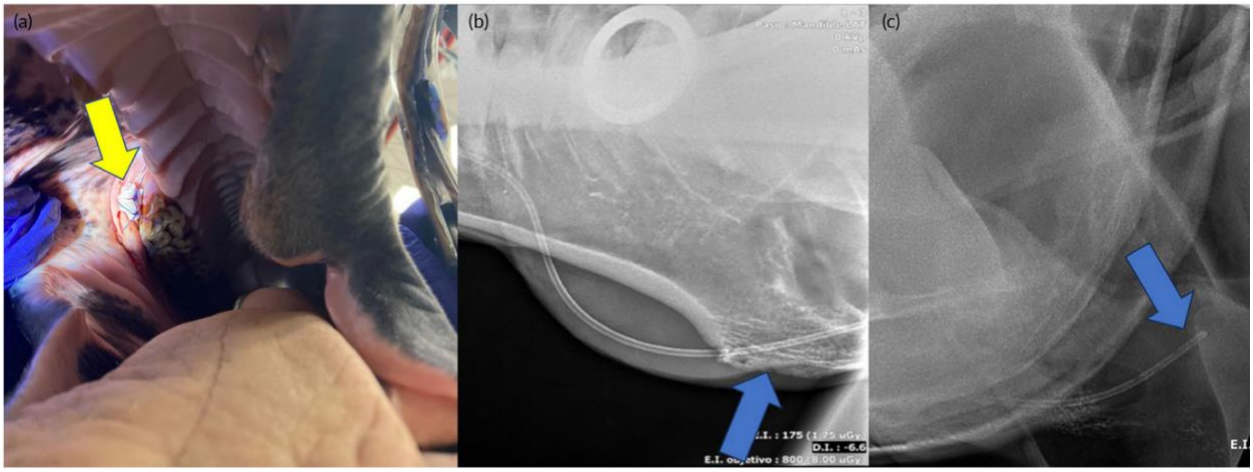


Figure A2. (a) Polyethylene catheter entering the parotid duct through the oral papilla and secured to the oral mucosa. (b,c) Oblique and laterolateral radiographs confirming the catheter course through the duct to the parotid gland (blue arrows).

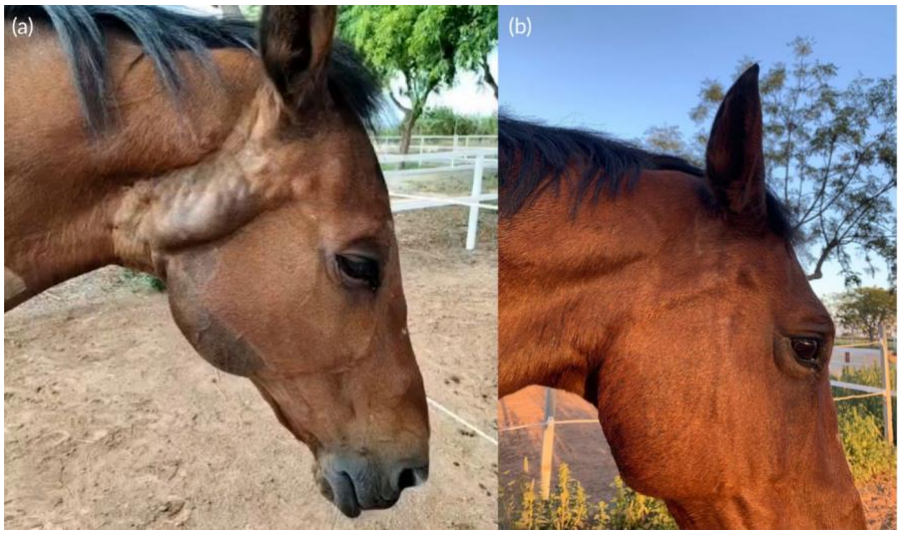


Figure A3. Clinical appearance (a) before admission and (b) 12 months after permanent polyethylene stent placement, demonstrating resolution of parotid swelling and an excellent cosmetic result.