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Case Report

Sphenopalatine artery rupture following posterior nasal nerve cryoablation: a rare but serious delayed complication

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ABSTRACT

Posterior nasal nerve (PNN) cryoablation is an emerging minimally invasive procedure for managing refractory chronic rhinitis. Although generally well-tolerated, complications can occur. This report presents the first documented case of sphenopalatine artery (SPA) rupture following PNN cryoablation, highlighting the need for vigilance in postoperative care. A 64-year-old female developed delayed epistaxis one month postoperatively, requiring emergent arterial ligation. This case underscores the importance of anatomical considerations, and the potential risks associated with this innovative treatment.

Keywords: Chronic rhinitis, Posterior nasal nerve cryoablation, Sphenopalatine artery rupture, Delayed epistaxis, Minimally invasive rhinologic procedures, Postoperative complications

INTRODUCTION

Chronic rhinitis, characterized by persistent inflammation of the nasal mucosa, presents with symptoms including nasal congestion, rhinorrhea, sneezing, and postnasal drip. These symptoms significantly impair the quality of life by disrupting sleep, causing discomfort, and reducing productivity.[1] Chronic rhinitis is classified into allergic and nonallergic subtypes. Allergic rhinitis results from environmental allergens such as pollen or dust mites, while nonallergic rhinitis arises from irritants like smoke or temperature changes.[1]

Treatment options range from intranasal corticosteroids and antihistamines to surgical interventions for refractory cases. One such intervention, posterior nasal nerve (PNN) cryoablation, targets the parasympathetic innervation of the middle and inferior turbinates to reduce excessive mucus production. Increasingly used for patients unresponsive to conventional therapies, PNN cryoablation offers a promising option for managing refractory chronic rhinitis.[2,3] The Clarifix device utilizes liquid nitrogen within the device tip, inducing controlled tissue injury, disrupting the parasympathetic nerve fibers, and providing symptomatic relief.[3] While the procedure is generally well-tolerated, rare complications, including epistaxis, have been reported.[4,5] Postoperative adverse effects such as nasal dryness, epistaxis, ocular symptoms, and palatal numbness occur in <5% of patients, with postoperative pain and headaches occurring in up to 10% and 20% of cases, respectively.[6,7]

CASE REPORT

A 64-year-old female presented with chronic sinonasal congestion, postnasal drip, and daily headaches predominantly on the right side. She had failed multiple treatments, including allergy management, intranasal corticosteroids, and prolonged courses of antibiotics. CT imaging had demonstrated chronic maxillary sinusitis, chronic ethmoid sinusitis, deviated nasal septum, and bilateral inferior turbinate hypertrophy. Despite conservative measures, her symptoms persisted,

prompting consideration of functional endoscopic sinus surgery including PNN cryoablation.

The patient was taken to the operating room and underwent uneventful endoscopic septoplasty, and bilateral inferior turbinate reductions using microdebrider-assisted medial flap technique, wide maxillary antrostomies, total ethmoidectomies, and posterior nasal nerve cryoablations. The cryoablation was performed with usual technique, with no bleeding and no cautery utilized in the area of the nerve origin.

Postoperatively, she did well. She underwent debridement's at 1 and 2 weeks postoperatively with expected crusting removed. The cryoablation sites were devoid of eschars. During this period, the patient endorsed mild "ice cream headaches," which were tolerable but were requiring mild analgesia.

However, at four weeks postoperatively, the patient reported a severe "ice cream" headache, followed by profuse right-sided nasal bleeding. She was seen emergently, and posterior lateral wall arterial bleeding was noted on the right side with in-office packing failing to gain complete control. Emergent operative management demonstrated arterial bleeding from the sphenopalatine artery (SPA) region. The vessel then underwent surgical ligation. Postoperatively, she was admitted to the intensive care unit for observation and discharged the next morning. Her postoperative course following this surgery was uncomplicated. Her "ice cream headaches" also fully resolved.

DISCUSSION

The SPA is the primary blood supply to the nasal cavity, branching from the maxillary artery and traversing the sphenopalatine foramen to supply the posterior septum and lateral nasal wall.[3] Its proximity to the PNN makes it susceptible to trauma during interventions such as cryoablation. PNN cryoablation is increasingly recognized as a viable option for refractory chronic rhinitis, with studies supporting its efficacy and safety profile.[2,5] However, complications such as SPA rupture, as highlighted in this case, underscore the need for careful consideration of anatomical landmarks and potential risks during the procedure.[7,8] Preoperative imaging may be quite pivotal in the identification of the anatomical variant that does predispose a patient to complication. High-resolution CT or MRI angiography may further delineate the course of SPA relating to the posterior nasal nerve. Such information may allow one to make procedural adjustments such as cryoprobe repositioning or adjustment of the depth of cryoablation to minimize the risk of vascular injury.[7] The delayed rupture of the SPA in this patient may have been precipitated by tissue remodeling or an unrecognized aneurysm/pseudoaneurysm formed due to cryoablation-induced injury.[6-9]

The "ice cream headache" experienced by the patient may serve as a warning sign of vascular complications, warranting further investigation.[8] While adverse events such as headache have been documented in the postoperative period, this case emphasizes the need for thorough patient monitoring and early intervention when vascular injury is suspected.[6,7] The "ice cream headache" experienced by the patient may be a warning sign of the possibility of epistaxis and the patient may require close monitoring and screening.

Screening patients for their eligibility for PNN cryoablation can prevent complications. The presence of pre-existing vascular anomalies, previous history of epistaxis, or advanced age might predispose them to complications. This process of patient selection can be further optimized, probably by including vascular imaging or risk assessment tools, which will further enhance safety and outcomes.

This is the first documented case of SPA rupture following PNN cryoablation. It highlights the importance of understanding the anatomical relationship between the PNN and SPA to mitigate risks during the procedure. Further studies are needed to clarify the exact anatomical relationship and enhance procedural safety.[2-10]

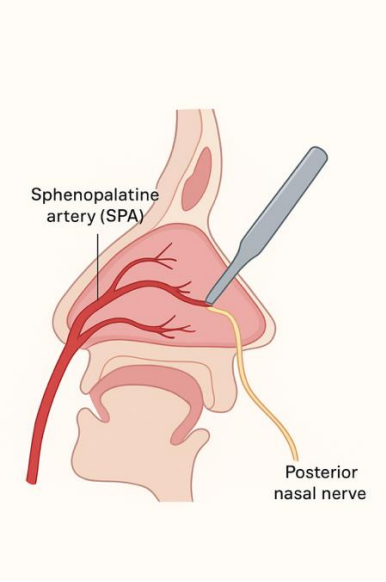

Figure 1: Anatomical relationship of the PNN and SPA, illustrating potential mechanism of vascular injury during cryoablation.

CONCLUSION

This case represents the first documented instance of SPA rupture following PNN cryoablation and highlights an important, previously underrecognized vascular risk associated with an increasingly popular minimally invasive treatment for refractory chronic rhinitis. By demonstrating that delayed catastrophic bleeding can occur even after an uncomplicated procedure and normal

early postoperative course, this report expands current understanding of PNN cryoablation safety and underscores the critical importance of anatomical awareness, preoperative vascular assessment, and vigilant postoperative monitoring. The association between severe "ice cream headaches" and subsequent arterial rupture observed in this patient suggests a potential early warning sign that may help clinicians identify evolving vascular injury before epistaxis occurs. This case advances the field by emphasizing the need for refined patient selection, consideration of preoperative vascular imaging, and heightened awareness of SPA vulnerability during cryoablation. Further research is warranted to better characterize SPA–PNN anatomical relationships, define high-risk anatomical variants, and develop evidence-based guidelines that enhance procedural safety and patient outcomes.

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