Journal Reading

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CLINICAL LETTER

Severe epistaxis after posterior nasal nerve ablation requiring surgical intervention: A multi-center case series

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Background

- Chronic rhinitis affects ~33% of the U.S. population
- Symptoms: sneezing, nasal congestion, rhinorrhea
- PNN ablation: emerging office-based treatment
- Targets **parasympathetic nerves** to decrease submucosal gland secretion, blood flow, and stromal edema
- FDA-approved devices:
    - Cryotherapy: ClariFix
    - Radiofrequency: RhinAer, Neuromark

      → Symptom burden significant improvement 70-100%

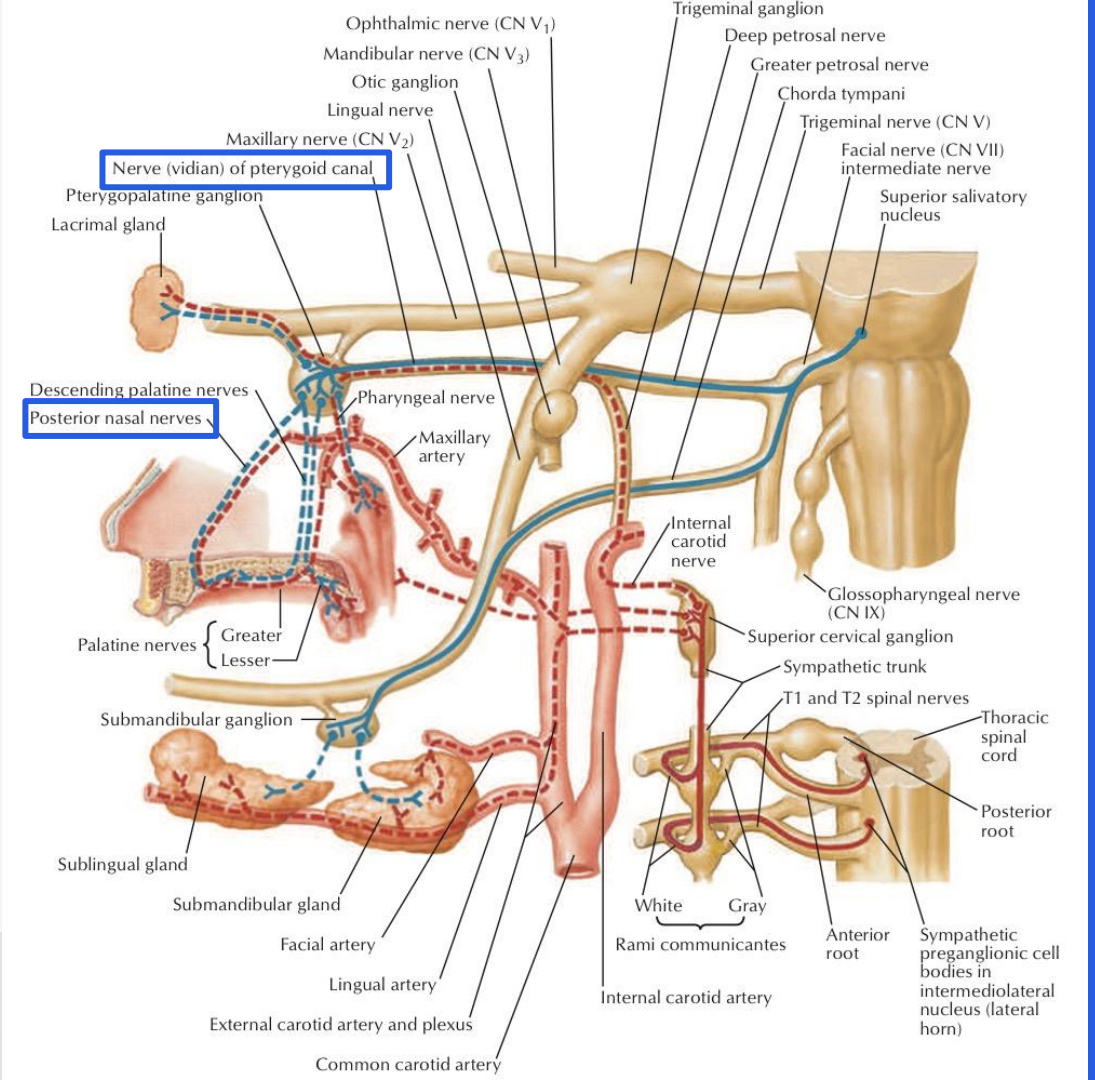
Background

PNN ablation

- Etiology of non-allergic rhinitis: arise from a **dysfunction of sympathetic and parasympathetic** innervation
- Medical therapy failure→ surgery
  - Vidian nerve (VN) neurectomy: notably **eye dryness**
  - Posterior nasal nerve (PNN) neurectomy: fewer adverse effects, but unsatisfactory symptom resolution
- Recently, posterior nasal nerve (PNN) ablation has emerged as a popular option

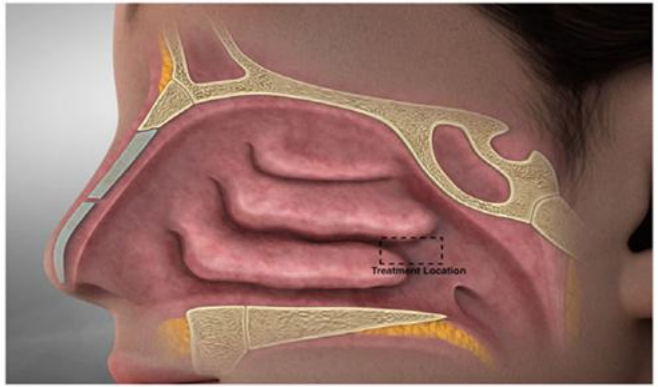
Background

Anatomy

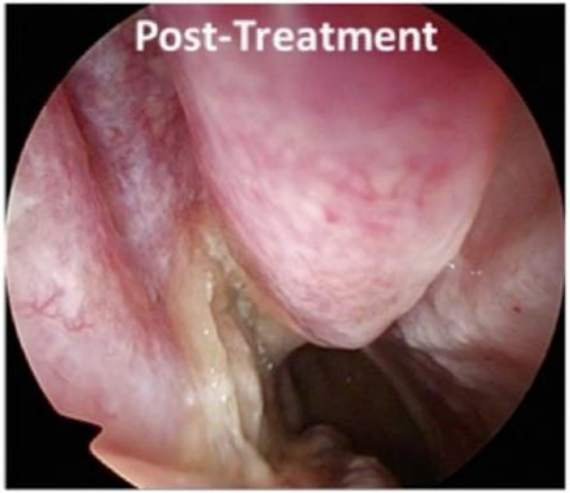


Background

- Cryotherapy



3.A



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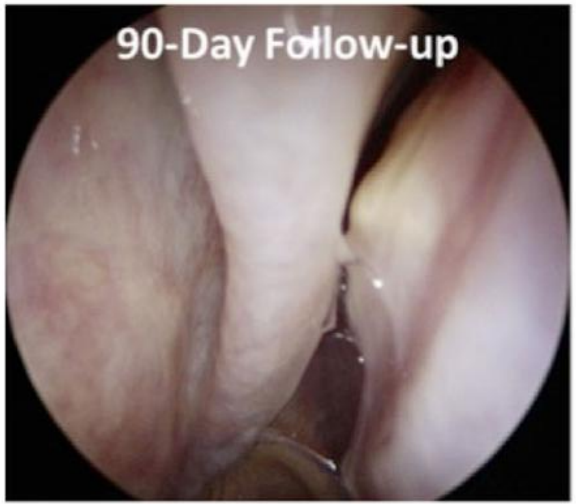
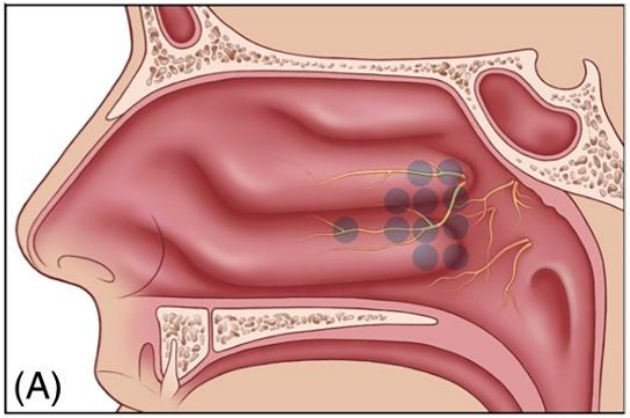
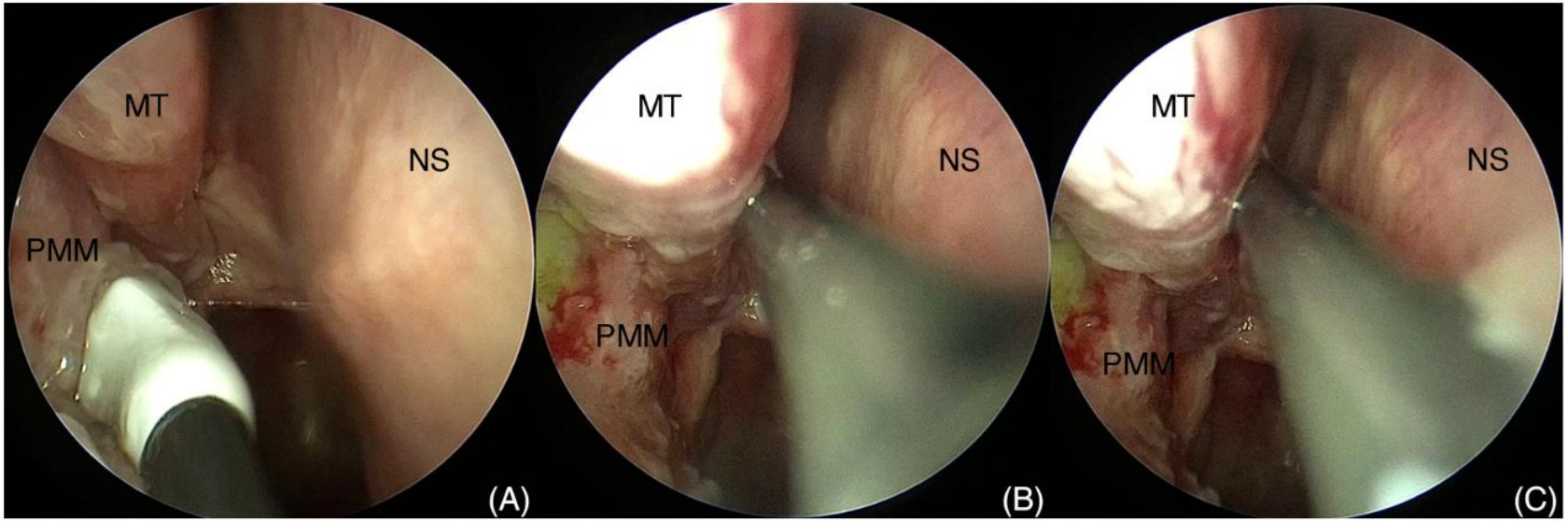


3.C

Background

- Radiofrequency





Purpose of Study

- Evaluate **incidence of severe epistaxis** after PNN ablation
- Analyze patient demographics and outcomes
- Provide guidance on patient counseling and risk management

Material and Method

- **Retrospective review:** June 2018 – August 2023
- **Settings:** 2 tertiary centers, 1 private practice
- **Total patients:** 461

Result

Overview

- 11/461 patients (2.4%) had severe epistaxis
- Mean onset: **20 days** post-op (13– 24 days)
- **No significant differences** by device type
    - ClariFix: 2.7%
    - RhinAer: 1.9%
    - Neuromark: 1 case
- **SPA** involvement in all severe epistaxis cases

Result

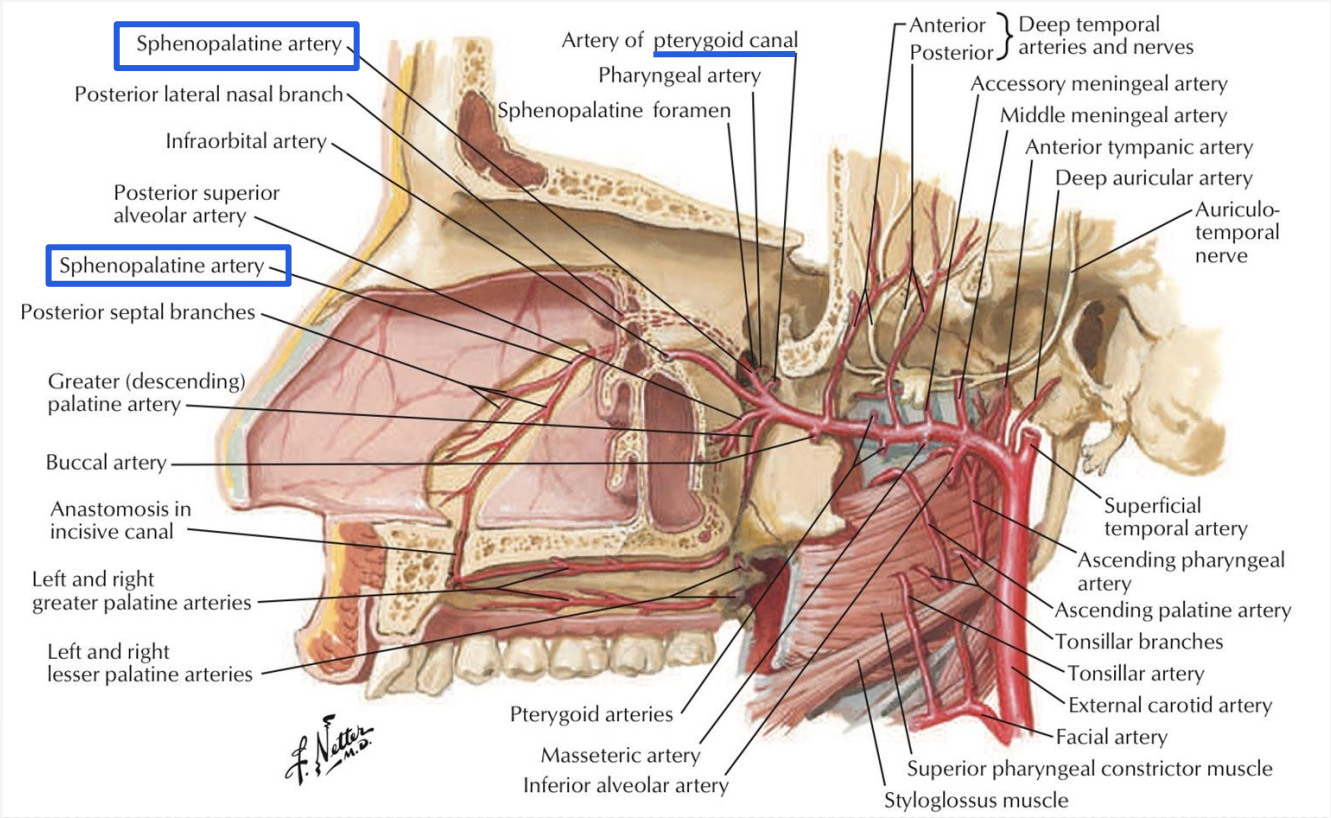

Sphenopalatine artery
Posterior lateral nasal branch
Infraorbital artery
Posterior superior alveolar artery
Sphenopalatine artery
Posterior septal branches
Greater (descending) palatine artery
Buccal artery
Anastomosis in incisive canal
Left and right greater palatine arteries
Left and right lesser palatine arteries
Artery of pterygoid canal
Pharyngeal artery
Sphenopalatine foramen
Pterygoid arteries
Masseteric artery
Inferior alveolar artery
Anterior
Posterior
Deep temporal arteries and nerves
Accessory meningeal artery
Middle meningeal artery
Anterior tympanic artery
Deep auricular artery
Auriculo-temporal nerve
Superficial temporal artery
Ascending pharyngeal artery
Ascending palatine artery
Tonsillar branches
Tonsillar artery
External carotid artery
Facial artery
Superior pharyngeal constrictor muscle
Styloglossus muscle
F. Netter M.D.

TABLE 1 Demographics of patients who underwent posterior nasal nerve (PNN) ablation.

	Overall	No epistaxis	Epistaxis requiring intervention	*p* value
Total no. of patients	461	450	11	
Age (median [IQR])	66 [61, 74]	66.00 [51, 74]	57 [45, 68.50]	0.260
Sex (%)				1
Male	234 (50.8)	228 (50.7)	6 (54.5)	
Female	226 (49.0)	221 (49.1)	5 (45.5)	
Comorbidities (%)				
Allergies	234 (50.8)	228 (50.7)	6 (54.5)	1
Hypertension	218 (47.3)	210 (46.7)	8 (72.7)	0.160
Diabetes	92 (20)	89 (19.8)	3 (27.3)	0.816
Tobacco use (%)				
Never	287 (62.4)	279 (62.1)	8 (72.7)	0.688
Current	30 (6.5)	28 (6.2)	2 (18.2)	0.333
Former	143 (31.1)	142 (31.6)	1 (9.1)	0.206
Anticoagulation therapy (%)	93 (20.2)	89 (19.8)	4 (36.4)	0.330
Method of ablation (%)				
Rhinaer	263 (57)	258 (57.6)	5 (45.5)	0.634
Clarifix	192 (41.5)	187 (41.6)	5 (45.5)	1
Neuromark	3 (0.7)	2 (0.4)	1 (9.1)	0.104
Rhinaer and Clarifix	3 (0.7)	3 (0.7)	0	1
POD of epistaxis onset (mean (SD))	—	—	19.64 (3.78)	
Method of operative intervention (%)				
Embolization	—	—	2 (18.2)	
SPA ligation	—	—	7 (63.5)	
Cauterization	—	—	2 (18.2)	

Abbreviations: IQR, interquartile range; POD, postoperative day; SD, standard deviation; SPA, sphenopalatine artery.

Result

Intervention

- 7 patients: SPA ligation
- 2 patients: Embolization
- 2 patients: Cauterization
- No recurrent bleeding reported after intervention

TABLE 2 Summary of patients with significant epistaxis after posterior nasal nerve (PNN) ablation requiring surgical intervention.

Age	Sex	Tobacco	AC	Allergies	HTN	DM	Device	POD	Intervention	Notes
57	M	Never	N	N	Y	N	RhinAer	21	Embolization	–
50	F	Never	N	N	Y	Y	Neurent	20	Bilateral SPA ligation	Presented to OSI with bilateral epistaxis.
67	M	Never	Y	N	Y	Y	ClariFix	24	Cauterization	Presented with right-sided epistaxis that persisted despite Merocel packing and subsequently inflatable balloon catheter use.
38	F	Never	N	Y	N	N	RhinAer	18	Embolization	–
70	F	Current	N	Y	Y	N	RhinAer	17	Unilateral SPA ligation	Presented to OSI with bilateral epistaxis, bilateral rhinorockets were placed and transferred to higher level of care
33	F	Never	N	N	N	N	RhinAer	22	Unilateral SPA ligation	Presented to OSI with right-sided epistaxis, right rhinorocket was placed and blood transfusion was given.
64	M	Current	N	Y	Y	N	ClariFix	23	Unilateral SPA ligation	Presented with persistent epistaxis despite two attempts of absorbable nasal packing.
89	M	Former	N	Y	N	N	ClariFix	14	Unilateral SPA ligation	Present with unilateral epistaxis, identified in office as SPA and treated in OR
51	M	Never	Y	Y	Y	Y	ClariFix	24	Cauterization	Presented with intermittent high volume epistaxis despite bioabsorbable nasal packing. Site identified and treated in office
40	M	Never	Y	Y	Y	N	ClariFix	20	Unilateral SPA ligation	Presented to OSI with unilateral epistaxis, persistent despite rhinorocket. Transferred for SPA ligation
76	F	Never	Y	N	Y	N	RhinAer	13	Unilateral SPA ligation	Presented to OSI with unilateral epistaxis, bilateral rhinorockets, intubation, multiple unit blood transfusion followed by SPA ligation

Abbreviations: AC, anticoagulation; DM, diabetes; HTN, hypertension; OSI, outside institution; POD, postoperative day; SPA, sphenopalatine artery.

- Age: 33–89 yrs, both sexes affected
- Most non-smokers
- Majority required SPA ligation
- Several cases needed transfusion, intubation, or referral to tertiary care

Discussion

- Minor side effects previously reported (pain, headache)
- **Delayed epistaxis** (**~3 weeks post-op**) may be due to:
  - SPA pseudoaneurysm or weakening of the SPA wall
  - Vascular remodeling
- Similar to post-tonsillectomy hemorrhage timing
- Need for clear preoperative counseling

Implications & Future Direction

- Although rare, serious bleeding should be anticipated
- Physicians should be equipped to manage late epistaxis
- Encourage:
    - Biopsy or imaging to explore etiology
    - Studies identifying patient/device-specific risks

Conclusion

- **PNN ablation is a safe procedure for the treatment of recalcitrant chronic rhinitis**
- Severe epistaxis is rare but significant
- Enhanced informed consent and follow-up planning are recommended

Thank you for your attention