Chronic Rhinitis –
New Surgical Technologies

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Disclosures

• None
Overview

- Definition of Rhinitis
- Mechanism
- Prevalence
- Medical management
- Surgical management
  - vidian neurectomy
  - posterior nasal neurectomy
  - cryotherapy

Definition

- Chronic inflammation of nasal mucosa causing:
  - nasal congestion/obstruction
  - rhinorrhea (anterior or posterior)
  - nasal pruritus
  - sneezing
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  - rhinorrhea (anterior or posterior)
  - nasal pruritus
  - sneezing
  - cough, decreased smell, ear fullness, throat clearing

**Definition**

- **Allergic rhinitis (AR)** → IgE mediated
Definition

• **Allergic rhinitis (AR)** → IgE mediated

• **Non-allergic rhinitis (NAR)** → inflammatory and neurogenic
  – NARES, gustatory, hormonal, drug-induced, atrophic, *vasomotor/idiopathic most common type*
  – nasal itchiness not a common symptom
  – symptoms can occur with odors, foods, meds, weather

*Allergy testing for definitive diagnosis*
**NAR**

- older age of onset than AR
  - 30 and 60 years
- women
- more headaches and olfactory dysfunction, less sneezing and pruritus
- predominant symptom is nasal congestion
  - sleep disturbances, daytime somnolence, decreased productivity at work (like AR)

**Mechanism - AR**

- Type 1 Hypersensitivity

Antigen presenting cells (APCs): dendritic cells, macrophages

Naïve T-helper cell

B cells

IL4

IL5

Histamine

Early phase

Late phase

Th2 Basophils

Eosinophils

Th2 cell

Eosinophils

IgM

IgE
Mechanism - NAR

• Neurogenic

Prevalence

• AR → affects 9-42% of people
  ▪ likely ~15-20% or 58 million Americans

• NAR → approximately one-third that of AR
  ▪ affecting ~7% of the U.S. population
  or ~22 million people
  (and more than 200 million worldwide)
The Challenge

• Significant impact on QOL & unhappy patients, but…

  – Limited medical options
    • require daily compliance and work less than 50% of the time

  – Historically no great non-risky surgical options
    • specifically for patient’s with rhinorrhea

Treatment – Medical (AR)

• Allergen avoidance
• Saline
• Intranasal corticosteroids
• Oral and intranasal antihistamines
• Intranasal anticholinergic (rhinorrhea)
  – blocks acetylcholine and inhibits parasympathetic activity
• Oral and topical decongestants
• Cromolyn
• Probiotics
• Acupuncture
Treatment – Medical (NAR)

- Avoid triggers
- Nasal saline
- **Intranasal corticosteroids** (fluticasone propionate and beclomethasone approved for NAR) and **azelastine** are first-line options → **oral antihistamines not as helpful**
  - azelastine works on neural mechanisms, inhibit the release of various mediators implicated in the pathogenesis of nasal hyper-responsiveness (substance P)
- Ipratropium for rhinorrhea
- ?Capsaicin → option in idiopathic
- Short term decongestants
- Acupuncture

Problem with Medical Management

- 1/3 of children and almost 2/3 of adults report partial or poor relief with pharmacotherapy to treat AR
  - Allergen Immunotherapy (AIT)
  - Surgical options (for NAR or patients who do not wish to undergo immunotherapy)

- **AAOHNS 2015 Clinical Practice Guidelines** → AIT may be offered to AR patients with inadequate response to pharmacotherapy, or adverse SEs from pharmacotherapy
Treatment – Surgical

- **Addressing nasal obstruction** → Turbinate reduction


Lack of correlation between objective outcome of radiofrequency ablation of the inferior turbinate and subjective patient symptoms
Treatment – Surgical

- **Addressing rhinorrhea** → more directed targeting of the autonomic nerve supply to the nasal cavity
  - ie parasympathetic disruption (vidian nerve and branches)
    - vidian neurectomy
    - posterior nasal neurectomy
    - cryoablation of the posterior nasal nerves
Posterior Nasal Neurectomy


10/14/19
Cryoablation

• Well tolerated and low risk
  – Controllable zone of effect
  – Large blood vessels and extracellular tissue preserved
  – Minimal impact on connective tissue
  – Minimal inflammatory reaction

• Can be performed under topical or local anesthesia in the office

How Cryotherapy Works

Cryoablation temperature -20 to -100°C

- Axonotmesis – 2nd degree nerve damage
- Results in loss of axon continuity, but preservation of the connective tissue
How Cryotherapy Works

- closed end probe applied to target tissue

- as liquid cryogen in probe turns to gas in pulls heat from surrounding tissue causing freezing

- a variable temperature distribution exists in the frozen and unfrozen regions, with the lowest temperatures experienced at the cold application site

- freezing continues until heat provided by body is in equilibrium to the heat extracted by the probe
Cryoablation

• Patient Selection

  – medically refractory perennial rhinitis
  
  – unhappy with medical management
  
  – moderate to severe chronic runny nose and/or nasal congestion
  
  – non-allergic chronic rhinitis
  
  – mixed allergic and non-allergic chronic rhinitis
  
  – response to anti-cholinergic drugs

• Insert probe into nasal cavity with tip pointing towards the lateral wall

• Target is posterior aspect of MT at point of attachment to LW

• Basal lamella will stop cryoprobe from advancing further
Cryoablation

- **Risks:** pain, bleeding, scarring, “ice cream headache”
  - overall low risk
  - minimally invasive (no dry eye)

- **Anesthesia:**
  - anesthetize treatment area as well as pathway there
  - depth greater than treatment area likely minimizes post-treatment headache
  - suction, pledgets, Cottle or Freer, anesthetic agents

**Example Anesthesia Protocol**

- Gabapentin 600mg 1 hour prior to procedure
- Spray with Afrin and lidocaine
- Insert 1/2inch pledgets soaked in Afrin and lidocaine into the middle meatus and along the inferior turbinate and septum
- Inject 1% with 1:100,000 epinephrine into the basal lamella, axilla of the middle turbinate, and/or sphenopalatine area
Patient Expectations

- 20-45 minutes with 30 seconds of freeze time per side
- May feel pressure, cooling sensation in nose and around teeth, hear a hissing sound while cryogen is deployed
- May experience acute headache
- Transient pain and discomfort should be expected
- Transient increase in nasal congestion, dry nose, or ear blockage can occur
- Improvement occurs 2-6 weeks postop

Cryoablation

- Statistically significant reduction of rhinorrhea & congestion
- Efficacious in both non-allergic & patients with + allergy test
- 4 of 5 patients reported durable improvement (followed to 1 yr)
- No device or procedure SAEs; AEs self resolved or rated mild at Day 90

- Statistically significant reduction of rhinorrhea & congestion
- Efficacious in both non-allergic & patients with + allergy test
- >80% of patients reported improvement through 6-month post-treatment (study currently still in follow-up)
- No DADRs: no device SAEs
  - 1 Procedure-related SAE (procedural, not cryo-related); 6 device-related and 14 procedure-related AEs
Cryoablation

Both

> 50% reduction in rTNSS through 180 days in both allergic and non-allergic populations.

Allergic

66% of Allergic had improvement in both Rhinorrhea and Congestion at 90 and 180 days.

Cryoablation

Endoscopic Assessment – Nasal Congestion

<table>
<thead>
<tr>
<th>Severity</th>
<th>Baseline (n=27)</th>
<th>7-Day (n=27)</th>
<th>30-Day (n=27)</th>
<th>90-Day (n=31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1.5 ± 0.1</td>
<td>1.4 ± 0.1</td>
<td>0.8 ± 0.1</td>
<td>0.5 ± 0.1</td>
</tr>
</tbody>
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(Average score ± Standard Error)