Maximizing Sinus Surgery Outcomes with Post-op Management

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Disclosures

Consultant
• Lyra Therapeutics Stryker ENT
• IntersectENT Aerin Medical

Serve of scientific advisory board
• ENTvantage Diagnostics
• Sanofi/Regeneron
• Novartis/Genetech
Goals of endoscopic sinus surgery

1. Remove polyps
   - IL-5 ectomy and minimize burden of disease
   - To improve nasal breathing
2. Provide access to sinuses for topical delivery of medications
3. Remove trapped mucus/mucin that may harbor triggers of inflammation

How to maximize effectiveness of FESS?

- **Short term**
  - Immediate post-operative care should minimize the negative inflammatory effects of surgery itself
  - And keep access to sinuses open by minimizing scarring

- **Long term**
  - Establish a new baseline for the sinonasal mucosa and to maintain this baseline of minimal inflammatory state
Packing versus no packing

- Goals of sinus packing
  - Hemostasis
  - Minimize scarring/adhesion
  - Improve mucosal healing
  - Medialize middle turbinate

- Why not to pack?
  - Discomfort to the patient
  - Possibly increase risk of perioperative infection
  - Worsens mucociliary clearance

Numerous packing options

<table>
<thead>
<tr>
<th>Synthetic</th>
<th>Polyvinyl alcohol based (Merocel)</th>
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<tbody>
<tr>
<td></td>
<td>Poly(DL-lactide-co-c-caprolactone urethane) (Nasopore)</td>
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<tr>
<td>Organic</td>
<td>Carboxymethylcellulose based</td>
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<tr>
<td></td>
<td>Hyaluronic acid based</td>
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<tr>
<td></td>
<td>Chitin based</td>
</tr>
<tr>
<td>Drug eluting</td>
<td>Off-label surgeon combining steroid with available packing</td>
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<tr>
<td></td>
<td>Commercially available steroid-loaded bioabsorable synthetic device</td>
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Merocel in a finger cot

- Pros
  - Mucosal healing is anecdotally noted sooner
  - Minimal inflammatory response to the packing
  - Inexpensive
  - Goal is primarily hemostasis
- Cons
  - Must be removed within a couple of days after surgery
  - Unsightly to the patient
  - No ability to infuse with topical medication

Chitin-based packing – Posisept and Chitozolve

- Pros
  - Thin and easy to place
  - Soft with good hemostatic function
  - Chitin has wound healing properties
  - Relatively inexpensive
  - Can be infused with topical steroids
  - Debridement is less time-consuming
- Cons
  - May need to be trimmed
  - May obstruct sinus outflow
Commercially available steroid eluting implants

**Pro**
- Only option with significant RCT data with clinically significant endpoints
- Controlled delivery of steroids locally with minimal if any systemic effects
- 3 configurations available

**Cons**
- Cost
- Crusting often found on implant
- Debridement is challenging if done after 2 weeks
Management of Middle Turbinate – key to success

Partial resection of anterior and/or inferior aspect of middle turbinate

Management of Middle Turbinate – key to success

Medialization of middle turbinate
Minimize post-op inflammation

- Steroid-eluting stents placed intraoperatively
- Oral steroids
  - Polyps present?
  - Elevated serum eosinophils
  - Nasal endoscopy at 1 week post op

Post op follow-up

Goals
- Emphasize compliance with saline irrigations and medical therapy
- Remove crust in middle meati
- Clear maxillary sinus of mucus
- Manage synechia if needed
- Initiate anti-inflammatory treatment

Typical post-op schedule
- 1 week
- 2 weeks
- 6 weeks
Recurrence rates vs surgical revision rates

- Deconde et al (IFAR, 2017)
  - Polyp recurrence based on LK score despite post op medical therapy – 40%
  - Risk factors: prior FESS and worse pre-op polyp severity
- University of Utah (Smith KA et al, IFAR, 2019)
  - Overall long term surgical revision rate – 15.9%
  - CRSwNP surgical revision rate – 29.9%
  - Risk factors: asthma, allergy, female, and nasal polyps

Disease specific post-op management

- Allergic fungal rhinosinusitis
- Aspirin exacerbated respiratory disease
Allergic fungal rhinosinusitis – intraoperative packing?

Post op management of AFRS

- Oral steroids
  - Prednisone 30 mg daily x 9 days started 3 days pre-op
- Saline irrigations
  - Topical steroids (budesonide) added to saline about 2 weeks
- Oral antibiotics
  - Duricef x 7 days to manage crusting on stents
Post op of management AERD patient

- Oral steroids
  - Prednisone 30 mg daily x 4 days, then 20 mg until ASA desensitization started

- Saline irrigations
  - Topical steroids (budesonide) added to saline about 2 weeks

- Oral antibiotics
  - Duricef x 7 days to manage crusting on stents

Various mechanisms of delivery for topical steroids

- Nasal steroid sprays
  - Distribution primarily limited to nasal cavity

- Added to saline irrigations
  - Minimal persistence in sinus cavity

- Xhance
  - 93 mcg per actuation
  - Fluticasone propionate
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**Epithelial activation/antigen presentation**

- Bacteria
- Fungi
- Viruses
- Proteases
- Allergens

**Sinonasal epithelium**

1. Anti-IL-25, anti-IL-33, & anti-TSLP pathways

2. Anti-IL-5 pathway

3. Anti-IL-4/IL-13 pathway

4. Anti-IgE pathway

5. Anti-Siglec-8 pathway

6. Anti-platelet pathway

**Chemokines attracting lymphocytes**

- B cell-rich lymphoid aggregate with plasma cells

**B cells**

- Chemokines attracting B cells

**Dendritic cells**

- Antigen interacting with APC

**Platelets**

- Chemokines attracting lymphocytes

**Mast cells**

- IL-33R
- TSLP-R

**Neutrophils**

- Siglec-8
- IL-25R

**Eosinophils**

- IL-33R
- TSLP-R

**Basophils**

- IL-33R
- TSLP-R

**Inflammation/Edema**

- IL-5
- IL-4/IL-13
- Siglec-8

**Th2 cells**

- IL-33R
- TSLP-R

**Th0 cells**

- IL-25R
- IL-33R

**ILC2s**

- IL-25R
- IL-33R

**IgG**

**IgA**

**IgE**

**Antigen interacting with APC**

**Anti-Siglec-8**

**Anti-IL-5**

**Anti-IL-4/IL-13**

**Anti-IgE**

**Anti-platelet**