Laryngeal granuloma

Introduction

- Laryngeal granuloma: granulomatous disease of the larynx
- Term used for laryngeal granuloma: contact ulcer, contact granuloma, vocal process granuloma, peptic granuloma ……

Historical perspective

- 1928 Chevalier Jackson
  superficial ulceration along the post. border of on or both sides of larynx
  >> “contact ulcer”
- 1935 Jackson and Jackson
  result from vocal abuse, most commonly :Men
- 1932 Clausen: first report of postintubation granuloma
- 1949 New and Devine
  contact granuloma from endotracheal intubation>>more common :women
- 1950s Ballenger and Ballenger: voice abuse >>primary cause of the granuloma
  predisposing factors irritation from dust, URI, cough, smoke, alcohol…. 
- 1967 Cheery and Margulies (high recurrence rata after surgical removal)
  pharyngolaryngeal reflux as pathogenesis
- 1960s Cherry and Delahunty: experiment on dogs (gastric juice)

Diagnosis

- 1928 Jacksons
  Symptoms: Hoarseness (91%) sensation of lump(47%) Dyspnea (18%)
  cough(12%) hemoptyisis (6%)
- Macroscopically: proliferative tissue emenating from the vocal cord
  Color: pale gray to dark red, 2-15 mm, polypoid, nodular, fungating or ulcerated
- Typical location of the laryngeal granuloma: posterior aspect of the vocal cords
  (uncommon site for SCC)

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<th>Table 2. Differential diagnosis</th>
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<td>Tuberculosis</td>
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<td>Coccioidiomycosis</td>
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<tr>
<td>Blastomycosis</td>
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<td>Wegener’s granulomatosis</td>
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<td>Scleroma (rhinoscleroma)</td>
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<td>Syphilis</td>
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<td>Leprosy</td>
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<td>Crohn’s disease</td>
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<td>Squamous cell carcinoma</td>
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Histopathology

- Granulation tissue: new connective tissue and tiny blood vessels that form on the surface of a wound during the healing process
- Granuloma: a tumor composed of granulation tissue resulting from injury, inflammation or infection
- 1990 Wenig et al (105 cases)
  Epithelial hyperplasia with proliferation of underlying granulation tissue. Inflammatory changes include acute and/or chronic inflammatory cells, as well as with giant cell reaction.
  Mitoses are rarely presents, and fibrosis may be a prominent feature.

Etiology:

<table>
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<th>Table 5. Proposed causes for contact granuloma.</th>
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<td>Mechanical</td>
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<td>- Vocal trauma</td>
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<td>- Nonvocal laryngeal trauma</td>
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<td>1. Intubation injury</td>
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<td>2. Surgical trauma</td>
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<td>- Gastroesophageal reflux</td>
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<td>- Infectious</td>
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<td>- Postnasal drainage</td>
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<tr>
<td>- Allergic</td>
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<td>- Idiopathic</td>
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A. Mechanical

1. Vocal trauma

- 1960 von Leden and Moore:
  excessive speaking in a low-pitched macho voice
- 2000 Koufman: the granuloma developed from hyperkinetic compensation for the hypokinetic vocal fold paresis
  Arytenoid granuloma: in patients with unilateral laryngeal paralysis

2. Non vocal laryngeal trauma
1980 Ward et al: habitual throat clearing >> the cause of granuloma

3. intubation injury

✓ 1994 Santos et al: postextubation laryngeal examination (99 patients)
94% erythema, 76% ulceration
44% laryngeal granuloma, after an average 4 weeks after extubation
   Most intubation-induced granuloma spontaneously heal >> unrecognized

✓ (vocal process of the arytenoid cartilage) traumatic injury → secondary healing
   and slow healing process if the basement membrane layer has been destroyed +/-
   secondary infection → perichondritis → granuloma formation (sessile, pedunculated)

4. Surgical trauma: posterior laser cordectomy

B. Inflammatory

1. Gastroesophageal reflux

✓ 1960s Delahunty and Cheery: gastric juice to the dogs
✓ 1989 Miko: antacid and antireflux therapy was effective than the traditional methods
✓ 2002 Ylitalo: (24 hour pH meter)
   acid reflux: 17/26 cases with laryngeal granuloma/ 5/19 control group

2. Infection

✓ 1960 Holinger and Johnston: 28% patients of contact granuloma had onset of symptoms at the time of an URI
✓ infection may not be primary cause of contact granuloma but may indirectly instigate behavior leading to granuloma formation

3. Allergy and postnasal drainage
   sensitize laryngeal mucosa to damage
   provide an irritative stimulus cough and throat clearing

4. idiopathic

✓ 1994 McFerran et al: 26% idiopathic
✓ More exacting pH measurements >> some of the idiopathic cases would have been reconsidered as caused by reflux

Clinical Approach

1. rule out neoplasm: histological exam or close follow-up?
2. Ensure airway patency: dyspnea → surgical removal
3. Symptomatic relief

**Treatment**

1. **voice therapy**
   - voice rest for months >> “regimen of silence”
   - 1947 Peacher and Holinger voice therapy
   - voice therapy alone has better results than surgery followed by vocal rest
   - 1981 Bloch et al: relaxation exercise >> 71% successful (12 to 17)
   - 1980 Ward et al: voice therapy >> only useful for voice abuse and habit of clearing throat

2. **Management of gastroesophageal reflux**
   - avoid large and late meals, avoid reflux induced agents (PPI, H2 blocker)
   - PPI (Proton pump inhibitor) is more efficient than anti-histaminic H2
   - Proton pump inhibitor for 2,4,6 months + antireflux behavior

   - Koichi Tsunoda et al: Lifestyle modification
     - overnight pH monitor >> decreased in total esophageal acid exposure
   - 1994 Koufman: the resolution of granuloma: take as long as 6-8 months

3. **Surgery**
   - High recurrence rate
     - 1999 Ylitalo et al: trauma of surgery may delay recovery
   - Surgical indication: (1) airway obstruction (2) histopathological diagnosis
   - 1949 New and Devine removal part of the vocal cord if it was exposed
   - 1994 McFerran et al aggressive resection was suggested
   - CT: ossification of the arytenoid cartilage secondary to overlying perichondritis
   - Most: suggested less aggressive surgical approach
     - Use of cold knife excision, CO2 laser and cryotherapy…….
   - CO2 Laser: precision and limit bleeding (thermal injury, destroy the specimen)
     - No significant difference between CO2 laser and traditional method
   - Cryotherapy (1988 Jaroma, 2.7 recurrences per patient)
   - 2004 Stephen et al: Pulse dye laser (PDL) 10 patients
   - Dermatologist (for cutaneous vascular lesion)
PDL energy penetrates epithelium without damaging it
Result (10 patients): 5 resolution, 3 partial response, 2 unchanged

4. Antibiotics
clinically observations without support from critically evaluated study
✓ 1998 Hynes:
evaluated blood of patients with laryngeal granuloma for Ab to Helicobacter pylori
positive: give clarithromycin+ metronidazole>>without supportive data

5. Steroids
✓ 1989 Jaroma: The recurrence rate: surgical only and op+ post op steroid and
antibiotics >> similar
✓ Systemically, oral, intralesional steroid injection, inhalation steroid….
✓ 1983 Iwamura et al: surgical removal +local injections of steroid in to the
granuloma >>85% disappear after one year
✓ Hwan-Jung Roh et al:
   Inhalant budesonide (Pulmicort, nasal): qid, 2 spray/each time (400 mg daily)

6. Irradiation
✓ 1991 Harari et al 1200 cGy immediately after excision for multiple recurrent
contacte granuloma >> no recurrence with 3-year follow-up
✓ 1998 Mitchell support the value of irradiation
✓ 1-3% risk at 30 years of late malignancy develop
✓ Not be used in young patients, previous cancer, high risk for cancer developing
  (smoker)

7. Botulinum neurotoxin injection
   1. inhibitor of hypertonicity
   2. strengthens antagonist muscles
   3. restore balance of forces
✓ 1995 Nasri 10-15 units, thyroarytenoid injection, effective in decreasing the
forceful adduction of the arytenoids
✓ 1999 Emami et al Botex+ steroid injection 10-12U to the thyroarytenoid muscle

8. Membranous vocal fold augmentation
redirect collision forces anteriorly away from the vocal process
use Gelfoam, lipoinjection, collagen injection, throplasty

Conclusion
✓ Most common factor of laryngeal granuloma: trauma to vocal cord and chemical
irrtation of posterior glottis
✓ Management: conservative treatment (anti reflux, voice therapy, steroid…..)
   Surgery removal: airway obstruction or for pathologic diagnosis
Reference
5. Sina Nasri MD, Treatment of vocal fold granuloma using Botulinum toxin type A. Laryngoscope 105:June 1995
11. Henry T Hoffman MD ,vocal process granuloma Head and neck December 2001 1061-1074