Obstructive Salivary Gland Disorders

- Sialolithiasis
- Mucous retention/extravasation
Obstructive SG Disorders:
Sialololithiasis

- Sialololithiasis results in a mechanical obstruction of the salivary duct
- Is the major cause of unilateral diffuse parotid or submandibular gland swelling\(^2\)
Obstruction to the salivary glands is usually seen in the submandibular and parotid glands due to:

- calcified stones (most common in the submandibular gland)
- mucous plugs (most common in the parotid)
- strictures of the duct.
Stone formation is classically due to

• stasis of flow,
• infection,
• and alteration of the duct contents.
• Calcified stones are formed by the precipitation of calcium salts around a
• nidus of mucous plugs, epithelial cells, or microorganisms.
Etiology

- Water hardness ↑likelihood? …Maybe….
- Hypercalcemia…in rats only
- Xerostomic meds
- Tobacco smoking, positive correlation
- Smoking has an increased cytotoxic effect on saliva, decreases PMN phagocytic ability and reduces salivary proteins
Etiology

Gout is the only systemic disease known to cause salivary calculi and these are composed of uric acid.

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Stone Composition

- Organic; often predominate in the center
  - Glycoproteins
  - Mucopolysaccarides
  - Bacteria!
  - Cellular debris

- Inorganic; often in the periphery
  - Calcium carbonates & calcium phosphates in the form of hydroxyapatite
Reasons sialolithiasis may occur more often in the SMG

- Saliva more alkaline
- Higher concentration of calcium and phosphate in the saliva
- Higher mucus content
- Longer duct
- Anti-gravity flow
Clinical presentation

- Painful swelling (60%)
- Painless swelling (30%)
- Pain only (12%)
  - Sometimes described as recurrent salivary colic and spasmodic pains upon eating
Clinical History

- History of swellings / change over time?
- Trismus?
- Pain?
- Variation with meals?
- Bilateral?
- Dry mouth
- Recent exposure to sick contacts (mumps)?
- Radiation history?
- Current medications?
Exam: Inspection

- Asymmetry (glands, face, neck)
- Diffuse or focal enlargement
- Erythema extra-orally
- Trismus
- Medial displacement of structures intraorally?
Exam: Palpation

• Palpate for cervical lymphadenopathy
• Bimanual palpation of floor of mouth in a posterior to anterior direction
  – Have patient close mouth slightly & relax oral musculature to aid in detection
  – Examine for duct purulence
• Bimanual palpation of the gland (firm or spongy/elastic).
Diagnostics: Plain occlusal film

- Effective for intraductal stones, while....
- Intraglandular, radiolucent or small stones may be missed.
Diagnostic approaches

CT Scan:
• large stones or small CT slices done
  also used for inflammatory disorders

Ultrasound:
• operator dependent, can detect small stones (>2mm), inexpensive, non-invasive

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Diagnostic approaches: 
Sialography

- Consists of opacification of the ducts by a retrograde injection of a water-soluble dye.
- Provides image of stones and duct morphological structure
- May be therapeutic, but success of therapeutic sialography never documented
Sialography continued…

- Disadvantages:
  - irradiation dose
  - pain with procedure
  - poss. perforation
  - infection dye reaction
  - push stone further
  - contraindicated in active infection.

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Diagnostic approach: Radionuclide Studies

• Useful to image the parenchyma
• T99 is an artificial radioactive element (atomic #43, atomic weight 99) that is used as a tracer in imaging studies.
• T99 is a radioisotope that decays and emits a gamma ray. Half life of 6 hours.
• Helman & Fox 1987, found that Technitium-99 shares the Na-K-Cl transport system on the basement membrane of the parotid acinar cells.

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Diagnostic Approaches: Radionuclide Studies

- Some say T99 is useful preoperatively to determine if gland is functional.
- However, no evidence to suggest gland won’t recover function after stone removed. Not advised for pre-op decision making!
Diagnostic Approach: 
MR Sialography

• ADV: No dye, no irradiation, no pain
• DIS: Cost, possible artifact
Diagnostic approach: Diagnostic Sialendoscopy

- Allows complete exploration of the ductal system, direct visualization of duct pathology
- Success rate of $>95\%$
- Disadvantage: technically challenging, trauma could result in stenosis, perforation

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Sialolithiasis Treatment

• antibiotics and anti-inflammatory medicines, hoping for spontaneous stone passage.

• Stone excision:
  – Lithotripsy
  – Interventional sialendoscopy
  – Simple removal (20% recurrence)\(^7\)

• Gland excision

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Sialolithiasis Treatment

• If patients defer treatment, they need to know:
  • Stones will likely enlarge over time
  • Seek treatment early if infection develops
  • Salivary gland massage and hyperhydration when symptoms develop.

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Stone excision

- **External lithotripsy**
  - Stones are fragmented and expected to pass spontaneously
  - The remaining stone may be the ideal nidus for recurrence

- **Interventional Sialendoscopy**
  - Can retrieve stones, may also use laser to fragment stones and retrieve.
Gland excision indicated

- Very posterior stones
- Intra-glandular stones
- Significantly symptomatic patients
- Failed transoral approach

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Mucocele

- Mucus is the exclusive secretory product of the accessory minor salivary glands and the most prominent product of the sublingual gland.
- The mechanism for mucus cavity development is extravasation or retention
Mucocele

- Mucoceles, exclusive of the irritation fibroma, are most common of the benign soft tissue masses in the oral cavity.
- *Muco*: mucus, *coele*: cavity. When in the oral floor, they are called ranula.
Mucocele

**Extravasation** is the leakage of fluid from the ducts or acini into the surrounding tissue.

*Extra*: outside,  *vasa*: vessel

**Retention**: narrowed ductal opening that cannot adequately accommodate the exit of saliva produced, leading to ductal dilation and surface swelling. Less common phenomenon
Mucocele

- Consist of a circumscribed cavity in the connective tissue and submucosa producing an obvious elevation in the mucosa.
Mucocele

• The majority of the mucoceles result from an extravasation of fluid into the surrounding tissue after traumatic break in the continuity of their ducts.

• Lacks a true epithelial lining.
Ranula

• Is a term used for mucoceles that occur in the floor of the mouth.
• The name is derived form the word *rana*, because the swelling may resemble the translucent underbelly of the frog.
Ranula

- Although the source is usually the sublingual gland,
  - may also arise from the submandibular duct
  - or possibly the minor salivary glands in the floor of the mouth.
Ranula

• Presents as a blue dome shaped swelling in the floor of mouth (FOM).
• They tend to be larger than mucoceles & can fill the FOM & elevate tongue.
• Located lateral to the midline, helping to distinguish it from a midline dermoid cyst.
Plunging or Cervical Ranula

• Occurs when spilled mucin dissects through the mylohyoid muscle and produces swelling in the neck.
• Concomitant FOM swelling may or may not be visible.
Treatment of Mucoceles in Lip or Buccal mucosa

- Excision with strict removal of any projecting peripheral salivary glands
- Avoid injury to other glands during primary wound closure
Ranula Treatment

• Marsupialization has fallen into disfavor due to the excessive recurrence rate of 60-90%
• Sublingual gland removal via intraoral approach

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Thank You

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