Sialadenitis / Sialolithiasis Imaging

Ultrasound, CT, and Others

William Ryan, MD
Assistant Professor
Head and Neck Oncologic/Endocrine/Salivary Surgery
Department of Otolaryngology-Head and Neck Surgery

PURPOSES OF IMAGING

Establishing Diagnosis – Etiology
- Sialolith
- Stenosis
- Inflammation / Fibrosis
- Tumor, Cyst
- Single Gland / Generalized

Disclosures
Consultant for Medtronic
Establishing Diagnosis – Etiology

- Sialolith
- Stenosis

- Size (Number) of Sialolith(s)
  >4-7mm – OPEN (combination)

- Location of Sialolith(s) / Stenosis(es)
  Parotid, Submandibular
  Distal, Proximal, Parenchymal

Determine Indication for:

Observation / Conservative Measures

Referral (oral medicine, rheumatology, neurology, etc)

Sialendoscopy

Transoral Open

Transcervical/Transfacial Open Combination

Sialadenectomy

Location of Sialolith (Stenosis) -> Treatment

Distal:
  Transoral or Sialendoscopy

Proximal:
  Sialendoscopy or Transoral
  Transcervical / Transfacial Combined Approach

Parenchymal:
  Transcervical / Transfacial Combined Approach or
  Sialadenectomy
Modalities

Ultrasound
(Ultrasound Guided Sialendoscopy / Sialithotomy)

CT neck

Others:
Head / Dental X-ray
MRI
Sialogram
MR Sialogram

Modalities

Ultrasound
(Ultrasound Guided Sialendoscopy / Sialithotomy)

CT neck

Others:
Head / Dental X-ray
MRI
Sialogram
MR Sialogram

Ultrasound and CT

Common place / available
Interpretable
Establishing Diagnosis - Etiology
Location (Number)
Determining Treatment

Ultrasound Advantages

7.5-13 MHz linear probe
High Resolution has improved sensitivity
Cheaper
Efficient
Non-invasive
No radiation
Surgeon-performed / In-clinic
Dynamic (real time / intraoperative)
Dynamic dilation (with sialagogues)
Better lymph node definition
Easy repeat follow up (extension of physical exam)
Ultrasound Disadvantages

- Sensitivity: 77-81%
- Specificity: 94-95%
- PPV: 94%
- NPV: 78%
- Accuracy: 85-86%

Can't totally rule out sialolithiasis
No deep parotid lobe evaluation
Operator dependent

CT Neck Advantages

- Need 1 mm slices
- NON-CONTRAST BETTER
- Less Operator Dependent
- More Sensitive
- Precise location of sialoliths
- Better floor of mouth definition
- Better tumor / infiltrative process delineation

CT Neck Disadvantages

- False positives
- Less ductal definition
- Radiation (more with contrast)
- Expensive
- Another visit
Submandibular Ultrasound
Parotid Ultrasound
Intraoperative Ultrasound Guided Sialendoscopy/Sialolithotomy

- Updated Imaging At Time of the Procedure
- Intraoperative Sialolith / Stenosis Location
- Intraoperative Sialolith Removal Confirmation
  - Sialendoscope / Forceps Guidance (Retrieval / Fragmentation)
  - Needle Catheter Insertion
Dynamic Assessment

Finger Floor of Mouth Manipulation

Finger Floor of Mouth Manipulation
Intraoperative Sialolith Confirmation (of Removal)

Forceps Guidance (Retrieval / Fragmentation)

Stentendoscopy Guidance

Transfacial Ultrasound-Guided Gland-Preserving Resection of Parotid Sialoliths

William W. Carroll, MD\textsuperscript{1}, Rohan R. Walvekar, MD\textsuperscript{2}, and M. Boyd Gillespie, MD\textsuperscript{1}
Submandibular CT
Tonsilith

Parotid CT
MRI

Sometimes an incidental finding
Better Soft Tissue Definition
Better Parotid (Deep) Evaluation
Tumor Type Prediction
No Radiation
Expensive
Time-Consuming
Claustrophobia
Contraindications: Pacemakers, etc
Less PPV / NPV
Sjogren’s

Carcinoma

X-rays
Sialography
Sialography

Old Gold Standard
Better / Comprehensive
- Sialolith size/ location
- Duct morphologic structure
Sjogren’s - Diagnostic
Sometimes therapeutic

**Drawbacks:**
- Invasive
- Irradiation
- CAN PUSH STONE UP FURTHER
- Perforation / Infection / Pain
- Anaphylactic shock
MR Sialography

- T2 pulse sequence
- Non-invasive
- No contrast
- No irradiation
- No pain

- Time-consuming (45 mins)
- Expensive
- Claustrophobia
- Dental artifacts
- Misses very small stones (CT better)

Note: Misses very small stones (CT better).
A Comparison of Parotid Imaging Characteristics and Sialendoscopic Findings in Obstructive Salivary Disorders

Rawan Kiringoda, MD; David W. Eisele, MD; Julie L. Chang, MD

Objectives/Hypothesis: To examine how preoperative imaging characteristics correlate with sialendoscopic findings and operative outcomes in patients with obstructive parotid syndrome.

Study Design: Retrospective review.

Methods: We identified 112 consecutive patients who underwent 136 unilateral or bilateral parotid gland sialendoscopies between December 2005 and August 2012. We reviewed clinical history, radiographic imaging and reports, operative reports, and clinical outcomes. Available preoperative computed tomography (CT) or magnetic resonance imaging (MRI) were analyzed for parotid stone size and location relative to the masseter muscle.

Results: For patients with parotid stone on preoperative imaging, at least one stone was found on sialendoscopy in 63% of cases. In contrast, for all cases with preoperative imaging negative for stone, no stone was found on sialendoscopy suggesting that parotid stones are not radiolucent on CT imaging. Furthermore, stones located anterior to the masseter were more successfully visualized on sialendoscopy compared to stones located posterior to the masseter. Anteriorly located stones were also more accessible for endoscopic management, whereas posterior stones required combined approaches for management.

Conclusions: Preoperative imaging characteristics such as stone presence, size, and location provide essential information that can guide surgical planning and clinical outcome expectations for obstructive parotid disease management. All parotid CT scans that failed to demonstrate stones on imaging had no stone found on sialendoscopy. Stones posterior to the masseter muscle are the most difficult to access with sialendoscopy, and in these cases, patients should be counseled about the potential need for a translabial approach to remove symptomatic stones.

112 patients with chronic parotitis

CT, MR, U/S, Sialography scans
Positive and negative for sialoliths
63% PPV for endoscopic visualization
100% NPV for sialoliths

<p>| Causes for Inability to Access Stone on Sialendoscopy Based on Location. |
|-------------------------------------------------|------------------|</p>
<table>
<thead>
<tr>
<th>Anterior to Masseter</th>
<th>Along Masseter</th>
<th>Posterior to Masseter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total patients, n</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Stone size, mm, average ± SD</td>
<td>6.4 ± 2.4 6.2 ± 3.1 4.7 ± 2.0</td>
<td></td>
</tr>
<tr>
<td>Inaccessible on sialendoscopy, n</td>
<td>1 (7%) 6 (43%) 12 (100%)</td>
<td></td>
</tr>
<tr>
<td>Lack of access, n</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stenosis or stricture, n</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Prior abscess or active purulence, n</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>No stone seen, n</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Repeat procedure needed, n</td>
<td>3 (20%) 4 (29%) 4 (33%)</td>
<td></td>
</tr>
</tbody>
</table>

Describes number of cases with percentages as marked.
SD = standard deviation.
CONCLUSIONS

Ultrasound – Adequate
- Inexpensive / In clinic

CT Scan – Highly sensitive / thorough
- Expensive / Radiation

MRI / Sialography / MR Sialography
- Interpretable
- Possibly More Accurate
- Expensive
- May Not Change Management

CONCLUSIONS

Location of Sialolith (Stenosis) Dictates Treatment / Expectations

- Distal: Transoral or Sialendoscopy

- Proximal: Sialendoscopy or Transoral or Transcervical / Transfacial Combined Approach

- Parenchymal: Transcervical / Transfacial Combined Approach or Sialednectomy

THANK YOU