Salivary Calculi

- Males > females
- Peak incidence between 30-60 years of age
- Multiple calculi in 25% of cases
- Bilateral calculi in approximately 2% of cases


Distribution of Salivary Calculi
- Submandibular gland 80-90% 1
- Parotid gland 5-20% 1
- Sublingual gland rarely


Location of calculi

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distal half of main duct</td>
<td>50.3%</td>
</tr>
<tr>
<td>Proximal half of main duct</td>
<td>18.7%</td>
</tr>
<tr>
<td>Hilus and intraglandular</td>
<td>31.0%</td>
</tr>
</tbody>
</table>


Salivary Calculi

- Bright (hyperechoic) curvilinear focus with posterior shadowing
- If calculus <2mm in diameter, acoustic shadow may be missing
- Salivary stimulation may make small calculi easier to identify
- Duct dilation
- Gland hypoechoic
- Hypervascular
Parotid calculi

Pre contrast

Post contrast

Salivary Strictures

Incidence at sialography
- Salivary strictures account for 22% of cases of salivary obstruction
- 75% arising in the parotid gland
- 7% of patients presented with bilateral stenoses
- 72% of stenoses in females


Bacterial Sialadenitis

- Hypoechoic / heterogeneous gland parenchyma
- Enlarged intraglandular nodes (parotid)
- Hypervascularisation
- May be abscess
- May be calculus (50% of adult cases)
- Salivary duct dilation
Juvenile Recurrent Parotitis

- Multiple small hypoechoic round foci
- Gland hypervascular

Sjögren’s syndrome

- Parenchyma heterogeneous with multiple scattered small hypoechoic or anechoic areas
- May be multiple small cysts
- Hypervascular in the acute phase
- In later stages glands become small
- For hypoechoic lesions larger than 2cm and for rapidly growing lesions consider MALT lymphoma and carry out biopsy

Sjögren’s syndrome

- Objective salivary gland involvement:
  - Focal lymphocytic sialadenitis in minor salivary glands (by biopsy)
  - Plus one positive finding from one of the following
    - Unstimulated whole salivary flow (≤1.5ml/15min)
    - Parotid sialography
    - Sialoscintigraphy

**Sjögren’s syndrome**

- US is more sensitive than sialography as a diagnostic test in patients with suspected SS.


- We agree the scientific evidence supports the substitution of SGUS in the AEC criteria for both sialography and salivary scintigraphy.


**MALT lymphoma**

- Subset of B-cell non-Hodgkin’s lymphoma
- Enlarged glands
- Multiple hypoechoic foci with increased vascularity

**Salivary tumours**

- Uncommon: 2-10% of head and neck neoplasms
- 70% in the parotid gland, 8% in the submandibular gland
- 70-80% of tumours are benign
- 75-90% are either pleomorphic adenoma or Warthin’s tumour (adenolymphoma)

**Pleomorphic Adenoma**

- Hypoechoic
- Often lobulated
- Well defined margins
- Acoustic enhancement common
- Moderate vascularisation
- Peripheral flow pattern has been described
- May contain calcifications
- Rapid growth of formerly stable mass is suspicious for Carcinoma ex pleomorphic adenoma (5% of cases)
Accessory Parotid Gland

- 21%-56% have an accessory parotid gland


Warthin’s tumour

- Hypoechoic
- Well defined margins
- May be lobulated, oval or irregular in shape
- Cystic components present
- More common in the tail of the parotid
- Multiple in up to 30% of cases
- Acoustic enhancement less common
Malignancy

<table>
<thead>
<tr>
<th>Gland</th>
<th>% of malignant tumours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parotid</td>
<td>20-30%</td>
</tr>
<tr>
<td>Submandibular</td>
<td>45-60%</td>
</tr>
<tr>
<td>Sublingual</td>
<td>70-85%</td>
</tr>
<tr>
<td>Minor salivary glands</td>
<td>49-80%</td>
</tr>
</tbody>
</table>

Malignant tumours

- **Mucoepidermoid Ca**
  - Most common malignancy of the salivary glands
  - Most common malignancy in the parotid gland
  - Second most common malignancy in the submandibular gland

- **Adenoid cystic Ca**
  - Second most common salivary malignancy
  - Most common malignancy in submandibular gland and sublingual gland

- **Acinic cell Ca**
  - Second most common parotid malignancy

Malignant tumours

- Irregular shape
- Ill-defined and irregular margins
- Heterogeneous
- Hypervascular and chaotic pattern of flow
- May be acoustic shadowing
- Abnormal lymph nodes
- However small lesions and low grade tumours such as mucoepidermoid Ca often appear ‘benign’ on US
Lymph node metastasis to the parotid

- Malignant melanoma
- Sq Cell Carcinoma
- Breast
- Lung

Nodes drain anterior face, lateral scalp and EAM

Can US confidently distinguish benign and malignant lesions?

'The sonographic characteristics of parotid masses between benign and malignant lesions had no significant differences.'


Can US confidently distinguish benign and malignant lesions?

- High vascularisation and high systolic peak flow should raise the possibility of malignancy.
- Evaluation of tumour vascularisation using colour Doppler sonography and pulsed Doppler sonography cannot differentiate benign and malignant tumours with certainty.'


Can US confidently distinguish benign and malignant lesions?

'US can accurately differentiate benign from malignant lesions. There is an overlap in features of pleomorphic adenoma and Warthin’s tumours and some benign and malignant conditions.'

There is overlap in the US appearance of salivary masses, therefore biopsy is required

Others:

Mucous retention Cyst

- Arise from the sublingual gland
- Well defined hypoechoic mass
- Acoustic enhancement present
- Important to describe the relationship to the mylohyoid muscle

Herniation of the mylohyoid muscle

<table>
<thead>
<tr>
<th>Grade</th>
<th>Degree of sublingual gland penetration</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>Thinning of mylohyoid muscle, vertical reduction in muscle thickness during swallowing, no signs of glandular penetration</td>
<td>40%</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Herniation of gland during swallowing, normal anatomical features at rest</td>
<td>17%</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Constant hiatus in the mylohyoid muscle with permanent herniation of the sublingual gland</td>
<td>2%</td>
</tr>
</tbody>
</table>

Thank you for listening