Radiologically guided balloon sialoplasty for benign salivary duct obstruction: a 7-year UK service evaluation.

Dr Jake Cowen, Dr Muhammad Ali, Mrs Roma Dave, Dr Joe Woodhouse, Mr Anand Rajiv, Mr Costa Repanos, Professor Peter A Brennan, Dr Jasper Bekker
Queen Alexandra Hospital, Portsmouth Hospitals University NHS Trust

Background

• Obstructive sialadenitis is the most common cause of non-malignant salivary gland disorders with salivary gland strictures being responsible for approximately 23% of cases [1,2].

• Symptomatic sialadenitis is responsible for 27.5 hospital admissions per million per year in the UK [1,2].

• Significant advances in minimally invasive techniques such as radiology guided balloon sialoplasty offer the potential of successful treatment with reduced complications [3].

• At present, there is a paucity of follow-up data regarding patient outcomes and repeat intervention in those undergoing the procedure.

Methods

Patient identification and analysis

• 44 patients underwent radiologically guided balloon sialoplasty at Queen Alexandra Hospital, Portsmouth, UK between 2015–2022.

• Patients with obstructive salivary gland disease were identified for intervention after referral to the ENT/maxfac department for salivary gland swelling.

• Patients were then referred to the radiology department for a sialogram +/- sialoplasty.

• Inclusion criteria:
  - Obstructive parotid or submandibular sialadenitis secondary to a visible stricture at sialogram
  - Patient physically capable of undergoing sialoplasty procedure
  - Written and informed consent gained.

• Patient data was collected prospectively. Cohort analysis was performed retrospectively using SPSS. All identifiable patient data was anonymised at the time of data collection.

Results

Key Results

• 44 patients proceeded to initial sialoplasty.

• The average age of the patient undergoing the procedure was 57.8 years, with 64% of patients being female and 36% male.

• 89% (n=39) of patients underwent sialoplasty for parotid gland disease.

• A minority (n=8) received intervention for submandibular gland stricture.

• Success – determined by improvement of contrast flow through the previously stenosed duct seen on post-procedure sialography was seen in 84% of cases.

• 82% and 100% of parotid and submandibular gland obstructions were successfully treated, respectively.

• Follow up imaging was performed on 59% (n=26) of patients who underwent sialoplasty.

• Mean time to follow up imaging was 4.7 months.

• 5 patients required a second sialoplasty, with the mean time to follow up procedure 15.8 months (range, 6·31, SD 11.39).

• No patients to date have required a third procedure.

• Complications were seldom with 4.5% (n=2) of patients having immediate and 2.6% (n=1) of patients having a delayed complication post-procedure.

• 85% (n=17) of successfully treated patients who were followed-up in clinic described complete resolution of their symptoms. The remaining patients described at least partial resolution.

Table 1. Demographics of patients undergoing radiologically guided balloon sialoplasty.

<table>
<thead>
<tr>
<th>N</th>
<th>All patients</th>
<th>Parotid gland obstruction</th>
<th>SMG obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>44</td>
<td>39</td>
<td>5</td>
</tr>
<tr>
<td>Age (mean)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57.8</td>
<td>57.1</td>
<td>63.4</td>
<td></td>
</tr>
<tr>
<td>Sex (male) (%)</td>
<td>16 (36.4)</td>
<td>14 (35.9)</td>
<td>2 (40.0)</td>
</tr>
<tr>
<td>Sex (female) (%)</td>
<td>28 (63.6)</td>
<td>25 (64.1)</td>
<td>3 (60.0)</td>
</tr>
<tr>
<td>Side of disease (R/L)</td>
<td>24/20</td>
<td>23/16</td>
<td>1/4</td>
</tr>
</tbody>
</table>

Procedure details

• A screening sialogram was initially performed to confirm obstructive stricture.

• With the patient in the supine position, the buccal or sublingual mucosa was infiltrated with a combination of lidocaine and adrenaline 1:80,000.

• Further lidocaine was instilled along the duct lumen and the duct then flushed with antiseptic 4% + 1:100,000.

• A Terumo™ or Nitrex® wire and low profile (2 mm or 2.5 mm) angioplasty balloon was inserted along the duct lumen.

• Serial inflations were then performed at the stricture site.

• Post-sialoplasty images were then acquired and procedure deemed a success if sialography demonstrated good flow post-procedure.

• A 3mg of dexamethasone was administered into the duct lumen.

Conclusions

1. Radiologically guided balloon sialoplasty for the treatment of benign obstructive sialadenitis secondary to a gland stricture is a safe and effective method for eliminating the obstruction and relieving patient symptoms.

2. The majority of patients (>80%) are symptom free at 3-6 months, suggesting no routine follow-up imaging may be both safe and appropriate to prevent unnecessary radiation exposure and reduce non-attendance rates.

3. Follow-up data suggests a minority of patients will need a second sialoplastical procedure, but the need for further interventions beyond this are rare.

4. Our results are comparable with limited evidence to date regarding the success rate, mid-term recurrence and complication rate of the procedure, performed instead by a head and neck radiologist rather than predominantly dental radiologists in the current literature [4].

References


Table 2. Patient outcomes from radiologically guided balloon sialoplasty.

<table>
<thead>
<tr>
<th>N</th>
<th>All patients</th>
<th>Parotid gland obstruction</th>
<th>SMG obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean procedure time (min)</td>
<td>17.5</td>
<td>17.8</td>
<td>12.0</td>
</tr>
<tr>
<td>Successful</td>
<td>37 (84.0)</td>
<td>32 (80.2)</td>
<td>5 (100.0)</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>7 (15.9)</td>
<td>7 (17.9)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Immediate complication</td>
<td>2 (4.5)</td>
<td>2 (5.1)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Delayed complication</td>
<td>1 (2.3)</td>
<td>1 (2.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Follow-up procedure</td>
<td>5 (11.4)</td>
<td>5 (12.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Mean time to follow up scan (n=23) (months) (SD)</td>
<td>4.3 (2.3)</td>
<td>5.5 (2.3)</td>
<td>5.0 (3.4)</td>
</tr>
</tbody>
</table>

| Mean time to follow up procedure (months) (SD) | 15.8 (11.39) | 15.8 (11.39) | N/A |

All data provided as N - number of patients, and (%) unless otherwise stated. SD, standard deviation.

Table 3. List of immediate and delayed complications of sialoplasty procedure

Immediate complication | N
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasovagal episode</td>
<td>1</td>
</tr>
<tr>
<td>Weakness in the zygomatic branch of the facial nerve distribution</td>
<td>1</td>
</tr>
</tbody>
</table>

Delayed complication

Post-procedure infection requiring hospitalisation | 1

A 66-year-old woman with right parotid gland swelling and pain. Sialographic images demonstrate a short high-grade stricture of the right parotid duct at the junction of the intra- and extra-glandular duct (A), sialoplasty balloon catheter inserted along the duct (B), post-sialoplasty images showing improvement in contrast flow through the duct with resolution of the patient’s symptoms (C).

A 64-year-old woman with left submandibular gland swelling. Initial sialogram demonstrates up to 3 cm high-grade stricture of the extra- and submandibular gland duct (A). Terumo wire inserted and 2mm angioplasty balloon dilated (B). Post sialoplasty image (C) demonstrating improved flow through the duct. Patient symptoms subsequently resolved.