BACKGROUND

Sialolithiasis is one of the most common non-neoplastic pathologies of the salivary glands, occurring in 1.2% of the general population1. 60-80% of sialoliths are found within the submandibular gland (SMG), with an average reported size of 4.9mm2,3.

While sialoendoscopy has recently become widely accepted as the treatment of choice for submandibular gland (SMG) stones <4mm in size, SMG stones >4mm cannot always be effectively removed via sialoendoscopy alone4.

Recently, these stones have been managed using a combined transoral and sialoendoscopic approach (CTA). While this is an improvement over previous non-gland-sparing procedures, symptom recurrence and post-operative lingual nerve damage can be seen as sequelae4,5. The risk for lingual nerve damage is due to its intimate relationship with Wharton’s duct, which lies directly inferior to the lingual nerve as it exits the SMG. 6

In this study we describe Robot-Assisted Sialolithotomy with Sialoendoscopy (RASS) for the management of large (>4mm) hilar SMG stones, and compare preliminary outcomes to those reported for CTA within the English literature. We hypothesize that the use of the robot will provide improved visualization and magnification of the operative field, as well as improved utility of the surgical assistant, thus providing enhanced lingual nerve protection.

HYPOTHESIS

RASS will provide improved lingual nerve protection while maintaining similar procedural success rates in comparison to CTA, in the management of hilar SMG stones >4mm.

METHODS

RASS Technique:
1. The location of the sialolith is palpated and marked in correlation with pre-op non-contrast CT.
2. The Da Vinci Robot is docked after full exposure of the operative field is established.
3. A submucosal incision is made over the marked area using electrocautery.
4. Blunt dissection is performed to identify, preserve, and isolate the lingual nerve from Wharton’s duct.
5. Electrocautery is used to perform sialolithotomy and stone removal.
6. Sialoendoscopy is performed to explore the proximal duct, retrieve any stone fragments or additional stones, and irrigate the duct.

Figure 1. CTA technique. Sialolith seen within Wharton’s duct, while the lingual nerve is retracted laterally.

Figure 2. Large sialolith seen within right SMG.

Figure 3. Identification of the lingual nerve.

Figure 4. RASS. Sialolith seen within Wharton’s duct as lingual nerve is retracted laterally.

RESULTS

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Procedural Success Rate</th>
<th>Lingual Nerve Damage</th>
<th>Patient Satisfaction (scale 1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RASS</td>
<td>100%</td>
<td>0%</td>
<td>9.8</td>
</tr>
<tr>
<td>N=14</td>
<td></td>
<td>2/14 temporary paresthesia</td>
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</tr>
<tr>
<td>CTA</td>
<td>75%</td>
<td>2%</td>
<td>NA</td>
</tr>
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<td>N=137</td>
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CONCLUSIONS

Preliminary data demonstrates the efficacy of RASS in the management of large (>4mm) SMG stones. Moreover, patients had improved procedural success and decreased lingual nerve injury with RASS in comparison to CTA. We suggest the decreased incidence of lingual nerve damage seen with RASS was a result of the improved visualization and magnification of the operative field afforded by use of the Da Vinci Robot as hypothesized. However, the limited study numbers prevent any conclusions of statistical significance from being drawn between RASS and CTA.

FUTURE DIRECTIONS

Results of this study indicate that RASS is of great utility in the management of large SMG stones. Indeed, it may even prove to have superior outcomes to the gland-sparing CTA technique. However, our limited sample size and brevity of the literature regarding CTA prevented any definitive conclusions from being made. Expansion of our case series and sample size in an effort to reach statistical significance is our immediate goal. Furthermore, increased data regarding outcomes with CTA may reveal a higher incidence of lingual nerve damage than originally reported, as not all of the literature reviewed commented specifically on this outcome.

CITATIONS