Background

Sialolithiasis is one of the most common non-neoplastic pathologies of the salivary glands, occurring in 1.2% of the general population. 1

Sixty to eighty percent of sialoliths are found within the submandibular gland (SMG), with an average reported size of 4.9 mm. 2,3

While sialendoscopy has recently become widely accepted as the treatment of choice for SMG stones less than 4 mm in size, SMG stones greater than 4 mm cannot be effectively removed via sialendoscopy alone. 2

Recently, these stones have been managed using a combined transoral and sialendoscopic approach (CTSA). While this is an improvement over previous non-gland-sparing procedures, symptom recurrence and post-operative lingual nerve damage can be seen as sequelae. 4,5 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.

In this study we examined robot-assisted sialolithotomy with sialendoscopy (RASS) for the management of large (>4 mm) SMG stones and compared preliminary outcomes to those reported for CTSA in the English-language literature.

We hypothesized 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.

Long Hypothesis (PICO Criteria)

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

Methods

Fig. 2. Large sialolith seen within right SMG.

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. Sialendoscopy is performed to explore the proximal duct, retrieve any stone fragments or additional stones, and irrigate the duct.

Fig. 3. RASS. Sialolith seen within Wharton’s duct as lingual nerve is retract-ed laterally.

Study Design: A retrospective case series was performed on patients at our institution with palpable SMG stones of >4 mm in size that were managed with RASS. Fourteen patients were identified who presented between October 2012 and January 2014 with a mean stone size of 11.9 mm. Patients were questioned regarding symptoms of recurrence, persistent lingual nerve damage, and subjective procedural satisfaction at a mean follow-up time of 8 months. Primary outcomes of procedural success and persistent lingual nerve damage were compared to CTSA following a review of the English literature. Procedural success was defined as the absence of symptom recurrence with gland preservation.

Results

Procedural Success Rate | Lingual Nerve Damage | Patient Satisfaction
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RASS N = 14 | 100% | 0% (2/14 temporary paresthesia) | 9.8 (1-10)
CTSA N = 137 | 75% | 2% | NA

Discussion/Conclusion

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 CTSA technique. However, our limited sample size and paucity of the literature regarding CTSA 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 CTSA may reveal a higher incidence of lingual nerve damage than originally reported, as not all of the literature reviewed commented specifically on this outcome.

Future Direction

Preliminary data demonstrate the efficacy of RASS in the management of large (>4 mm) SMG stones. Moreover, patients had improved procedural success and decreased lingual nerve injury with RASS in comparison to CTSA. 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 the 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 CTSA.

ABSTRACT

Outcome Objectives:

1. Describe robot-assisted sialolithotomy with sialendoscopy (RASS) for the management of large submandibular gland (SMG) stones.
2. Analyze symptom recurrence and lingual nerve damage following RASS in comparison to the combined transoral sialendoscopic approach (CTSA).

Methods:

A retrospective case series was performed on patients with large palpable SMG stones managed with RASS. Large stones were defined as >4 mm in size, the upper limit that can be removed via sialendoscopy. Fourteen patients who presented between October 2012 and January 2014 with mean stone size of 11.9 mm were identified. Patients were questioned regarding symptom recurrence, symptoms of lingual nerve damage, and procedural satisfaction at mean follow-up of 8 months. Procedural success was defined as absence of symptom recurrence in conjunction with gland preservation. These measures were compared to reported outcomes with CTSA in the English-language literature.

Results:

Procedural success was 100% (14/14) for our series. No patients reported symptoms of lingual nerve damage at the time of follow-up, while two patients reported transient lingual nerve paresthesia (mean duration 2.5 weeks). Mean patient satisfaction was 9.8 on a scale of 10. Literature review identified 137 patients that underwent CTSA for large SMG stones between 2005 and 2011. Procedural success rate for these patients was 75.0%. When commented on, lingual nerve damage was reported in 2% of patients.

Conclusion:

Preliminary data in the management of large SMG stones with RASS show improved procedural success in comparison to CTSA. Furthermore, the morbidity of lingual nerve damage seen in CTSA has yet to be encountered with RASS, likely due to improved visualization.

Citations