Critically Appraised Topic (CAT)

Project Team:
8A2
Project Team Participants:
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Clinical Question:
What is the progression and maintenance of salivary gland disease and its effect on dental management
PICO Format:
P:
Patients with submandibular sialolithiasis
I:
Less invasive techniques such as transoral stone removal, edoscopy or lithotripsy
C:
Submandibular gland resection
O:
Better outcome for the patient
PICO Formatted Question:
In patients with submandibular sialoliathiasis, do less invasive techniques such as transoral stone removal, edoscopy or lithotripsy versus submandibular gland resection result in better outcomes for the patients?
Clinical Bottom Line:
For submandibular salivary stones that are smaller in diameter (around 9mm), the less invasive the procedure the better, as you avoid potential nerve damage as well as providing a better aesthic outcome. For larger stones, conservative measures should be tried, but if problems persist or the stone is unable to be removed, gland resection might be the only option. The largest stone removed via transoral removal that I saw was 10 mm. Further research must be done for conservative methods of larger submandibular salivary stones.
Date(s) of Search:
11/02/20
Database(s) Used:
PubMed
Search Strategy/Keywords:
Sialolithiasis, submandibular gland resection, edoscopy
MESH terms used:
Endoscopy, Submandibular gland disease, Treatment outcome, Human
Article(s) Cited:

1. Zenk J, Koch M, Klintworth N, König B, Konz K, Gillespie MB, Iro H. Sialendoscopy in the diagnosis and treatment of sialolithiasis: a study on more than 1000 patients. Otolaryngol Head Neck Surg. 2012 Nov;147(5):858-63. doi: 10.1177/0194599812452837. Epub 2012 Jun 29. PMID: 22753615.

2. Jadu, Fatima M, and Ahmed M Jan. "A meta-analysis of the efficacy and safety of managing parotid and submandibular sialoliths using sialendoscopy assisted surgery." *Saudi medical journal* vol. 35,10 (2014): 1188-94.

3. Xiao JQ, Sun HJ, Qiao QH, Bao X, Wu CB, Zhou Q. Advantages of submandibular gland preservation surgery over submandibular gland resection for proximal submandibular stones. Oral Surg Oral Med Oral Pathol Oral Radiol. 2018 May;125(5):e113-e117. doi: 10.1016/j.oooo.2017.12.009. Epub 2017 Dec 29. PMID: 29530607.

4. Eun, Y.G., Chung, D.H. and Kwon, K.H. (2010), Advantages of intraoral removal over submandibular gland resection for proximal submandibular stones. The Laryngoscope, 120: 2189-2192. doi:10.1002/lary.21120

Study Design(s):

1: Case Series (5)

2: Meta Analysis (1a)

3: Randomized Control Trials (1b)

4: Randomized Control Trials (1b)

Reason for Article Selection:

1. Gave percentages of success rates for different techniques and combinations of the techniques.

2. This was a meta-analysis that looked at some of the complications of total gland resection and also at the benefits and safety of conservative gland surgery.

3. This was a randomized control trial that directly compared sialendoscopy assisted conservative removal and traditional SMG resection for the removal of submandibular stones.

4. This was a randomized control trial that compared transoral stone removal and SMG resection.

Article(s) Synopsis:

1. This article looked at 1154 patients with either submandibular or paratoid salivary stones from 2003 to 2008. It examined the long term success rates of different gland saving techniques for stone removal, including transoral stone removal, extracorporeal shockwave lithotripsy, and sialendoscopy. Total gland removal was also looked at in the study if there was not long term success from the above mentioned techniques. In submandibular sialolithiasis, transoral stone removal was the most used option to remove the stone, with only 4% of cases needing submandibular gland removal. Extracorporeal shockwave lithotripsy was the most common technique used for paratoid stone removal, although edoscopy and inscisional technique were also used at least 20% of the time. The success rate was above 75% for all techniques with only 4% of patients

needing paratidectomy. Endoscopy was successful on submandibular stones with a mean diameter of 4.9mm, endoscopy with transoral stone removal or ESWL was successful for submandibular stones with a mean diameter of 7.6mm and transoral stone removal was successful in submandibular stones that were a mean diameter of 9.1mm. The conclussions reached in this study found that transoral stone removal was the treatment of choice for submandibular stones if they could not be mobilized within a few minutes via edoscopy. This study also said the ideal sites for transoral submandibular stone removal are the distal duct or the hilar region of the gland.

2. This study was a meta-analysis that looked at articles from 2003 to 2014 dealing with the safety and efficacy of different techniques of salivary stone removal. The article goes on to say that stones larger than 7mm should not be removed conservatively. Round stones are also more congenial to conservative removal than irregular stones are. Asymptomatic stones should be managed conservatively and stones located in the primary or distal portion of the duct have a better outcome with conservative removal than do those stones located in the hilum or gland substance. Salivery function normally remains ok, but if there is too much distension in the gland itself this can lead to salivary pooling which then nescesitates gland removal. This study then goes on to describe in detail lithotripsy, sialendoscopy, gland preserving suregery and sialadenectomy. For lithotripsy, the authors say that it is best used on immobile stones or stones that are over 7mm in diameter. For sialendoscopy, they recommnended stones that were smaller than 7mm unless you use it in conjunction with other techniques such as gland preserving surgery or sialendoscopy or lithotripsy. Pain and swelling are the 2 main side effects and the only contraindication is acute sialdenitis. This study again listed a 92% success rate for submandibular transoral stone removal, with pain, transient lingual nerve perasthesia, hemmorage and ranula formation. Removal of the gland is only used if more conservative methods fail or if recurring stones appear. Complications include severing of the facial nerve, Frey syndrome, hematoma, seroma and facial asymmetry from a transcervicle entry point. It can also be done intraoraly, and this can cause damage to the lingual and hypoglossal nerve. All of the stones were at least 4mm large and most were in difficult locations to reach.

3. This study was a randomized case control study that looked at 40 patients with submandibular stones. The groups was divided into two groups of 20, with one group having sialendoscopy assisted surgery and the other having traditional SMG resection. For the sialendoscopy assisted surgery, the incision was extra oral because of the placement of the stone, but still did not lead to complete gland resection. The results stated that in the conservative group, after a 6 month follow up, there was no damage to the lingual nerve, swelling only lasted 1-2 days, and the facial morphology remained intact. The average size of the stone removed was 6.3 mm. In the resection group, swelling lasted for 3-5 days, all patients had some facial morphology change, certain patients reported dry mouth and 1 patient had lingual nerve damage. Pain scores were significantly higher post op for the

resection group as well. The study recognized that stones should be removed via intraoral inscisions if possible, but due to the location of the stone this is not always possible. In these cases, extra oral inscisions with sialendoscopy is a very good choice of treatment.

4 This study looked at 44 individuals with submandibular salivary stones which were posterior to the first molar who were randomly divided into 2 groups; stone removal via intraoral methods or conventional SMG resection. In the transoral method, the sublingual gland was removed but the SMG was left intact. The SMG resection done using traditional methods. Due to random selection, the stones in the resection group were significantly larger that in the transoral group, with the largest being 16mm and 10mm respectively. Hospital stays and post op pain wer significantly shorter and lower in the transoral method. No patient had any lingering nerve damage and all were free of symptoms at the 2 year mark. Although rare, permanent nerve damage is a side effect of resection, especially when the lingual nerve is welded on the gland via scar tissue. Patients also tend to dislike the scar from the surery. In this study, they ackwoledged the shortcoming of having significantly different sized stones between the two groups. This study concluded that due to lower post op pain, less complication and shorter hospital stays, transoral removal of stones is superior to SMG resection.

Levels of Evidence: (For Therapy/Prevention, Etiology/Harm)
See http://www.cebm.net/index.aspx?o=1025

☒ **1a** – Clinical Practice Guideline, Meta-Analysis, Systematic Review of Randomized Control Trials (RCTs)
☒ **1b** – Individual RCT
☐ **2a** – Systematic Review of Cohort Studies
☐ **2b** – Individual Cohort Study
☐ **3** – Cross-sectional Studies, Ecologic Studies, "Outcomes" Research
☐ **4a** – Systematic Review of Case Control Studies
☐ **4b** – Individual Case Control Study
☒ **5** – Case Series, Case Reports
☐ **6** – Expert Opinion without explicit critical appraisal, Narrative Review
☐ **7** – Animal Research
☐ **8** – In Vitro Research

Strength of Recommendation Taxonomy (SORT) For Guidelines and Systematic Reviews
See article **J Evid Base Dent Pract 2007;147-150**

☒ **A** – Consistent, good quality patient oriented evidence
☐ **B** – Inconsistent or limited quality patient oriented evidence
☐ **C** – Consensus, disease oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

Conclusion(s):

Based off the research and clinical opinions of Dr. Yale, for submandibular salivary stone removal, the most conservative measure is most likely the best. Lithotripsy and sialendoscopy are very effective on small submandibular stones, and transoral stone removal is effective for stones up to 10 mm (based on the research available). However, based on the size of the stone present in our patient, and if the stone were to become reoccurring, gland resection might be the only option.