CASE REPORT

Submandibular Intraductal Calculi Removal as an Office Procedure With Radiofrequency Device

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SUMMARY

Salivary duct obstruction secondary to calculi is a common disorder of the submandibular gland and often manifesting as painful episodic swelling of the gland during meals. Complications may arise in unresolved obstruction leading to infections, abscess formation and a hypofunctioning gland. Treatment of this disorder has evolved from the traditional sialadenectomy to organ preserving procedures done under general or local anaesthesia. Our technique using Ellman Surgitron radiofrequency device, is another alternative technique for transoral removal of extraglandular calculi. It is a simple, quick an easy technique to learn that can be done in the office setting under local anaesthesia.

KEY WORDS:
Submandibular gland, Sialolithiasis, Radiofrequency surgery

INTRODUCTION

Sialolithiasis is a common non-neoplastic disorder of the major salivary glands. Obstruction of the submandibular ductal system causes recurrent swelling of the gland during meals which is often painful. Chronic obstruction and stasis with subsequent infection can lead to sialadenitis, abscess formation or potentially Ludwig's angina[1].

Submandibular gland excision was the traditional treatment of choice but it has now been replaced by various organ preserving procedures in particular for removal of extraglandular calculi, done either under general or local anaesthesia (LA). Intraoral surgeries, sialendoscopy and retrieval with microforceps or basket and retrieval under fluoroscopy guidance have been used with different success rates[2]. Extracorporeal shockwave (ESWL) litotripsy have also been used as a primary treatment avoiding the need for instrumentation of the ductal system[2].

Radiosurgery has been a new entity performed in various fields. In the domains of otorhinolaryngology, radiosurgery have been performed mainly for tonsillectomy and surgery for obstructive sleep apnoea. However there are no reports in the English literature for its use in salivary gland pathology.

We are reporting our preliminary experience using a radiofrequency (RF) device for simple transoral calculi removal done in the office setting and its potential application in adjuvant procedures in the treatment of calculous obstruction of the submandibular duct.

CASE REPORT

Between March 2008 and September 2008, five patients with symptomatic sialolithiasis of the submandibular ductal system underwent this procedure in our ORL clinic. Pre-operative clinical assessment was done to look for the presence of calculi and concurrent infection followed by occlusal view X-ray assessing the site of impaction, size, shape and number of calculi. If stone was palpable and found in the distal part of the duct amenable for transoral surgery then these patients were offered sialodochotomy and calculi removal using RF device.

The procedure was performed with the patients in a sitting position and their mouths open. Local infiltration was done with Lignocaine 1% and adrenaline 1:100 000. Ellman Surgitron RF device (Ellman Internatioanl Inc.) model F.F.P.F. EMC at a frequency of 3.8 Mhz and AC power output of 140Watts was utilized. A needle electrode was used to make an incision on the mucosa overlying the calculi using both the cut and cut/coagulation mode at a power level of 3-4. The mucosal incision was made along the axis of the duct and Wharton's duct was then identified. Further incision was made on the duct over the bulging calculi. Exposed calculus was then removed leaving the duct laid open. Patients were sent home the same day with a course of antibiotic (Tablet Amoxycillin-Clavulinic Acid 625mg BD for 1 week) and instructed to gargle with Thymol Gargle. Admissions to ward were only considered for overt infection. They were reviewed again 2 weeks later to assess for resolution of symptoms and complications of treatment.

DISCUSSION

Intraoral surgery is a favoured approach for extraction of stones anteriorly placed and visible at the punctum(1). This approach has been described over the years with modifications of techniques and instruments. Sobol *et al* described sialodochotomy with papillotomy without closure of the duct or stenting stating that continuous flow of saliva will help prevent stricture[1]. In some centres, this practice differed and continuity of the ducts was reestablished with sutures[2].

Cold instrument has been the conventional instrument used for intraoral surgery, however bleeding can obscure visualization leading to higher risk of neurovascular injuries especially for surgery done on middle third and posterior part of the duct where the lingual nerve crosses the duct. CO_2 laser is also used as an alternative for cold instruments but it

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Table I: Demographic details, sign and symptoms, X-ray findings treatments received calculi size and outcomes of patients who underwent transoral calculi removal using Ellman Surgitron RF device.

No	Age	Sex	*Race	Symptom	Sign	X-ray findings **(OC, SLG)	Treatment received	Calculi size	Follow-up
1.	19	F	C	Painful recurrent right floor of mouth swelling after meals x 6/12 duration	Swelling over distal duct with redness	OC: stone seen at the floor of the mouth	Transoral dochotomy	3.0mm	Asymptomatic at 1
2.	28	M	M	Painful recurrent right Submandibular (SM) region swelling after eating x 1/12	Visible calculi near Wharton duct opening	OC: distal duct calculi Xray soft tissue: no radio-opaque calculi in the gland	Transoral dochotomy	2.5mm	Asymptomtic 1 year
3.	30	F	M	Left SM region pain after eating x 1 year	Tender SM gland, Palpable stone in floor of mouth	OC: stone seen Xray soft tissue: no radio-opaque calculi in SM gland	Transoral dochotomy	2.0mm	Asymptomatic 11 month
4.	39	M	M	Painful left SM region swelling fluctuating in size associated with food x 2/12 and associated with fever	Calculi near the orifice of the duct, SM gland enlarged 4x 4 cm, tender	OC: radio-opaque stone seen	Transoral dochotomy followed by SM gland excision 18 days later; Intraop findings: Intraglandular calculi	3.5mm	Asymptomatic at 1 year
5.	22	M	O	Painful Right SM region swelling x5/7 with pus discharge from floor of the mouth and asscociated with fever	SM gland swelling 2x 2 cm, pus discharge from duct opening with palpable stone	OC: no radio-opaque stone seen SLG: focal dilatation of distal duct with non-opacification of secondary ductules	Transoral dichotomy followed by SM gland excision. Intraoperatively another stone was found close to hilum.	4.5mm	Submandibular gland swelling reduced but there was intermittent discharge from the papilla.FNAC showed chronic sialadenitis.

*Race: M= malay, C=Chinese, I= Indian, O=others
**OC =occlusal view ,SLG=sialography

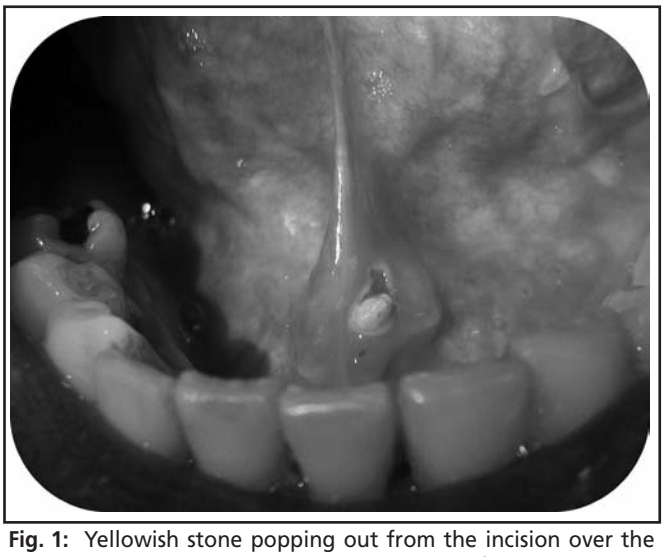

Fig. 1: Yellowish stone popping out from the incision over the duct made with Ellman Surgitron radiofrequency device.

requires a special training and set up of instruments with accompanying safety precautions.

We made further modifications to the technique using a radiosurgical device. This is a form of electrosurgery which is different from electrocautery. In electrosurgery, the tissue heats in response to the radiofrequency current passing through it as compared to electrocautery which operates on heated probe. This device utilizes high frequency current with low temperature and is believed to cause minimal tissue alteration, no burning or charring of the tissue, bacteria free incision and pinpoint coagulation. Complications of RF surgery performed in the upper airway were infrequent. Some of the reported complications are mucosal ulceration, crusting, uvular sloughing infections, haematoma, hypoglossal nerve paresis and lingual nerve hyperesthesia[3].

This is our preliminary experience using this technique and it has been an easy technique to learn. We used superficial LA infiltration and the procedure lasted less than 10 minutes; a quick procedure as compared to sialendoscopies and it obviates the hassle of the multiple visits required for ESWL[2].

Intraoperatively haemostasis was well controlled. Stone sizes varied between 2.0-4.5mm but all were palpable in the floor of the mouth which made duct identification easy and calculi removal successful. No postoperative complications were observed in the immediate or follow-up period.

Acute infection is a contraindication in sialendoscopies and radiological procedures and thus it can delay treatment for those suffering from intense pain of the acute obstruction. Intraoral surgery, on the other hand can still be done in acute infections and we noted quick pain relief for the acute stage even though some eventually underwent gland excision for intraglandular stones and chronic sialadenitis.

Sialodochotomies and papillotomies are also performed as adjuvant procedures. Large calculi, calculi within a diverticulae and fixed calculi can be a limitation to a purely intraductal endoscopic retrieval necessitating sialolithomy[2]. Similarly sialolithotomy will be required in stenosis of duct distal to stone impaction[2]. Lithotripsy does not always lead complete clearance of stone and sometimes papillotomies are also required for removal of residual fragments that migrate distally. These adjuvant procedures can be performed with radiosurgery

CONCLUSION

Intraoral surgery has evolved with modifications of technique as well as instruments used. We believe radiofrequency device will prove to be another good alternative for intraoral surgery in providing a bloodless field and an easy technique to learn. Preliminary study is promising but further data need to be obtained with larger group of patients and prospective studies to assess the effectiveness of radiosurgery for sialolithiasis.

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