

Sialoendoscopy-A New Scope & Sphere for Diagnosis of Salivary Gland Disorders

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Abstract

Sialolithiasis and sialadenitis are the most common salivary gland disorders. Many conventional modalities have been tried yet unsatisfactory. New endoscopic techniques have been pioneered with sialoendoscopy a novel therapy for optical exploration of salivary ductal system which incorporates diagnostic and therapeutic procedures. It can be used effectively for salivary gland infections, strictures and kinks. It is a simple procedure which can be performed under local anesthesia. Hence forth, diagnostic and interventional sialoendoscopy will be soon emerged into clinical practice. Thus this article reviews and focuses the importance of endoscopy in salivary gland pathologies.

Key Words : Sialoendoscopy, Sialolith, Endoscopy.

Introduction

Sialolith is one of the major cause for salivary gland disorders and symptoms preclude pain, swelling, tenderness of involved salivary glands and altered salivary flow¹. Over the last few years, many techniques have been introduced but still there is a increasing demand for minimally invasive surgery and sialoendoscopy is one such technology with new promising method for treatment of non neoplastic obstructive disease of salivary glands. It is an efficient yet simple mode of treatment for major salivary gland obstructions and strictures.^{1,2} It can be easily performed under local anesthesia. Thus the advancements have resulted with major progress in this field.

History of Salivary Gland Endoscopy

Koingsberger and colleagues introduced their first successful application of endoscopically controlled intracorporeal lithotripsy of salivary gland stones in 1990.³ Later in 1993 he introduced the use of combined flexible miniendoscopes and intracorporeal lithotripter for sialolith fragmentation. In 2004, Zenk and colleagues reported their experiences with a new highly flexible, semirigid Sialoendoscope with high-quality imaging (6,000 pixels)⁴. In 2006 Nahlieli and Nazarian reported the results of preliminary study of endoscopic treatment of radioactive iodine sialadinitis⁴.

Instrumentation

The use of miniature endoscopic imaging tools makes the procedure uncomplicated. Miniendoscopes are traditionally divided into three types namely rigid, flexible, and semirigid endoscopes.⁴ The semirigid endoscopes can be further divided into

compact and modular endoscopes were compact is used for therapeutic purpose and modular for diagnostic, irrigation and surgical purposes. (Figure A,B) Semirigid endoscopes are most commonly used as it incorporates both flexible and rigid endoscope, with peculiar features like clear view, small diameter, stiffness which allows modification of salivary gland anatomy hence endoscope can be easily introduced. It consists of working and rinsing channel with external diameter of 1.3mm.⁵

Types of sialoendoscopes include:

Diagnostic Sialoendoscope: 0.8 mm diameter/120-mm length/6000-pixel port for irrigation.

Multi functional Sialoendoscope: 1.1-mm diameter / 120-mm length / 6,000 pixels.

Surgical Sialoendoscope: 1.6mm diameter/ 120mm length 6000 pixels⁴.

Indications

1. When calculus removal by conventional method is difficult to perform as in posterior portion of Wharton's duct with proximity to lingual nerve or in stenson's duct posterior to sigmoid area.¹
2. For screening of ductal system to rule out any residual calculi after surgical sialolithotomy.²
3. When there is positive evidence of ductal dilatation or stenosis on sialography.¹
4. Cases of recurrent major salivary gland swellings without obvious cause.^{1,2}
5. When the calculus diameter does not exceed 7 mm in Wharton's duct and 5mm in stenson's duct.⁶
6. When there are strictures, bends within ductal system or presence of intraductal adenoids or foreign bodies.^{1,2}

Contraindications

1. Absolute contraindication include acute inflammatory conditions like acute sialadinitis and non-functioning gland.⁴
2. Relative contraindication include intraparenchymal stones and when the ductal lumen cannot be enlarged more than 1.3mm.^{2,6}

Procedure of sialoendoscopy

Preoperative assessment is done using conventional, digital radiographs or ultrasound. The average time of sialoendoscopy is 60min. Before introducing the endoscope into the gland it should be dilated either by using papillotomy or sialolithomy procedure⁷, then lubrication is done using isotonic saline, and anesthetized with 2 percent lidocaine. Intra ductal approach is used when the sialolith diameter <5mm while extra ductal approach is used

when sialolith is >5mm⁴. (Fig. C)

Methods of Retrieving The Sialolith

Endoscopic techniques which are used to remove the sialolith include:

1. **Basket Technique:** This is the oldest technique. Basket is introduced in close position to bypass the calculus and open the prongs, basket is then pulled out in open position with the stone entrapped.^{4,3,6} (Fig. E).
2. **Grasper :** In grasper there are three prongs which are used to hold the calculus. It need not be bypassed as in basket system.^{4,3,6} (Fig. D).
3. **Minigrasping Forceps:** It is newly designed with two prongs namely a) Flexible b) Rigid.⁴ (Fig. E).
4. **Balloon Technique:** It uses 2 techniques
 - a. Irrigate thoroughly and wash out the stone.
 - b. Pull the balloon in inflated position and retrieve the stone.
5. **Mechanical Fragmentation:** can be done by intracorporeal laser fragmentation or combined intracorporeal laser lithotripter, basket and minigrasp forceps.^{6,8}

Ductal catheterization is carried out with a polymeric cathostent into the duct for two to four weeks to prevent post operative oedema, and allow crushed particles of calculus to be washed out by saliva. A total of 100mg of hydrocortisone solution should be injected intraductally after the procedure.

Postoperative antibiotics, analgesics are given with follow up.^{6,2}

Complications

Complications of sialoendoscopy while retrieving a sialolith may result in temporary lingual nerve parasthesia, Post operative infection, bleeding, development of traumatic ranula, ductal strictures, tears and perforations.^{6,9,4}

Advantages

1. It is a minimally invasive technique which enhances removal of sialolith from the deeper portions of ducts, within the glands, and openings of strictures, kinks and duct strictures through endoscopic guided visualization.¹
2. It is the only endoscopic technique that ensures complete removal of stones.^{2,6}
3. Surrounding tissues are minimally damaged.
4. The status of glandular tissues from appearance of ductal lining can be observed. In healthy gland, shiny

appearance of duct and proliferating blood vessels can be appreciated .In chronic sialadinitis, matted lining, echymosis and small blood vessels can be perceived.¹⁰

5. It can identify radiolucent stones, polyps, stenosis, mucous plugs and foreign bodies.²

Success Rate

- Success rate of parotid endoscopic sialolithotomy is 86%
- Success rate of submandibular sialolithotomy is 89%.^{1,4}

Conclusion

Sialoendoscopy is a promising and proficient method in diagnosing and treating inflammatory conditions of major salivary glands. The post operative management of

sialolith is easy. It is an outpatient procedure performed under local anesthesia without major complications, and a solution for managing intricate and perplexing inflammatory salivary gland pathology. As the technique advances with endoscopy, more findings, innovations and uniqueness will be forthcoming, adding to its effectiveness.

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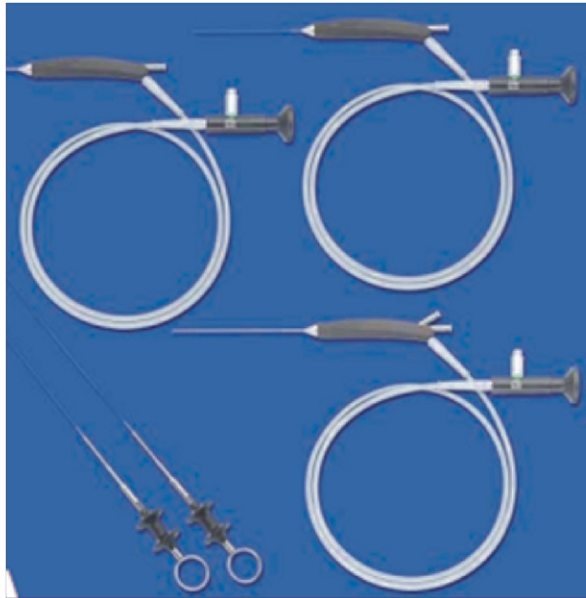


Fig. A: The new set of diagnostic and multifunctional sialoendoscopes (0.8-millimeter diameter [top right], 1.1-mmdiameter [top left] and 1.6-mm diameter [lower right]). The instruments at the lower left are minigrasping forceps. (Courtesy Nahlieli O; JADA 2006).



Fig. C: Introduction of a Sialoendoscope through the orifice of the Wharton's duct (after dilatation) into the gland. Note the transilluminating effect. (courtesy Nahlieli O; JADA 2006).



Fig. D: Grasper used to retrieve sialolith.

Fig. E: A: Endoscopic view of a basket retrieving a sialolith from the submandibular hilum.

B: Endoscopic view a minigrasping forceps retrieving a sialolith from the submandibular hilum. (Courtesy Nahlieli O; JADA 2006)

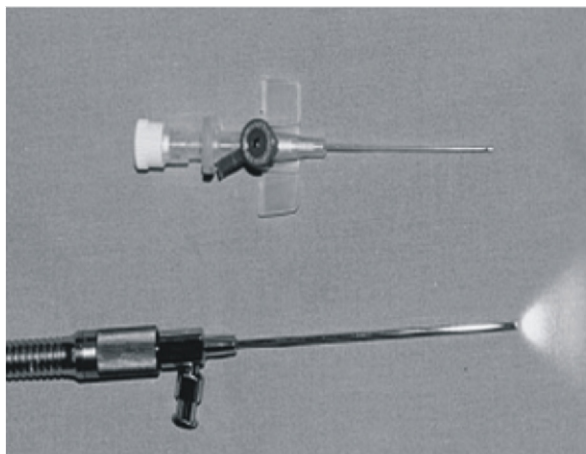


Fig. B: Sialoendoscope with telescope inside cover sheath and surgical unit. (Courtesy Nahlieli O; OOOO 2003).

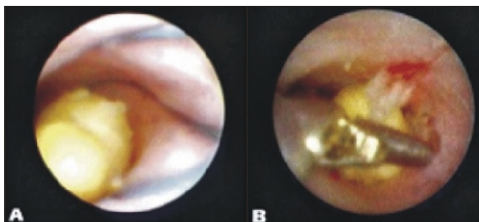


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