Penn Medicine

CLINICAL BRIEFING™

Department of Otorhinolaryngology • Division of Head and Neck Surgery

Sialendoscopy for the Management of Salivary Duct Obstruction

Christopher Rassekh, MD, and colleagues at Penn Otorhinolaryngology–Head and Neck Surgery are performing sialendoscopy to diagnose and treat sialolithiasis (stone disease), duct strictures and other obstructive and inflammatory diseases of the parotid and submandibular salivary glands.

Sialendoscopy is a minimally invasive technique that has the potential to avoid nerve injury and the facial and oral scarring associated with traditional open surgery. The "all-in-one" sialendoscope combines a delicate, semi-rigid (1.1, 1.3 and 1.6 mm) fiber-optic endoscope, an irrigation port and a working channel in a single instrument. The endoscope broadcasts high definition images to a monitor (Fig. 1).

The missions of the Penn Sialendoscopy Program are to make a diagnosis, clear the salivary duct; preserve the native gland; and protect the lingual and facial nerves while using the safest, least invasive and most appropriate therapies available.

Sialendoscopy Treatment Algorithm

At Penn Medicine sialendoscopy is indicated for sialolithiasis and for strictures or other duct and gland abnormalities, including autoimmune and radioactive iodine-induced sialadenitis.

Diagnosis of sialolithiasis and other duct pathologies involves ultrasound, computed tomography and MR sialography, usually after the onset of pain, swelling and other classic symptoms.

Treatment is dependent on salivary stone size, shape, number and location.

- Smaller stones can be retrieved and removed through a salivary duct using the sialendoscope alone.
- Medium sized stones (5-7 mm) may require lithotripsy using the Holmium-Yag laser, a modality typically used for kidney stones, but found effective in some patients with salivary stones.
- Stones >7 mm in a proximal location (near the gland itself and far back from where the duct drains) require a combined approach involving an incision in the back of the mouth below the tonsil (for submandibular gland), or on the face (for parotid gland stones).
- For larger proximal stones in the hilum or gland, surgical access may be difficult. To address these stones at Penn Medicine, a robotically-assisted sialendoscopy procedure has been developed called **TORS-sialo** or **Sialo-TORS-sialo**.

The TORs / Sialendoscopy Interface at Penn Medicine

TORS-sialo adds the instrumentation of robotic surgery to that of endoscopy, and is employed at Penn Medicine to remove large stones from the hilum of the submandibular gland, which is situated deep in the floor of the mouth adjacent to the lingual nerve.

Sialo-TORS-Sialo may be used for multiple or deeply placed stones when the stones cannot be easily localized with palpation alone during the combined approach. Use of the light or an instrument through the working channel of the sialendoscope can help guide the pathway to the stone to allow a more precise incision.

In both TORS-sialo and Sialo-TORS-sialo, the excellent optics of the robot combined with manual dexterity and improved coordination with the bedside assistants makes working in this tight space safer and more reliably protects the lingual nerve in the floor of mouth.

Figure 1: Christopher H. Rassekh, MD, FACS, performs a sialendoscopy at Penn Medicine for a patient with a suspected parotid duct sialolith.

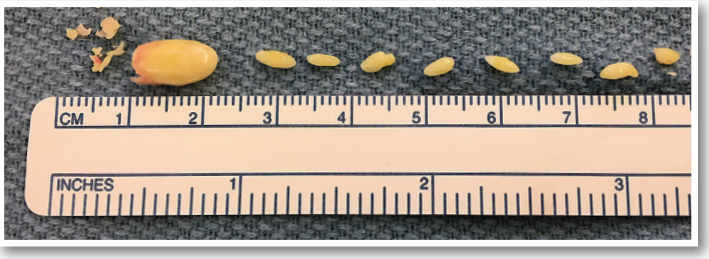

Figure 2: Photo of one large and numerous small sialoliths removed during sialendoscopy of the submandibular duct.

CASE STUDY 1

JG, a 23-year-old male, came to Penn Medicine for suspected parotitis after experiencing repeated episodes of post-prandial facial swelling over a three-month period. A CT scan at Penn found a 3mm density in JG's left parotid duct deemed highly suspicious for a salivary stone. After a consultation to review his treatment options, JG opted for sialendoscopy.

At the start of the procedure, the left parotid duct papilla was dilated to permit irrigation of the duct. A 1.3 mm scope was then advanced and navigated within the duct to the obstruction, a compact sialolith, lodged at a bifurcation distal to the parotid gland.

With further irrigation to dilate the duct, a stone extractor was extended through the working port until it grasped the stone. At this point, the stone was gently drawn beyond the bifurcation, but floated into the opposite duct. A micro-sialendoscopic burr was then introduced, freeing the stone, which was grasped and extracted by rotating past the muscle to the papilla.

JG's recovery from surgery was unremarkable, and he was discharged the same day. At his one-year follow-up visit, there was no evidence of evolving sialoliths in the cleared duct or elsewhere.

(See Case Study 2 on back page)

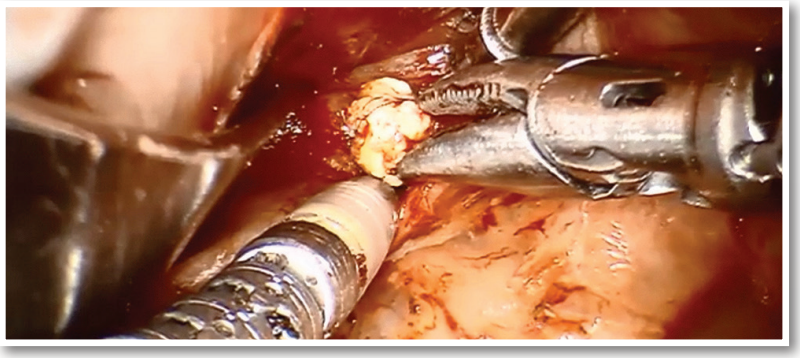

Figure 3: Robotic portion of Sialo-TORS-sialo with stone trapped in a basket being accessed and removed.

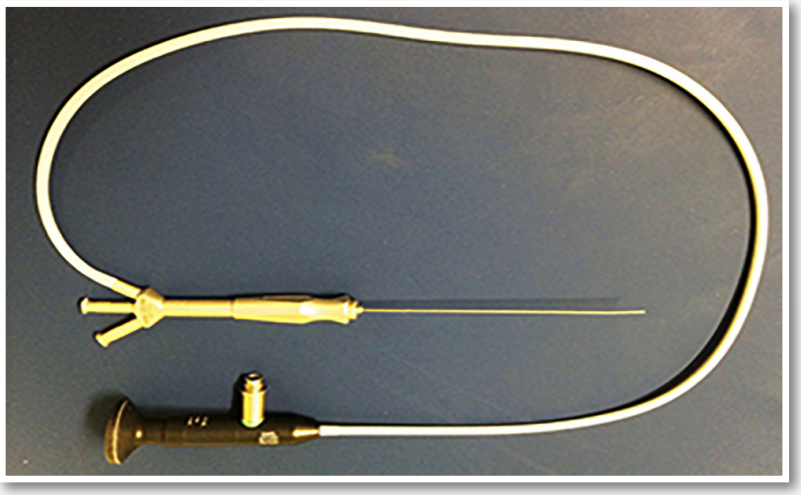

Figure 4: The STORZ sialendoscope comprises a 1.3 mm diameter high-definition endoscope (i.e., approximately the width of an 18-gauge needle) capable of entering most salivary and parotid ducts. The ports shown above represent the working (center) and irrigation (bottom) channels for the device. ©KARL STORZ GmbH & Co. KG, Tuttlingen.

CASE STUDY 2

Mrs. M, a 46-year-old woman, came to Penn Medicine with recurrent left neck pain and swelling. A CT scan showed multiple stones in the submandibular duct, including a large one very far back in the duct; none of the stones was palpable. Mrs. M. was offered a robotically assisted combined approach to remove the stones with sialendoscopy (Sialo-TORS-sialo).

The sialendoscope was used to locate the stones and a basket placed through the working channel was used to trap the largest stone. The robot was then used to make an incision in the floor of mouth and find and preserve the lingual nerve. The magnified robotic scope improved the visualization of the nerve and other structures. The duct was opened, the stone removed and the basket then released. Repeat sialendoscopy was performed to remove additional fragments and debris. The incision was closed and the duct allowed to heal on its own. Figure 3 shows the robotic portion of the operation and the instruments.

Mrs. M's recovery from surgery was unremarkable, and she was discharged the same day with normal tongue sensation and mobility. At her one-year follow-up, there was no evidence of sialolith recurrence and the flow of saliva from the duct was normal. She reported no episodes of pain or swelling.

FACULTY TEAM

The faculty of Penn Otorhinolaryngology–Head and Neck Surgery are leaders in the field in patient care, surgical innovation and clinical and laboratory research. The Department logs more than 86,000 patient visits each year—the highest volume in the nation of any center or program performing otorhinolaryngology–head and neck surgery— and offers comprehensive and multidisciplinary programs to manage every disease or disorder affecting the organs and tissues of the nose, ears, throat, face and skull base.

Performing Sialendoscopy at Penn Medicine

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