Intracorporeal Lithotripsy

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KEYWORDS

• Lithotripsy • Pneumatic lithotripsy • Laser lithotripsy • Sialolithiasis

KEY POINTS

- Salivary gland sialolithiasis is the most common cause of salivary duct obstructive disease.
- Lithiasis treatment has evolved toward minimally invasive procedures but open surgery is still an option exercised by surgeons. Intracorporeal lithotripsy is offered to patients if the sialoliths are between 3 and 7 mm in greatest dimension.
- Laser lithotripsy has been the most popular technique but the advent of pneumatic lithotripsy may also gain wide acceptance.

Introduction: nature of the problem

Salivary gland sialolithiasis is the most common cause of salivary duct obstructive disease. Submandibular glands are more commonly involved. Sigismund and colleagues[1] published a retrospective analysis of 2322 patients in whom 2959 calculi were identified. In these cases, 80.4% were located in the submandibular duct system (53% hilar/proximal, 37% distal, 10% intraparenchymal) and 19.6% were in the parotid glands (83% Stensen duct, 17% intraparenchymal).[1] Lithiasis treatment has evolved toward minimally invasive procedures but open surgery is still an option exercised by surgeons. Intracorporeal lithotripsy is offered to patients if the sialoliths are between 3 and 7 mm in greatest dimension. Laser lithotripsy has been the most popular technique but the advent of pneumatic lithotripsy may also gain wide acceptance.

Surgical technique

Preoperative planning

Sialolithiasis is the most common cause for obstructive salivary disease but associated stenosis must also be considered. Ngu and colleagues[2] published results on 1362 sialograms carried out on patients presenting with obstructive salivary gland disease and noted 73.2% incidence of lithiasis and 22.6% incidence of strictures within their study group. Within the stricture group 66.7% were single and 22.6% were multiple. Most of the strictures (75.3%) were found in the parotid gland. Hence when patients present with a prolonged history of salivary obstructive disease process or cases of parotid involvement thoughts must always be given about the possibility of associated stenosis.

Imaging is an important part of the preoperative planning. The most common preoperative imaging is ultrasound (Fig. 1). Ultrasound imaging is operator dependent and thus incidence of sialolithiasis may be missed. Ideally preoperative ultrasound should be done by the surgeon performing the sialendoscopy as part of preoperative assessment. For many surgeons a computed tomography (CT) scan is still the preferred imaging study (Fig. 2). The CT is the most sensitive study for identification of salivary sialolithiasis. CT study gives definitive location and number of stones. The only information that may be missed is whether associated stenosis is present.

Ultrasound and CT are complementary studies; however, even these studies can miss stenosis if these are located immediately before the stone. Although the chance of associated unsuspected stenosis is higher in parotid glands, unsuspected stenosis in cases of submandibular lithiasis can also be encountered (Fig. 3). This is much less frequent. Anecdotally, submandibular stenosis needs to be suspected in cases where there are multiple stones along the course of the duct. As part of the preoperative assessment, routine diagnostic sialendoscopy on parotid lithiasis is performed to verify the existence of associated stenosis. Establishing presence of associated stenosis in the preoperative period is more desirable than finding this out at the time of the interventional sialendoscopy especially if the procedure is conducted under anesthesia.

Preparation and patient positioning

1. All interventional sialendoscopies are performed under general anesthesia. Half hour before the scheduled surgery patients are given a sialagogue in the holding area, although some anesthesiologist may oppose this preparatory technique. The sialagogue allows for much faster identification of the papilla and speeds up the access process.
2. Patients are placed in supine position.
3. The surgeon stands opposite to the operative site (Fig. 4).
4. In all cases magnification is required for papilla identification and if a microscope is used, it is placed opposite to the operative site.
5. The nursing staff checks the working condition of the scope before the patient is placed under general anesthesia. Because of their size, sialendoscopes are fragile and hence prone to damage during the sterilization process if mishandled.

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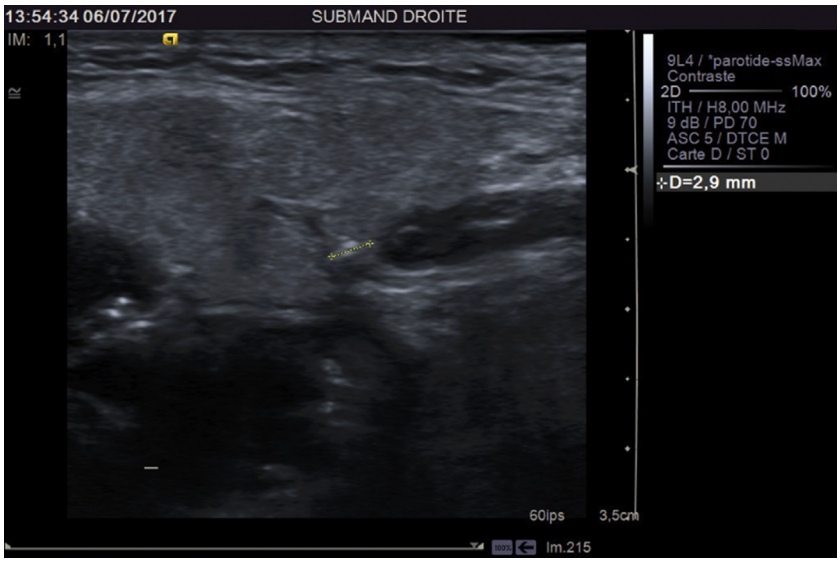

Fig. 1 Ultrasound of stone in submandibular gland. (*Courtesy of* Philippe Katz, MD, Paris, France.)

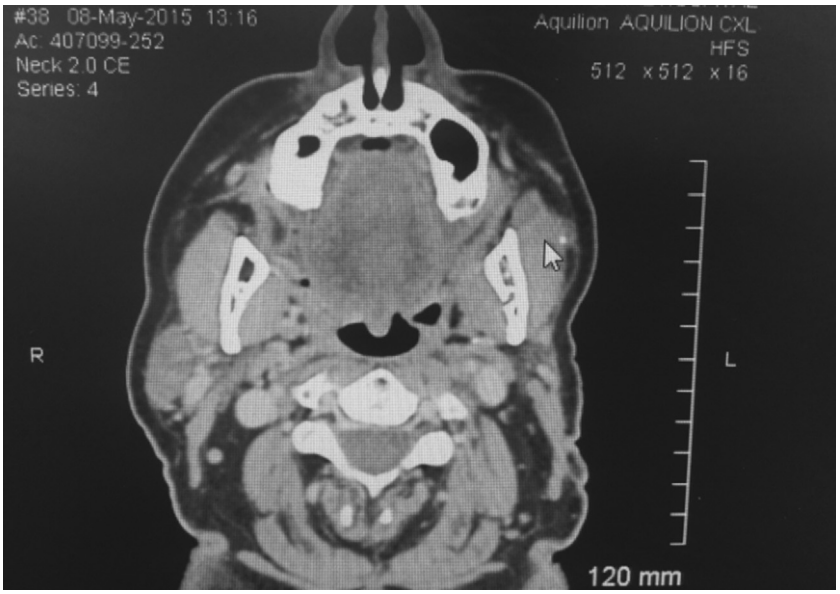

Fig. 2 CT image of parotid stone.

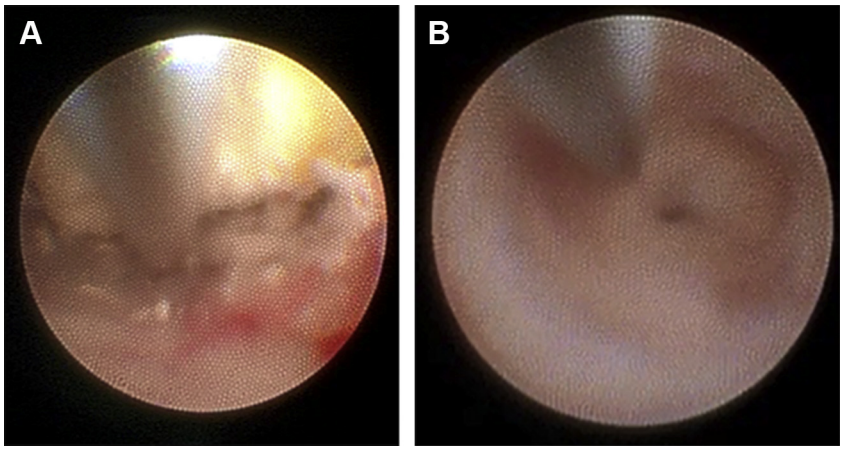

Fig. 3 (*A*) Unexpected stenosis in front of submandibular gland lithiasis. (*B*) Lithiasis seen posterior to the unexpected stenosis.