

Modern Sialography for Screening of Salivary Gland Obstruction

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Purpose: To revisit and reintroduce sialography as an important tool for the assessment and diagnosis of salivary gland obstruction.

Patients and Methods: A sample of 30 consecutive patients undergoing sialography was selected. Parotid sialography was performed in 22 patients (12 females and 10 males). The patients undergoing parotid sialography presented with bilateral or unilateral enlargement or swelling. Submandibular sialography was performed in 8 patients (all males) who had presented with swelling and pain in the affected gland.

Results: Parotid sialography revealed 6 cases of sialolithiasis without significant duct narrowing, 3 of narrowing and strictures of Stensen's duct without a sialolith, 3 glands with gland sialectasis, 1 parotid gland with intraglandular cyst-like duct degeneration, 1 of a parotid mass displacing Stensen's duct, and 1 gross dilation of duct. The findings of 7 parotid gland sialograms were normal. Submandibular gland sialography revealed the presence of sialolithiasis (single and multiple) in 4 patients, narrowing of the duct in 2, and normal findings in 2.

Conclusions: Sialography is a simple technique and an important tool for the assessment of salivary gland obstruction in patients presenting with sialadenitis.

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Obstruction of salivary glands is a common pathologic finding that affects a large number of patients. Oral and maxillofacial surgeons have been increasingly involved in the diagnosis and treatment of different types of salivary gland obstructions, making necessary understanding and familiarity with the diagnostic tools available for these pathologic features of utmost importance.

New techniques, such as endoscopy of the salivary glands (sialoendoscopy),¹⁻⁴ have been introduced as an important strategy for assessing and treating salivary gland obstruction. Endoscopic techniques have upgraded the available arsenal of therapeutic approaches for treating salivary gland pathologic features. Nevertheless, after many years as a neglected technique, technological advances have brought back sialography as an important diagnostic x-ray study for patients with recurrent sialadenitis, who are candidates for sialoendoscopy. Up to the late 1970s and early 1980s, patients with salivary gland obstructions

underwent sialography, which revealed pathologic findings in different areas of the salivary gland system. Although surgical techniques have enabled the removal of the obstructions and the opening of strictures in deeper areas of the gland, injury to vital structures, such as the lingual nerve, which passes below the submandibular gland duct, is still a risk.

With the introduction of sialoendoscopy, sialography gained an important role in the assessment of salivary gland status, reviving this radiographic technique.

The purpose of the present study was to report modern day sialography, discuss different sialographic pictures, and indicate the importance of this radiographic study in mapping salivary gland obstructions before performing interventional sialoendoscopy.

Patients and Methods

A total of 30 consecutive patients undergoing sialography of the affected salivary gland were included in the present study. Sialography was performed after the acute phase in patients with sialadenitis. All sialographic studies were performed without the need for local anesthesia. The use of delicate catheters and gentle techniques made the procedure painless. After visual identification of the duct orifice of the affected gland, lacrimal probes were introduced to dilate the duct entrance (Fig 1). When the orifice was suffi-

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ciently dilated, an adult intravenous catheter (22-gauge) was introduced (Fig 2). It was not necessary to suture the catheter in place. Next, 1.5 to 2 mL of contrast material was injected. Ultravist (Bayer Healthcare Pharmaceuticals, Wayne, NJ), an iodinated water-soluble agent, was used. Patients usually reported some discomfort and pressure sensation during the dye injection. Alternatively, salivary duct lavage with 0.5 mL bupivacaine hydrochloride (Marcaine) can be performed before the procedure to reduce the sensation of pressure. The contrast material was injected under fluoroscopic guidance, reducing risk of perforations and gland extravasation. Panoramic or posteroanterior and lateral views of the mandible were obtained. The presence of acute salivary gland infection and allergy to contrast material are contraindications for sialography. Patients with a sialolith blocking the opening of the duct also cannot undergo sialography. Such patients should undergo surgical sialolithiasis removal and exploratory sialoendoscopy as the treatment of choice.

Results

All 30 sialograms were successful. Parotid sialography revealed 6 cases of sialolithiasis (Fig 3), 3 of narrowing and strictures on the Stensen's duct (Fig 4), 3 of gland sialectasis (a diffuse spherical collection of contrast material distributed through the gland) (Fig 5), 1 gland with cyst-like degeneration of intraglandular duct (Fig 6), 1 parotid mass displacing the Stensen's duct (Fig 7), and an oversized dilated duct in 1



FIGURE 2. Cannulation of duct with intravenous catheter (22 gauge).

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patient with intermittent swelling in the anterior parotid gland (Fig 8). The findings of 7 parotid gland sialograms were normal.

Submandibular gland sialography revealed the presence of sialolithiasis (single and multiple) in 4 patients (Fig 9), narrowing of the duct in 2, and normal findings in 2. All patients underwent sialography using fluoroscopic guidance. None of the patients under-

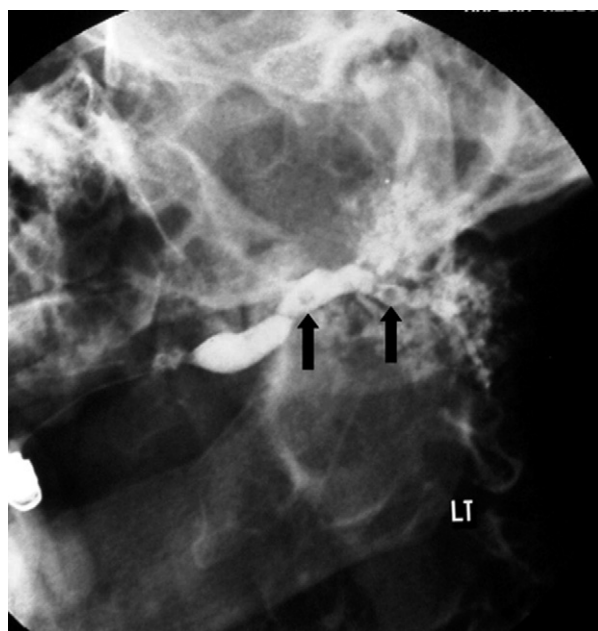


FIGURE 3. Sialogram of the parotid gland demonstrating presence of sialolithiasis (arrows).

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FIGURE 1. Dilatation with probe of Wharton's duct of the submandibular gland.

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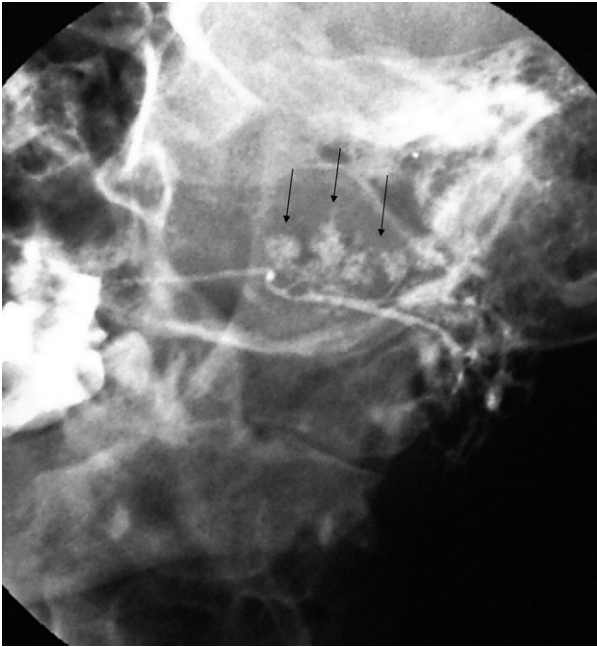


FIGURE 4. Sialogram of parotid gland demonstrating narrowing of strictures of Stensen's duct. Note presence of accessory gland (arrows).

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went a second radiographic study to check for voiding of contrast material. No complications occurred during any of the procedures. The postoperative instructions to the patients included consuming a normal diet after sialography.

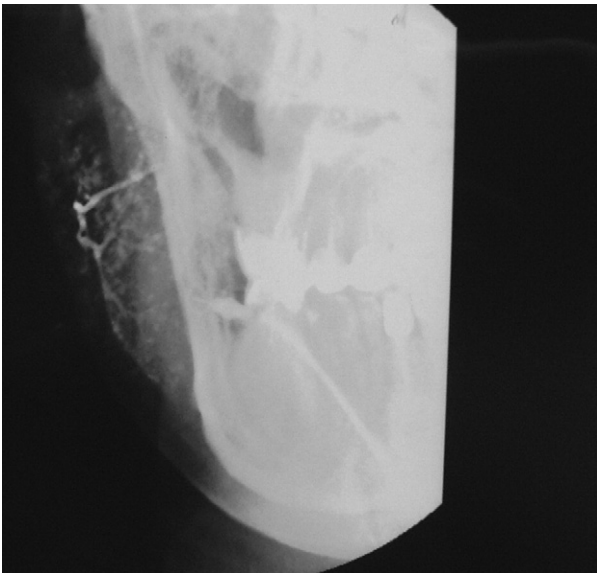


FIGURE 5. Sialogram of parotid gland showing sialectasis in female patient presenting with bilateral gland enlargement.

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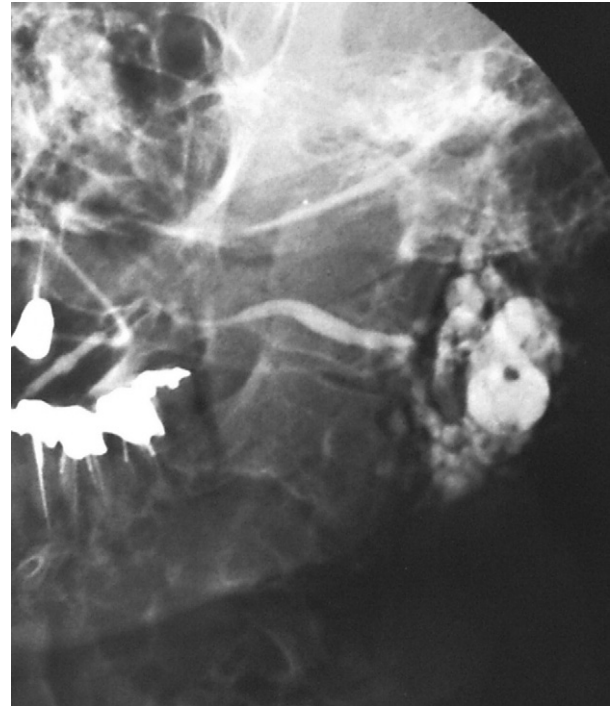


FIGURE 6. Sialogram of the parotid gland showing intraglandular cyst-like duct degeneration.

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Discussion

The initial screening for patients with suspected obstruction of the salivary glands consists of a clinical examination and radiograph studies, such as Panorex, occlusal radiography, ultrasonography, and computed tomography, when indicated. With the advance in

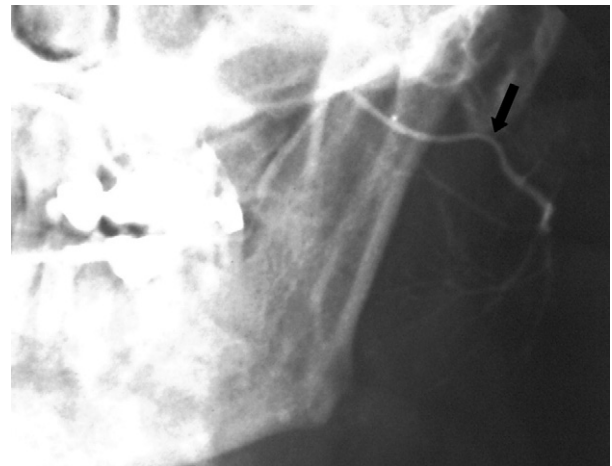


FIGURE 7. Parotid sialogram of patient with intragland tumor displacing Stensen's duct (arrow). Note, also, gross lateral displacement of ducts by medially placed tumor.

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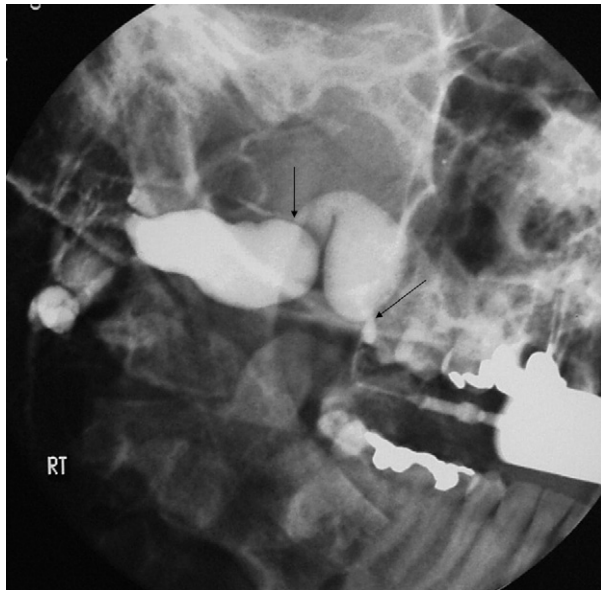


FIGURE 8. Gross dilation of Stensen's duct. Note presence of intraduct strictures (arrows).

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technology and the development of endoscopic techniques for the diagnosis and treatment of obstructions of the salivary glands, sialography has regained an important place as one of the tools available for the evaluation of salivary gland obstructions.^{1,4,5}

In most cases, modern sialography is not time-consuming, and the refinement of intravenous catheters has made the procedure painless and easy to perform. The contraindications for the procedure include when the duct is blocked by sialolithiasis and the presence of an internal stricture. In both situations, duct dilation with probes and sialography is not possible. Instead, surgical removal of the sialolith and surgical opening of the duct should be done and sialoendoscopy performed without previous sialography. An allergy to the contrast material (usually iodine) is also a contraindication. With the introduction of minimally invasive endoscopic procedures for salivary gland obstructions, sialography has re-emerged as an important gland examination, disclosing important anatomic and pathologic information about the gland before sialoendoscopy.

Reviewing the published data, we found that sialography is an accepted tool for the assessment of salivary gland obstructions; however, some have indicated their abstention from performing the procedure. Marchal and Dulguerov⁶ reported a preference for using sialoendoscopy, rather than sialography, as a primary tool for the diagnosis of salivary gland obstruction. They reported that the injection of contrast material could push sialoliths further back into the

duct, complicating endoscopic removal of the sialolith. Varghese et al⁷ also claimed that the invasiveness of sialography is a drawback of the procedure. They compared the use of magnetic resonance sialography with that of conventional sialography in 49 patients and concluded that magnetic resonance sialography is sufficiently sensitive in cases of tight strictures but not sensitive enough when salivary stones are present. Katz,⁸ Hasson and Nahlieli,³ and Hasson⁴ have, however, indicated the use of sialography as their tool of choice for salivary gland assessment.

Sialography is also a minimally invasive and painless technique if performed carefully. Kalk et al⁹ reported on the morbidity of the procedure. Of the 24 patients included in their study, 19 experienced no pain, and 5 reported little pain during infusion of the contrast material. During sialography, 16 reported no discomfort, 7 found it slightly unpleasant, and only 1 reported that it was very unpleasant.

Sialographic studies can demonstrate important and interesting pathologic features of the involved salivary glands. The anatomy of the duct can be displayed, revealing its form as narrow or large, the presence of secondary branches leaving the main duct, and the presence of accessory glands or sialolithiasis, including their dimensions, number, and positions. Another advantage of this technique is its ability to reveal the presence of internal duct strictures, especially in the parotid gland, which always escape detection with radiography and sometimes with ultrasonography. Without doubt, all this information, readily obtained from sialography, is necessary for a better understanding of salivary gland status before sialoendoscopy.

The sialographic techniques for the parotid and submandibular glands are similar. In most cases,

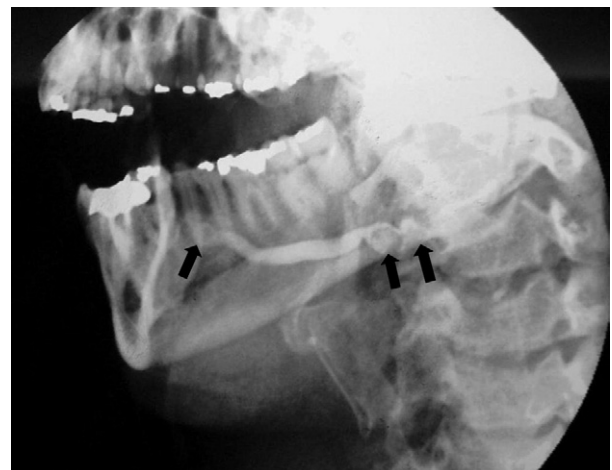


FIGURE 9. Sialogram of the submandibular gland showing presence of multiple sialolithiasis (arrows).

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Stensen's duct opening is easily seen, dilated, and cannulated compared with Wharton's duct opening. When performing the study in the parotid gland, however, care must be taken to avoid iatrogenic perforation of the duct owing to its curvature when bending around the anterior border of the masseter muscle. Wharton's duct is straighter and runs in a downward direction within the floor of the mouth, rendering it is less prone to perforation.

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