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.

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 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-
cientsly 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 watersoluble 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 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-
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 4.** Sialogram of parotid gland demonstrating narrowing of strictures of Stensen’s duct. Note presence of accessory gland (arrows).


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


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


**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.


**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
technology and the development of endoscopic tech-
niques 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-con-
suming, 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 pos-
sible. Instead, surgical removal of the sialolith and
surgical opening of the duct should be done and
sialoendoscopy performed without previous sialogra-
phy. An allergy to the contrast material (usually io-
dine) is also a contraindication. With the introduction
of minimally invasive endoscopic procedures for sal-
ivary gland obstructions, sialography has re-emerged
as an important gland examination, disclosing impor-
tant anatomic and pathologic information about the
gland before sialoendoscopy.

Reviewing the published data, we found that sia-
lography is an accepted tool for the assessment of
salivary gland obstructions; however, some have indi-
cated their abstention from performing the proce-
dure. Marchal and Dulgueron6 reported a preference
for using sialoendoscopy, rather than sialography, as
a primary tool for the diagnosis of salivary gland ob-
struction. They reported that the injection of contrast
material could push sialoliths further back into the
duct, complicating endoscopic removal of the sialo-
lith. 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, how-
ever, 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 discom-
fort, 7 found it slightly unpleasant, and only 1 re-
ported 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 dis-
played, revealing its form as narrow or large, the
presence of secondary branches leaving the main
duct, and the presence of accessory glands or sialoli-
thiasis, including their dimensions, number, and po-
sitions. Another advantage of this technique is its
ability to reveal the presence of internal duct stric-
tures, especially in the parotid gland, which always
escape detection with radiography and sometimes
with ultrasonography. Without doubt, all this infor-
mation, readily obtained from sialography, is neces-
sary for a better understanding of salivary gland status
before sialoendoscopy.

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

References