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Selective management of obstructive submandibular sialadenitis

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Abstract

We aimed to describe the effect of our surgical and sialoendoscopic technique for diagnosis and treatment of chronic obstructive submandibular sialadenitis.
Methods: Between January 2004 and June 2006, 68 patients presented with obstructive symptoms and were diagnosed and treated by interventional sialoendoscopy or excision. The patients all had radiographs and then, if the sialolith could not be found, diagnostic sialoendoscopy. The obstruction was treated by operation or interventional sialoendoscopy depending on the size, shape, site, and quality of the sialolith.
Results: Forty-nine patients had sialoliths shown radiographically, and the features of 19 were found endoscopically and were of three types: radiolucent ($n=6$), in the branch ($n=3$), mucus plug ($n=3$), and stenotic ($n=7$). Twenty-seven obstructions were successfully removed surgically, giving a success rate of 27/31 (87%). Twenty-seven patients were treated by interventional sialoendoscopy, and in 22 cases the sialoliths were removed directly by sialoendoscopy (22/27, 81%). Obstructive symptoms were relieved in 9 of 10 cases without stones.
Conclusion: Operation or sialoendoscopy can be used to treat the obstruction in the submandibular gland.

Keywords: Sialolith; Sialoendoscopy; Obstructive sialoadenitis; Submandibular gland

Introduction

Obstructive submandibular sialadenitis, with or without a sialolith, is common. Sialoliths are the main cause of obstruction of the submandibular gland, and cause repetitive swelling during meals. The traditional diagnostic methods include plain radiographs (occlusal film), sialography, ultrasound, and scintigraphy.[1] The conventional treatment depends on the site of the stone, and can be either by intraoral or external approach.

The aetiological factors are still unknown, but have mainly an anatomical and a salivary component. The anatomical structure of the submandibular duct was first described by Wharton in the 17th century, and the first attempts to visualise the duct with an endoscope were reported in the early 1990s.[2–4] During the past 10 years, with the rapid development in endoscopic techniques and the introduction of sialoendoscopy, diagnosing and exploring the submandibular gland directly has improved, and also permits minimally invasive surgical treatment to deal with the obstruction.

We report here our experience with the diagnosis and treatment of obstructive submandibular sialadenitis by different methods: classic and sialoendoscopic, and we particularly describe the outcome of sialoendoscopic diagnosis and treatment of patients with obstructed submandibular glands.

Patients and methods

Between January 2004 and June 2006, 68 patients were diagnosed with obstructive submandibular sialadenitis in

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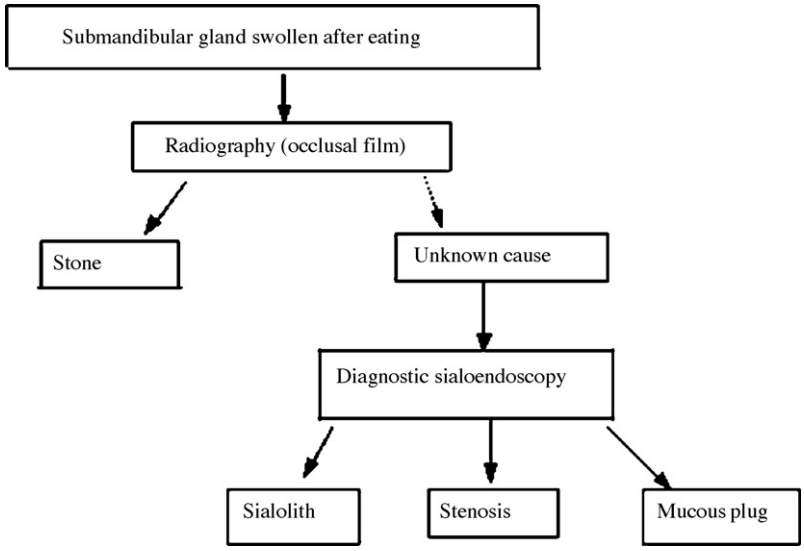


Fig. 1. Diagnostic algorithm.

Shanghai Ninth People's Hospital, with symptoms of intermittent swelling of the gland that was aggravated by eating. Some discharged pus. No other diseases were found on routine examination. All patients were evaluated by plain radiographs (occlusal film). If no sialolith was found, they had diagnostic sialoendscopy, which was also used to detect the duct postoperatively (Fig. 1).

There are three ways in which we can treat patients with salivary stones: removal through the oral cavity, interventional sialoendoscopy, and resection of the gland. Our choice depends on the site, size, shape, number, and quality of the stones.

The endoscopic system (Karl Storz, Germany) includes diagnostic and interventional sialoendoscopy, a papillary dilator, forceps, grasping wire basket (3 or 6 wires), and an electrohydraulic lithotripter (no. 27080B).

The procedure can be done under local or general anaesthesia according to the site of the stone and the wishes of the patient. Local anaesthesia is by nerve block (the lingual nerve) and perfusion of 2% lignocaine into the duct through the orifice. The endoscope is rinsed intermittently with a solution of 0.9% sodium chloride. This slightly dilates the duct, cleans the view of the endoscopist, and removes pus, debris, and occasionally blood.

The device is inserted through the orifice of Wharton's duct or by a mini-incision into the orifice or the anterior part of duct, and the papilla is dilated with dilators of increasing diameter. The first procedure is diagnostic, and can explore the ductal system thoroughly.

When a stone is located or a ductal disorder identified, interventional sialoendoscopy is required. The small, round stones, particularly one floating in the duct, can be removed directly by wires or forceps. Larger stones should be fragmented by and then removed by wires or forceps (Fig. 2).

When stenosis is the problem, the patients are treated by balloon dilatation and continuous irrigation through the endo-

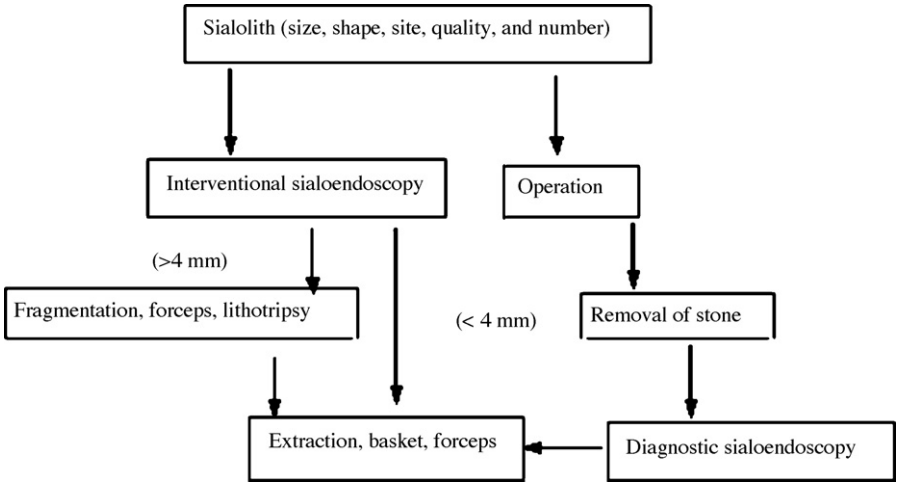


Fig. 2. Therapeutic algorithm.

scope if the stenosis is located in the middle or distal part or branch of the duct. Mucus plugs can also be removed by forceps and washed out by continuous lavage through the endoscope.

Patients in whom the stone is located in the anterior part of Wharton's duct, particularly if it is solitary or if a large or irregular stone is found distally or at the hilum, removal is difficult and complicated. If the stenosis is in the orifice or anteriorly, marsupialisation is done simultaneously.

Interventional sialoendoscopy and operation can be used jointly to treat multiple stones. Excision of the gland is the ultimate choice for cases in which no other method is possible.

Our evaluation of the results included whether the stone had been removed successfully and whether symptoms of obstruction were relieved.

Results

Sixty-eight patients were treated in our department, 41 men and 27women aged 12 to 65. Duration of symptoms was 2 months to 3 years. Stones were confirmed by plain radiographs (occlusal film) in 49 patients (72%), and 19 other patients were examined and their obstructive problem identified by diagnostic sialoendoscopy.

Nineteen patients, the reasons for whose stones were unknown, were classified into stone (Fig. 3), stenosis and mucus plug (Fig. 4), and a combination of the two. Nine patients had radiolucent stones or stones located in the branch duct; 6 had radiolucent stones, and 3 had stones in the branch duct. Seven patients had stenosed ducts and there were mucus plugs in three.

A single stone was diagnosed in 37/58 (64%) cases and multiple stones in 24 by radiography and sialoendoscopy. We categorised the three positions by radiography or sialoendoscopy according to the position of the stone. The anterior part is in front of the first molar and including it; the distal part is behind the first molar, and there is the branch. Of 58 stones, the sialoliths of 17 were located anteriorly, 3 in the branch duct, and 38 in the distal duct. The most posterior stone was recorded when there was more than one.

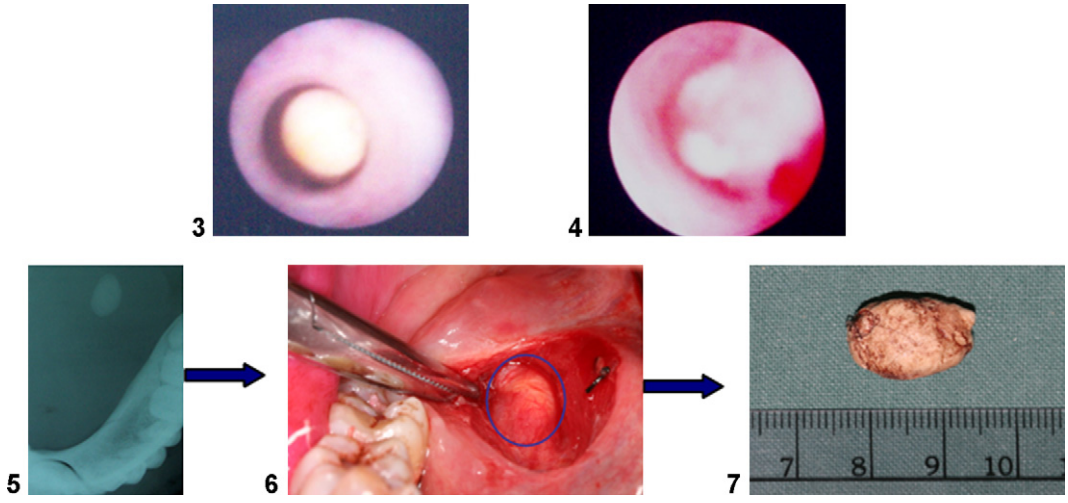
Table 1
Results of removal of sialoliths surgically and endoscopically

	Surgical removal		Interventional sialoendoscopically		Total
	Success	Failure	Success	Failure	
Anterior	13	0	4	0	17
Distal	14	4	16	4	38
Branch duct	–	–	2	1	3
Total	27	4	22	5	58

Stones were removed after radiographs and diagnostic sialoendoscopy. Of 58 cases, 27 were treated by interventional sialoendoscopy and 5 failed. The failures were caused by the stone being embedded in the ductal wall, unsuccessful dilatation of the stenosis, and the stone being located in the branch duct. Thirty-one were removed by routine excision (Figs. 5–7) and four failed because of the position of the stone and severe adhesions (Table 1). The results showed that the further back the stone was, the more difficult it was to remove. Failures were treated by resection of the gland.

Obstructive symptoms were relieved in 9/10 cases with no stones by interventional sialoendoscopy and operation. Remaining or radiolucent stones were found in seven cases by sialoendoscopy after operation.

The diameter of stones was measured after different procedures, and the maximum differed greatly, ranging from 2 to 18 mm. There were six complications: one patient had a sublingual cyst; five required corticosteroids together with antibiotics intravenously for severe swelling of the gland and floor of the mouth.



Figs. 3–7. (3) Stone in the main duct. (4) Mucus plug. (5) Occlusal film. (6) Removal of stone. (7) Salivary stone.

Discussion

Stones are the main cause of obstructive submandibular sialadenitis. They vary in size, shape, and quality, and either float in the lumen or attach to the ductal wall. They can be either single or multiple, and mechanically obstruct the salivary duct, causing recurrent swelling during meals.

Radiographs are a practical and simple way of investigating the ductal system. Nowadays, however, magnetic resonance sialography is a new way to diagnose the problem;[5] it provides two-dimensional or three-dimensional images of the salivary gland without contrast medium and too much exposure to radiation. These methods do not allow us to see the inner duct system directly to make sure what is happening in the duct. Sialoendoscopy was promoted in the 1990s as an endoscopic technique,[2–4] and allows us to explore the ductal system completely, mainly because the scopes are so small.

Endoscopy was introduced to our department in 1999, and used to explore obstructed disorders of the submandibular gland.[6] In 2002, a new sialoendoscopic system was introduced, which made it possible to diagnose and treat obstructive problems with minimal intervention, directly and immediately. Using sialoendoscopy we found the inner signs in the duct of the salivary gland. Features were mainly classified as sialolithiasis, sialodochitis, stenosis, and mucus plug, and all produce obstructive symptoms in the submandibular gland. Sialoendoscopy enabled us to detect the radiolucent stone and the stone in the branch and gave us evidence of obstruction. Marchal et al. reported[7] the finding of 131 cases of obstructed Wharton's ducts, and 106 by stones. Ninety cases were successfully relieved, with an overall success rate of 85%. By using endoscopy, Nahlieli and Baruchin[8] found that 32% of stones in the submandibular gland were not detected by routine imaging methods. The number of such cases in our series was 9/58 (16%). We were therefore convinced that sialoendoscopy was superior to plain film or even to magnetic resonance imaging, particularly for the smaller and more distal stones.

Conventional removal is particularly difficult if the stone is in the distal or hilar area of Wharton's duct, and may lead to postoperative complications, particularly damage to the lingual nerve. In some cases, the gland must be removed. Classically, proximal stones close to the papilla can easily be extracted orally, whereas the gland must be resected if they are more distal. A gland in which the sialolithiasis has become chronic may change its function. Marchal et al.[9] found in 48 patients with sialolithiasis that had been treated by resection, half had abnormal histological patterns, and there was no correlation between the duration of history and the histopathological alterations in the gland. A long history cannot therefore be used to predict the degree of functional loss, and so conservative treatment is both reasonable and practical.

The sialoendoscopic system that we have helps us to remove the stone with minimal effort, particularly when it is distal, and our success rate was 82%. Like others[10–12] our experience shows the results of interventional sialoendoscopy to be directly related to the size, shape, and position of the stone. Sialoendoscopy is a minimally invasive technique for treating obstructions of the ductal system and can be used with operation if the stones are big or misshapen.[13–17]

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