J Stomatol Oral Maxillofac Surg xxx (2017) xxx–xxx

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Original Article

Sialolithiasis removal under general anesthesia: A descriptive retrospective study in the maxillofacial surgery department in Lille University Hospital

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ARTICLE INFO

Article history:
Received 28 April 2017
Accepted 2 November 2017

Keywords:
Benign salivary gland obstruction
Lithiasis
Sialolithiasis
Sialoendoscopy
Salivary gland
Minimally invasive surgery

ABSTRACT

Introduction: Since the beginning of the use of sialendoscopy and extracorporeal lithotripsy, recommendations have changed. The purpose of this retrospective study was to evaluate the efficiency of our treatment protocol, without a lithotripter, under general anaesthesia in the Stomatology and Maxillofacial Surgery Department of Lille University Hospital. The secondary goals were to evaluate patient tolerance and satisfaction.
Materials and methods: All patients treated with sialendoscopy alone, sialendoscopy with a combined surgical approach or a transoral approach (TOA) (sialolithotomy) between January 2013 and December 2015 were included. Efficiency was judged by the number and size of the extracted calculi compared to those found on the preoperative CTS, the symptoms mentioned during the one month postoperative examination and the recurrence within 6 months (telephone follow-up). Success was attained when the calculus was completely eliminated and the patient was symptom free after one month and without recurrence through six months. On the other hand, failure was attained when the calculus could not be completely removed, there was remaining debris, the patient was still symptomatic after one month or if there was a recurrence before six months.
Results: The sialendoscopy success rate was 78.57% for the submandibular gland and 92.3% for the parotid gland. We had a 100% success rate with the combined approach for the parotid gland, we had a 96.7% success rate with TOA and we had a 100% success rate with TOA assisted with sialendoscopy.
Conclusion: Our results conform with the literature and prompt us to suggest a protocol without a lithotripter.

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1. Introduction

Salivary stones can occlude salivary ducts. According to past autopsy studies, sialolithiasis affects approximately 1% of the general population [1]. Most sialoliths (80–90%) develop in the submandibular gland, 5–10% develop in the parotid gland and the rest develop in the sublingual and minor salivary glands [2]. Sialoliths are often found in the distal portion of the duct or at the hilum of the submandibular gland and a few are found in the parenchyma [3].

The main symptom is swelling, with or without pain, during a meal. This symptom is referred to as the mealtime syndrome [4]. Treatment depends on the symptoms, position and size of the calculus. Since the beginning of the use of sialendoscopy [5] and extracorporeal lithotripsy [6], recommendations have changed.

The main goal of this study was to evaluate the efficiency of our treatment, without a lithotripter, under general anaesthesia in the Stomatology and Maxillofacial Surgery Department of Lille University Hospital between January 2013 and December 2015. Patients could be treated by sialendoscopy alone, sialendoscopy with a combined surgical approach or a transoral

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https://doi.org/10.1016/j.jormas.2017.11.007
2468-7855/© 2017 Published by Elsevier Masson SAS.

Please cite this article in press as: Ruiz R, et al. Sialolithiasis removal under general anesthesia: A descriptive retrospective study in the maxillofacial surgery department in Lille University Hospital. J Stomatol Oral Maxillofac Surg (2017), https://doi.org/10.1016/j.jormas.2017.11.007

approach (TOA) (sialolithotomy). The secondary goals were to evaluate patient tolerance and satisfaction.

2. Patients and methods

This descriptive, retrospective study focused on patients who had salivary lithiasis treated with sialendoscopy or surgery in the Stomatology and Maxillofacial Surgery Department of Lille University Hospital between January 2013 and December 2015. The inclusion criteria were one or more sialolithiasis under 3 mm diameter on a computed tomographic scan; patients were treated by sialendoscopy alone, sialendoscopy with a combined approach for the parotid gland, TOA or TOA assisted with sialendoscopy (TOAS) for the submandibular gland. The exclusion criteria were patients treated under local anaesthesia or by extracorporeal lithotripsy, patients for whom we lacked information or files, patients who could not be contacted by telephone after 3 attempts, or patients who did not wish to answer the questionnaire.

3. Treatment

3.1. Pretreatment clinical and paraclinical examination

The patient's sex, age, comorbidities and symptoms were noted during a maxillofacial consultation. The clinical examination studied saliva, papilla, saliva crest, gland and whether the calculus was bimanually palpable. Every patient had a computed tomographic scan (CTS) in order to establish size, number and location of the calculus.

The extraction technique has been chosen on different criteria.

Patients without palpable sialolithiasis and who had a sialolithiasis under 5 mm in diameter in the proximal portion of Stensen's or Wharton's ducts or in the hole of the gland were recommended for sialendoscopy with general anaesthesia. Patients were informed that the intervention could be converted to a TOA assisted with sialendoscopy if we were unable to remove the stone with the Dormia basket.

TOA was suggested for patients with palpable sialolithiasis and those who had a sialolithiasis with a diameter exceeding 5 mm located in the submandibular gland. This technique was suggested for a calculus that could not be removed with local anaesthesia.

For patients with no palpable sialothiasis in the physical examination but a diameter exceeding 5 mm located in the submandibular gland, we tried to locate the calculus bimanually under general anaesthesia and perform a TOA. If the calculus could not be located, a TOA assisted with sialendoscopy was performed.

Patients with palpable sialolithiasis with a diameter over 5 mm and located in the parotid gland, a sialendoscopy with combined approach (SCA) was suggested. This indication was for a calculus localized in Stensen's duct hole or the parenchyma (in the Stomatology and Maxillofacial Department, we do a transoral approach with local anaesthesia for the calculus in the duct for which we could not perform a sialendoscopy).

All the patients were informed that they could undergo extracorporeal lithotripsy in Paris or Marseille.

3.2. Protocol

Sialendoscopy: we used a conservative technique [7,8], which begins with progressive dilatation of the papilla using salivary duct probes with diameters from 0000 to 6 (reference 745847–745856; Karl Storz Co., Tuttlingen, Germany). The next step is to enter the duct with the scope (usually the "all-in-one" 1.3-mm diameter). After visualization of the stone, we use the Dormia basket. If a papillotomy is necessary, it is performed at the end of the procedure and it should be kept as minimal as possible to avoid oedema.

TOA: this technique was carried out under general anaesthesia. We suggested this procedure first if the sialendoscopy was unsuccessful (dilatation was not possible). After localization with bimanual palpation, we used the same technique described by Benazzou et al. [9] Figs. 1, 2 et 3.

TOA assisted with sialendoscopy (TOAS): after localization using sialendoscopy, transillumination guided the removal.

SCA was carried out under general anaesthesia. We used Marchal's technique without facial nerve monitoring [10]. We introduced the sialendoscopy to find the calculus, then we used a surgical approach using a facelift approach and transillumination to guide the removal.

Clinical follow-up by the surgeon was one month after the surgery to control the evolution and eventual complications.

Efficiency was judged by the number and size of the extracted calculi compared to those found on the preoperative CTS, the symptoms mentioned during the one-month postoperative examination and the recurrence within 6 months (telephone follow-up). Success was considered when the calculus was completely eliminated and the patient was symptom free after one month and without recurrence through six months. Failure was considered when the calculus could not be completely removed or there was remaining debris or if the patient was still symptomatic after one month or if there was a recurrence before six months.

Tolerance was evaluated by the occurrence of complications such as infection, bleeding or a transitory swelling syndrome within the first month. The specific complications monitored were duct perforation for sialendoscopy, a lingual injury for TOA or TOAS and a facial injury for the combined approach. The patients' opinions concerning their treatment was evaluated by means of a standardized telephone questionnaire specifically designed for this study. Patients were contacted a minimum of six months post-treatment. The questionnaire consisted of six questions regarding overall satisfaction, understanding of the protocol and recurrence.

4. Results

Between January 2013 and December 2015, 122 patients underwent a sialolithiasis removal under general anaesthesia. Four patients were excluded because of missing information, nine patients did not come to the postoperative examination and 27 patients could not be contacted after three attempts. We included 82 patients in our study. Patient characteristics are listed in Table 1.

Regarding the evaluation of efficiency, after six months, success was obtained for 77 of 82 patients (93,9%). Forty-seven patients were treated by TOA or SCA, 23 patients were treated with sialendoscopy and five patients were treated by TOA with sialendoscopy.

We obtained a success rate of 85.18% with sialendoscopy alone (23 out of 27 patients) and a success rate of 98.18% with surgery (SCA, TOA and TOAS) (54 out of 55 patients). These results include both glands.

The sialendoscopy success rate was 78.57% for submandibular gland and 92.3% for the parotid gland. We had a 100% success rate with the combined approach for the parotid gland, we had a 96.7% success rate with TOA and we had a 100% success rate with TOAS (Table 2).

We had four patients who had undergone sialendoscopy alone and one who had TOA who had failures. For the patient with TOA, partial fragmentation occurred and we could not remove the

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