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EPIDEMIOLOGY AND MANAGEMENT OF LITHIASIS OF THE SUBMANDIBULAR GLAND: STUDY OF 38 CASES

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SUMMARY

Sialolithiasis is the most common disease of salivary glands. It mainly affects the submandibular gland. Its diagnosis is based on clinical and radiological signs and it is treated through surgery. The aim of our study is to determine the epidemiological, clinical, therapeutic and evolutionary aspects of lithiasis of the submandibular gland. To do that, we present a retrospective study of 38 patients operated on for calculi of the submandibular gland between January 2010 to December 2013 at the ENT department and head and neck surgery at the hospital August 20th, Ibn Rushd Hospital in Casablanca. 63% of patients were male with a mean age of 43 years and the main reason for consultation was submandibular swelling (34 cases). All our patients had a cervical ultrasound. Resection of the submandibular gland was performed on 35 patients. Some postoperative complications were noted in six patients. We monitored patients for 6 to 12 months after surgery. Only one case of recurrence was recorded.

Keywords: Submandibular gland, stones, diagnosis, treatment, evolution

INTRODUCTION

Salivary calculi are the most common pathologies after salivary infections (mumps) [1]. They predominantly occur in the submandibular glands (80-92%), followed by the parotid glands (6-19%) and unusually for sublingual glands and accessory glands [1-2%].
The aim of our study was to analyze the epidemiological, diagnostic, therapeutic and evolutionary data about lithiasis of submandibular glands in our series.

MATERIALS AND METHODS

This is a retrospective study of 38 patients undergoing sialolithiasis during the period from January 2010 to December 2013 in the ENT department and head and neck surgery at the hospital August 20th, Ibn Rushd Hospital in Casablanca.

Enrollment criteria: All patients with a lithiasis of the submandibular gland whose diagnosis was performed by clinical, radiological, intraoperative or histological examination were selected for our study,

RESULTS

From January 2010 to December 2013, 38 patients were operated on for lithiases of submandibular glands. A male predominance was noticed with 63% giving a sex ratio of 1.70. The average age was 43 years, ranging from 12 to 64 years. The consultation period ranged from two months to six years with an average of two years. One patient with Sjogren Sjögren's syndrome was noted. The circumstances of discovery were represented in (Table I).

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Table I: Distribution of patients according to the circumstances of discovery

		Number of cases	percentage %
Submandibular swelling		38	100
Mechanical accidents	Salivary colic Morestin	34	89,47
	Salivary hernia Garel	24	63,15
Infectious accidents	Whartonite	14	36,84
	Périwhartonite	2	5
Jet lithiasis by ostium		1	2

The main reason for consultation was submandibular swelling in all cases.
Inspection objectified pus at the Wharton's duct in 14 cases. Results of palpation were, in the majority of patients, a hard swelling, regular movable relative to the skin surface and deep level. Three patients had lithiases blocked at the anterior floor, and one of them had bilateral stones (Figure 1).

Figure 1: stones of the anterior floor with presence of pus in the ostium

All our patients had a preoperative cervical ultrasound. It revealed ductal dilatation upstream of the obstacle in 18 cases, including six patients who had two or more calculi. The size of the stones ranged between 0.34 cm and 1.15 cm. Computed tomography (CT) was requested in two patients with floor's cellulitis. The CT gave a collection of submandibular imageries showing stones of 0.3 cm and 0.28 cm. No patients had a sialography.
In order to prepare for surgery, medical treatment (antibiotics and non-steroidal anti-inflammatory drugs) was administered to 16 patients who had infectious complications. All patients were operated. 93% (35 cases) underwent a submandibular gland resection under general anesthesia, and three had a calculation excision under local anesthesia. Careful hemostasis was performed; along with suture in two shots and the implementation of suction drain. Postoperatively, antibiotics and analgesics were prescribed to all patients.
The postoperative course was uneventful in 32 patients with a mean hospital stay of two days. Table II shows the different postoperative complications.

Table II: Distribution of patients according to postoperative complications

	Number of cases	Pourcentage %
Paresis of the mental branch of the facial	**3**	**7,89**
Postoperative Infection	**2**	**5,26**
Postoperative bleeding	**1**	**2,63**
Paralysis of the hypoglossal nerve and lingual nerve	**0**	**0**

Histological examination was performed in all patients. It confirmed the presence of calculus with an inflammatory salivary parenchyma (sialadenitis). All patients were seen six months to one year after surgery. Only two patients relapsed after simple calculation excision under local anesthesia. They were called on for a submandibular gland resection under general anesthesia.

DISCUSSION

Sialolithiasis is a pathological condition caused by calculus obstruction in salivary gland or excretory duct [3]. Etiopathogenesis of salivary calculi is largely unknown. Stone formation is currently thought to be multifactorial (inflammatory, infective, mechanical, neurogenic and chemical). It is result to calcium salts' deposition due to the stagnation of saliva (that is rich in calcium), around an initial matrix formed by salivary mucins, bacteria and desquamated epithelial cells [4-5].
The submandibular gland is more susceptible to develop salivary calculi than parotid gland, and that is mainly due to anatomical factors: the submandibular duct (Wharton's duct) is longer and wider compared to the parotid duct [6]. In addition, the gland has an antigravity flow [6]. Physical and chemical factors are also involved: salivary

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secretion of the submandibular gland is richer in mucin, calcium and phosphates compared to the serous saliva from the parotid gland [6].
Often times, the submandibular gland calculi are found in adults of middle age. [7] In this study, the average age of patients was 43 years at diagnosis. Children are rarely affected by this disease. Among 216 patients suffering from sialolithiase, Schulz has found four children under 15 years old [8]. In our study, we report only one case of a 12 years old patient, thus validating the literature data. Also, male is prominent in our series (63%) as several others data (Table III).

Table III: Distribution of patients by sex

	Number of cases	Men (%)	Women (%)
Mela 1986 [9]	215	64	36
Lustmann 1989 [10]	245	49,4	50,6
Zupi 1995 [11]	155	59,4	40,6

Submandibular stone is sometimes unintentionally discovered during a mouth examination or radiography. But more often, mechanical accidents that cause salivary retention (salivary colic and salivary hernia) which reveal rarely infectious accidents (the Whartonite and periwhartonite) are the reason behind the diagnosis. These accidents occur during a meal or other salivary stimulations [12-13]. In our study, all patients had submandibular swelling with mechanical events which explains the chronicity nature of the disease. In this paper, only one patient was seen for Sjogren Sjögren's syndrome, corroborating the literature's data: Sjögren's syndrome and sarcoidosis facilitate stone formation [14].
Patient's clinical examination is based on mouth exam and gland palpation looking for swelling, following posterior to anterior direction, in order to feel the calculus [15]. In this study, only three patients had anterior floor calculations.
The paraclinical examinations are also very useful to sialolithiasis diagnosis. Radiography (occlusal radiographs and orthopantomogram) alone can confirm sialolithiasis [16]. Approximately 80-90% calculi are seen in radiography. However 20% of calculi are not seen because of radio-transparency, then requiring other forms of investigations [17].
Ultrasonography is, for many authors, the chosen method of diagnosis in salivary calculi. These authors claim that it has 94% sensitivity, 100% specificity and 96% accuracy [14]. According to Jäger et al., ultrasonography sensitivity in sialolithiasis detection is equal to 59.1–93.7%, and its specificity: 86.7–100% [18]. However, size is the limiting factor of ultrasound exams, because only calculi greater than 0.2 cm may be seen [18]. In this study, we performed this test on all patients and it helped detect calculi in 18 patients. The calculi sizes were greater than 0.2 cm (0.34 cm and 1.15 cm).
The use of Computed Tomography in lithiases disease is not yet a usual practice except when there are infectious complications (sialite, abscesses) or parenchymal signs of suffering [19]. CT was performed in two patients with cellulitis of the submandibular region which coincides with the literature data.
The treatment of submandibular calculi can be either medical or surgical: In case of inflammatory flare, the first solution is anti-inflammatory and antibiotics prescriptions, along with sialagogues and massage of the salivary gland in case of mechanical damage [20]. In this study, sixteen patients were able to receive medical treatment in order to cool down the infection before considering surgery. Intraoral resection for a single previous calculation of submandibular duct is considered in case of failure of medical treatment or to preserve the gland [21]. Radical surgery is proposed for multiple calculi cases: chronic inflammatory alterations; glandular atrophy and unique deep calculations [22-23]. In this study, thirty five patients had radical surgery, while three patients underwent conservative surgery with intraoral excision under local anesthesia. As reported in some papers [22], endobuccal excision is an ineffective treatment in multiple submandibular calculi.
Some operative risks in submandibular gland surgery are noted. According to Diop, among fifteen patients undergoing sub-maxillectomy for lithiasis, two patients had impermanent facial paresis (13.33%) and one had lingual nerve paresthesia, there was not any hypoglossal nerve injury [24]. In our study, we noted less impermanent facial (three patients) and no hypoglossal or lingual nerves injuries.
The aesthetic issues and nerve complications of resection of the submandibular gland gave appearance to new techniques: endoscopic extraction and extracorporeal lithotripsy. The extracorporeal lithotripsy is indicated in single calculi (smaller than 0.7 cm) and ductal location [25], while endoscopic ablation concerns only 0.3-0.4 cm calculi [26].

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CONCLUSION

There are various methods available for salivary lithiasis treatment. The endoscopic extraction and extracorporeal lithotripsy are both two current alternatives in resection of the submandibular gland.

REFERENCES

1 Bado F, Maladiere E, Guilbert F. Lithiase Salivaire. EMC Stomatologie 22-057-A 15, 2001,5p.
2 Kolokotronis A. Lithiase d'une glande salivaire mineure : un cas. Rev Stomatol Chir Maxillofac. 1999; 100:140-42.
3 Epker BN. Obstructive and inflammatory disease of the major salivary glands. Oral Surg Oral Med Pathol 1972; 33: 2-27.
4 Cawson R A, Odell E W. Essentials of oral pathology and oral medicine. 6th ed. pp 239-240. Edinburgh: Churchill Livingstone, 1998.
5 Carr S J. Sialolith of unusual size and configuration. Oral Surg, Oral Med, Oral Pathol 1965; 20: 709-712.
6 Raksin SZ, Gould SM, William AC. Submandibular gland sialolith of unusual size and shape. J oral Surg 1975; 33: 142-45.
7 Raji A, Janah A, Chakkoury L,Benchakroun Y. la sous maxillite lithiasique : aspects diagnostiques et thérapeutiques. Esp. Méd. 2001 ; 8 (76) :470-473.
8 Schulz HG : Das Röntgenbild der Kopfspeicheldrüsen. Barth, Leipzig : 148-64, 1969.
9 Mela F, Berrone S, Giordano M : Considerazioni clinicostatistiche sulla scialolitiasi sottomandibulare. Minerva Stomatol 35 :571-3, 1986.
10 Lustmann J, Regev E, Melamed Y :Sialolithiasis. A survey on 245 patients and a review of the litterature. Int J Oral Maxillofac Surg 19 :135-8, 1990.
11 Zupi A, Califano L, Russo A, Papa F, Piombino P, Giardino C : La sialolithiase. Observation de 155 cas. Acta Stomatol Belg 92 :83-5, 1995.
12 Bourgeois B., Masseau A., Hamidou M., Beauvillain de Montreuil C. Pathologie salivaire médicale [en ligne]. In : EMC (Elsevier Masson SAS) Oto-rhino-laryngologie 2006 ;
20-628-A-10.
13 Chossegros C., Guyot L., Alessi G. Lithiases salivaires [en ligne]. In : EMC (Elsevier
Masson SAS) Médecine buccale 2008 ; 28-290-M-10.
14 Yousem DM, Kraut MA, Chalian AA: Major Salivary Gland Imaging. Radiology, 2000; 216(1): 19–29.
15 Williams M F. Sialolithisis. Otolaryngologic Clinics of North America 1999; **32**: 819-834.
16 Obaid H, Sinha R, Robinson L: Submandibular sialogram performed through a Wharton's duct fistula: Technical adaptation of conventional technique. Eur J Radiol, 2006; 60(1): 56–57.
17 Alyas F, Lewis K, Williams M et al: Diseases of the submandibular gland as demonstrating using high resolution ultrasound. Br J Radiol, 2005; 78(928): 362–69.
18 Jäger L, Menauer F, Holzknecht N et al: Sialolithiasis: MR Sialography of the Submandibular Duct – An Alternative to Conventional Sialography and US? Radiology, 2000; 216(3): 665–71.
19 Marchal F, Dulguerov P, Becker M, Barki G, Disant F, Lehmann W. Specificity of parotid sialendoscopy. Laryngoscope 2001;111:264-71.
20 Pollack C V Jr, Severance H W Jr. Sialolithisis: case studies and review. J Emergency Medicine 1990. 8: 561–565.
21 Zenk J, Constantinidis J, Al-Kadah B, Iro H. Transoral removal of submandibular stones. Arch Otolaryngol Head Neck Surg 2001;127:432-6
22 Avrahami E, Englendr M, Chen E, Shabtay D, Katz R, Harell M. CT of submandibular gland sialolithiases. Neuroradiology 1996;38:287-90.
23 Ben Salem D, Baudoin N, Ricolfi F. Cellulite cervicale et pelvi-buccale. Feuillets de radiologie 2003 ;5 :461-3.
24 Diop E.M., Hitimana A, Bouillet D.N, Diop L.S. Lithiases salivaires. Dakar Médical,1983;28(1):265-278.
25 Ottaviani F, Capaccio P, Rivolta R, Cosmacini P, Pignataro L, Castagone D. Salivary gland stones: US evaluation in shock wave lithotripsy. Radiology 1997;204:437-41
26 Katz P, Fritsch MH. Salivary stones: innovative techniques in diagnosis and treatment. Current opinion in Otolaryngology and Head and Neck Surgery 2003;11:173-8.