Case Report

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SIALOLITHIASIS: REPORT FROM CASE ARCHIVES WITH REVIEW OF THE LITERATURE

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ABSTRACT:

Sialolithiasis occurs by obstruction of the salivary secretion with a calculus formation. Sialolithiasis is one of the common cause for salivary gland swelling involving submandibular(92%), parotid (6%), sublingual glands and minor salivary glands (2%). Annual incidence of sialolithiasis range from 1 per 10,000 individuals to 1 per 30,000 individuals Present work is based on the study of 11 cases of sialolithiasis, taken from case archives. Age range was between 9 to 55 years, male (81.8%) to female (18.2%) ratio was 9:2. Among 11 cases, 3 parotid (27.3%) and 8 submandibular (72.7%). Sialoliths are composed of combination of organic and inorganic substances. Biochemical analysis was done with calcium in sialoliths ranging from 6.6mg/dl to 7.32mg/dl and phosphate 2.11mg/dl to 2.67mg/dl. Carbonates and oxalates were in traces. Histopathology displayed salivary gland tissue with loss of acini architecture in 5 cases with inflammatory infiltrates, speckles of calcifications, dilated ducts with squamous metaplasia.

Key words: predisposing factors, sialolith, submandibular salivary gland

INTRODUCTION

Sialolithiasis occurs due to the obstruction of salivary secretion with a calculus formation. The cause for the formation of salivary calculi is unknown, though several etiological factors contribute to certain extent. Initiation of a calculus predominantly depends on nature of calcium rich saliva. The desquamated epithelial cells from mucous membranes attract the calcium salts from saliva to accumulate thus initiate the process of calculi formation superimposed by bacterial infection. The other main reason includes if there is any anatomical variation in the ducts can lead to mechanical obstruction. Sialolithiasis is one of the common cause for salivary gland swelling involving submandibular (92%), parotid (6%), sublingual glands and minor salivary glands(2%). Annual incidence of sialolithiasis range from 1 per 10,000 individuals to 1 per 30,000 individuals[1,2,3]

Treatment conventionally varies according to the size, duration and location of the sialolith. Small sialoliths escape from the duct without treatment. Some large sialoliths obstruct the duct completely or partially so surgical excision is the treatment of choice in such cases or treatment options varies with transoral sialodochotomy, sialoadenectomy other alternatives are extracorporeal lithotripsy, sialendoscopy with basket retrieval or laser lithotripsy.[4] We are reporting 11 cases of silaolithiasis taken from the case archives with brief review of the literature

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emphasizing more on the etiological aspect.

CASE DETAIL:

Clinical history, histopathological details were noted down from archived case files. Morphological features of the sialoliths were examined. Age range was between 9 to 55 years, male (81.8%) to female(18.2%) ratio was 9:2 [Table1]. Among 11 cases, 3 parotid (27.3%) and 8 submandibular (72.7%). Youngest patient was aged 9 years followed by 17years, others belonged to middle age group. 8 cases were found near the orifice. 1 case in the duct and 2 cases within the gland [Figure 1].

Symptomatic patients had swelling over the right/left(unilateral) side of the neck, increased while eating food. History of pain and tenderness with less flow of saliva were recorded. Duration was recorded from 2 weeks to 4 months. 7 of the patients had smoking habit for many years, with history of recurrence in one of them. Radiographs were taken in all the cases showed radio-opacity. Ultrasound showed sialoliths as mixed ecogenic lesion. Parenchymal calcifications were observed in MRI. Size of the sialoliths measured from 0.2cm to 1.2cm, varied in shape from oval, elongated to irregular [Figure2]. Biochemical analysis was done with calcium in sialoliths ranging from 6.6mg/dl to 7.32mg/dl and phosphate 2.11mg/dl to 2.67mg/dl. Carbonates and oxalates were in traces. Histopathology displayed salivary gland tissue with loss of acini architecture in 5 cases with inflammatory infiltrates [Figure 3A] speckles of calcifications, dilated ducts with squamous metaplasia [Figure 3B&3C]. Small, peripherally located sialoliths were removed with manipulation of the gland. Others required surgical excision, two of the cases with large sialoliths, located within gland required surgical excision.

DISCUSSION

Etiology of sialolithiasis is not still clearly found out till date. There are several factors directly or indirectly involved to be the cause for the sialolith formation. Sheman and McGurk have found that the higher calcium levels does not induce sialolith formation. But previous studies from literatures have found calcium levels as the prime causative factor in the sialolith formation. Tibor K et al., has mentioned about the calcium phosphate salts leading to the formation of calculus and sialolith. Phospholipids react with the calcium salts and inorganic phosphates forming a calcium phosphate phospholipid complex with salivary proteins, salivary pH play an important role for the reaction. In the present study from the case archives male predominance was found. The submandibular glands are found more frequently involved, because the saliva is generally more alkaline, has a greater concentration of calcium and phosphate. It has higher mucus content than the parotid and sublingual glands, besides the ducts are of considerable length. Smoking decreases the antimicrobial activity of saliva, allows accumulation of microbial debris into the salivary ductal system. Oval and elongated bacilli were detected

from the sialoliths from scanning electron microscope, confirmed by the presence of bacterial DNA from polymerase chain reaction. In addition, decreased salivary flow, factors that cause inflammation of the salivary ductal system precipitate calculus formation. Consequently, exploration of etiological factors has made possible to identify salivary stasis hence inflammation of the salivary ductal system. Proposed additional factors include reduced fluid intake, the use of medications.[5,6,7,8] In our study, 7 patients with chronic smoking habit, one had recurrence of the disease, indicates a correlation between added cytotoxicity of the saliva by smoking, Rad M et al., in their study of salivary flow rate from smoking have shown smoking as one of the risk factors for decreased salivary flow.[9] Submandibular sialoliths, are found to be reported in most of the literatures as most frequently involved. In contrary, Marchal F et al., reported parotid gland more involved in their study than submandibular gland,[8] in our cases among 11 patients 8 were from the submandibular gland. This implies though submandibular glands are more prone for the occurrence of sialoliths it is not always true, other etiological factors being equally contributing like the food and beverages, habits, medications affecting to the discrepancy in the constituents and pH of the saliva. The composition of the sialoliths in the present cases, from the biochemical analysis it was found that calcium, phosphate salts were the main ingredients others carbonates and oxalates were in traces. The X-ray diffraction patterns done by Grycova E et al., determined Calcium, Sodium, Magnesium, Phosphate and Hydroxylapatite as the main ingredients from sialoliths. They also found 70% of them containing Al, Fe, Cu, Ni, Pb, Ti and Zn nanoparticles of pure metal, believed to obtain from different environmental conditions.[10]

Traditional theories state the formation of sialolith in two phases, a central core with layered periphery. The central core contains precipitation of salts bound by organic substances followed by deposition of inorganic materials or some intracellular micro-calculi excreted into the canal acting as a nidus. Submandibular stones form around a nidus of mucous, generally surface is smooth, whereas parotid stones form most often by inflammatory cells or a foreign body origin with uneven surface. Another theory explains a metabolic phenomenon, specifies saliva bicarbonate content as a motivating factor, altering calcium phosphate solubility leading to precipitation of calcium and phosphate ions. Others, such as retrograde theory mentions, any substances or bacteria present within the oral cavity can migrate into the salivary ducts to create nidus for further calcification. The size of the stones are larger inside the gland than found in the ducts.[8,11,12]

Various infections involving the salivary glands including bacterial, viral, inflammatory conditions like sjogren's, radiotherapy, neoplastic masses contribute to the differential diagnosis of

sialolithiasis. Diagnostic imaging to identify salivary calculi are conventional radiography, sialography, ultrasonography and high-resolution noncontrast computerized tomography.[13,14]

CONCLUSION

Ductal metaplasia, atrophy, fibrosis, speckles of calcified masses are the long term reactive pathological features. Submandibular glands are involved in common. Incidence of recurrences seen if predisposing factors are not eliminated and resolved. Henceforth patient's awareness in the initial stages could prevent further complications.

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FIGURES:

Figure 1: Gross examination of the specimen revealing a sialolith within the salivary gland.

Figure 2: Sialolith diplays irregular spikes under stereomicroscope.

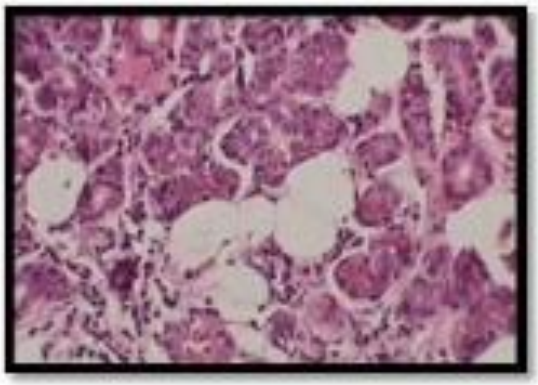

Figure 3: Photomicrograph of H&E stained sections, displays **(3A)** loss of architecture of acini and inflammatory infiltrates(x4)

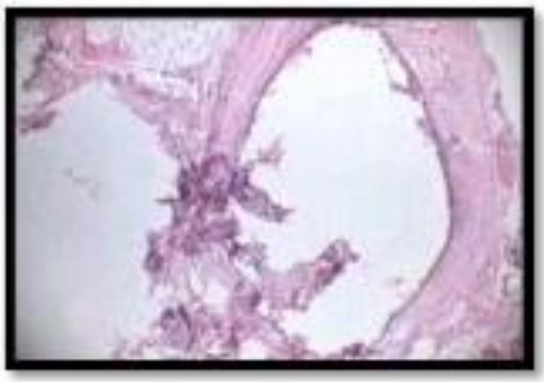

Figure (3B) dilated duct with squamous metaplasia(x10)

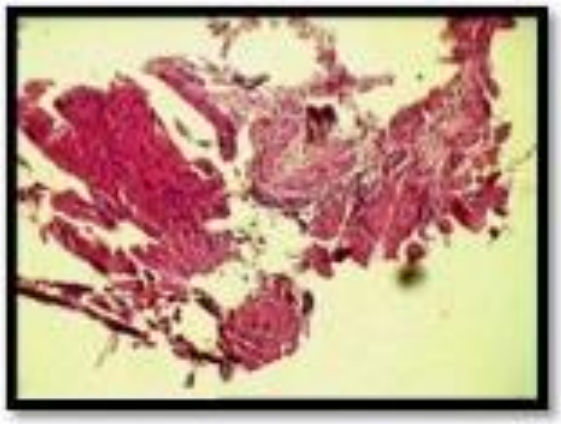

Figure 3C: dispersed speckles of calcifications(x4).

TABLE:

Table 1

Patients	Age	Sex	Gland involved	Side	Size(cm)
1	9	M	Submandibular gland	Right	0.2
2	17	M	Parotid gland	Right	0.2
3	39	M	Submandibular gland	Right	0.4
4	27	M	Submandibular gland	Right	0.2
5	32	F	Submandibular gland	Right	1
6	36	M	Parotid gland	Right	1.2
7	41	M	Parotid gland	Right	0.5
8	42	M	Submandibular gland	Right	O.5
9	44	F	Submandibular gland	Right	0.8
10	49	M	Submandibular gland	Right	0.5
11	55	M	Submandibular gland	Left	1.1(2 in number)