ISSN: 0975-3583,0976-2833 VOL14, ISSUE 05, 2023

Presence of pulp stones and its relation with systemic disorders

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Article History: Received: 16-04-2023 **Revised:** 10-05-2023 **Accepted:** 19-05-2023

Abstract

Background: To estimate the prevalence of pulp stones and its relation with systemic disorders.

Materials & methods: A total of 100 patients were enrolled. Out of which 66 were males and 34 were females. Age group enrolled in a study was 20-50 years and divided into groups of 20-30, 30-40 and 40-50 years. Systemic diseases like atherosclerosis and renal stones were studied and results were obtained with respect to presence of pulp stones in such patients. Result was evaluated using SPSS software.

Results: A total of 100 patients with a history of systemic diseases were taken under consideration. Subjects with presence of pulp stones in males in an age group 20-30 years was 4 (30.8%) out of 13 in total. In 30-40 years old patients, 30 in total 11 (36.7%) and in 40-50 years, 23 in total 13 (56.5%) had pulp stones. In females, age group 20-30 years had 6 (54.5%) out of 11 total, age group 30-40 years had 3 (37.5%) out of 9 total and age group 40-50 years had 6 (42.8%) out of 14 total. P- value was 0.04.

Conclusion: Cardiovascular patients had higher number of pulp stones than other groups.

Keywords: pulp stone, cardiovascular diseases, oral health.

Introduction

Pulp stones are discrete calcifications appearing within the pulp of the healthy, diseased and/or, even, the unerupted teeth. They may exist freely within the pulp tissue or, may be attached to, embedded in dentin.[(1)]Despite several microscopic and histochemical studies, the exact cause of pulp calcifications remains largely unknown; however, several conditions have been claimed to predispose to pulp stone formation, such as age, genetic predisposition, low-grade, persistent insults to the vital tissue, circulatory disturbances, and inductive interaction between the pulp tissue and the epithelium, although, in many instances, there is no clear-cut or defined etiology behind such degenerative changes, eventually leading to pulp calcifications. [(2)]

PS varies in size and number, where some might be very small in size and other may be large to occlude the pulp chamber. These PS may be free, embedded or adherent to the wall of pulp space. [(3)] True PS are formed by dentine and lined by odontoblast, whereas, false PS are formed from degenerative cells which gets mineralized. [(4)] They can be found in both primary and permanent dentition.

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 05, 2023

Pulp stones has been associated with many systemic conditions namely coronary artery disease (CAD), diabetes mellitus (DM), renal diseases and autoimmune diseases. Few authors have reported a significant association between renal calculi and pulp stones. [5] Moreover, researchers believe that PS detection can be a diagnostic marker of systemic disease. [6] Cardiovascular disease (CVD) is a major concern of morbidity and mortality in the modern era. Atherosclerosis is the major causative factor for CAD leading to ischemic heart disease. It has been found by many authors that CVD can be associated with PS. IHDs have been recorded as the leading cause of morbidity worldwide, wherein arteriosclerosis is the most common cause of IHDs, including stable and unstable angina, myocardial infarction (MI), cerebro vascular diseases such as stroke and peripheral artery disease (PAD), which is also known as peripheral vascular disease (PVD). [7] Hence, study is conducted to estimate the prevalence of pulp stones and its relation with systemic disorders.

Materials & methods

A total of 100 patients were enrolled. Out of which 66 were males and 34 were females. Age group enrolled in a study was 20-50 years and divided into groups of 20-30, 30-40 and 40-50 years. A complete case history was taken. Data was collected and analysed. Systemic diseases like atherosclerosis and renal stones were studied and results were obtained with respect to presence of pulp stones in such patients. Result was evaluated using SPSS software.

Result

A total of 100 patients with a history of systemic diseases were taken under consideration. Subjects with presence of pulp stones in males in an age group 20-30 years was 4 (30.8%) out of 13 in total. In 30-40 years old patients, 30 in total, 11 (36.7%) and in 40-50 years, 23 in total, 13 (56.5%) had pulp stones. In females, age group 20-30 years had 6 (54.5%) out of 11 total, age group 30-40 years had 3 (37.5%) out of 9 total and age group 40-50 years had 6 (42.8%) out of 14 total. P- value was 0.04. A total of 8 patients with atherosclerosis 3 (37.5%) had pulp stones and patients with renal stones were 3 in total and 1 (33.3%) had pulp stones in males. Whereas in females, 5 atherosclerotic patients out of which only 1 (20%) had pulp stones and out of 8 with renal stones 1(12.5%) had pulp stones.

Table 1: prevalence of pulp stones in relation to age groups and gender

Age groups	Male		Female		P-value
	Number	Patient with pulp stone	Number	Patient with pulp stone	
20-30	13	4 (30.8%)	11	6 (54.5%)	0.04
30-40	30	11 (36.7%)	9	3 (37.5%)	
40-50	23	13 (56.5%)	14	6 (42.8%)	
Total	66	25 (37.9%)	34	16 (48.4%)	

Table 2: Prevalence of pulp stones and systemic diseases.

	Atherosclerosis		Renal stones	
	Total	Pulp stones	Total	Pulp stones
Male	8	3 (37.5%)	3	1 (33.3%)
Female	5	1 (20%)	8	1 (12.5%)

Discussion

The PS are usually reported as an incidental finding on a radiograph. It can also be found during a pre-operative radiograph or intra-operative root canal treatment.[8] The prevalence of pulp stone reported with various 2D radiographic techniques such as IOPA, bitewing, and OPG, ranges from 8–90%, whereas histological section has revealed greater percentage.[9]

ISSN: 0975-3583,0976-2833 VOL14, ISSUE 05, 2023

It is believed that calcification seen in the various regions such as kidney, joints, teeth, and in atherosclerotic plaque are primarily made up of calcium phosphate crystals. These crystals can precipitate an acute immunological reaction leading to an inflammatory response within the arteries. Such event becomes a leading cause for ischemic heart disease causing significant mortality and morbidity. [10] According to other theory, calcifying nano particles classified nano bacteria's are the key factors for the pathological calcifications seen in the gall stones, joint calcification, renal calculi, atherosclerotic plaque and PS. [11] In our study, a total of 100 patients with a history of systemic diseases were taken under consideration. Subjects with presence of pulp stones in males in an age group 20-30 years was 4 (30.8%) out of 13 in total. In 30-40 years old patients, 30 in total 11 (36.7%) and in 40-50 years, 23 in total 13 (56.5%) had pulp stones. In females, age group 20-30 years had 6 (54.5%) out of 11 total, age group 30-40 years had 3 (37.5%) out of 9 total and age group 40-50 years had 6 (42.8%) out of 14 total. P- value was 0.04.

One of the study was done to determine the correlation between pulp stones and cardiovascular disorders, Type II diabetes mellitus, autoimmune disorders and dental wear defects. They studied on total of 1432 teeth of five groups were examined, comprising of patients with C.V.S. disorders; Type II diabetes mellitus, autoimmune disorders, dental wear defects and control group. [12] Pulp stones were found in 134 (9.35%) of 1432 teeth detected. Significantly, higher numbers of pulp stones were recorded in patients with cardiovascular disorder (15.86%) than other groups. The occurrence of pulp stones were significantly higher in molars (18.29%) than premolars (6.6%) and in maxillary arch (12.36%) than in mandibular arch (5.95%). No significant difference was found between sexes and sides. Positive correlation was found between systemic disorder and pulp stones. Cardiovascular patients had maximum number of pulp stones followed by dental-wear defects and least number of pulp stones were evident in control group. [13] In our study, total of 8 patients with atherosclerosis 3 (37.5%) had pulp stones and patients with renal stones were 3 in total and 1 (33.3%) had pulp stones in males. Whereas in females, 5 atherosclerotic patients out of which only 1 (20%) had pulp stones and out of 8 with renal stones 1(12.5%) had pulp stones.

Another study was done for detection of pulp stone in a patient suffering from undiagnosed systemic diseases can be an early diagnostic indicator. From a total of 229 scans, 4807 teeth were screened for pulp stones throughout the arches. The tooth-wise prevalence of pulp stones in group I, II, and III was found to be 16.65%, 9.01%, and 3.86%, respectively. Patient-wise ($p < 0.01$) and tooth-wise ($p < 0.01$) prevalence was recorded significantly highest in the cardiovascular group followed by the diabetic group. The control group had the least prevalence. Significantly ($p < 0.01$) higher number of pulp stones were found in cardiovascular patients with age > 50 years compared to other groups. Systemic disease such as cardiovascular disease and diabetes mellitus poses a higher risk for the development of pulp stones. [14]

Conclusion

Cardiovascular patients had higher number of pulp stones than other groups.

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ISSN: 0975-3583,0976-2833 VOL14, ISSUE 05, 2023

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