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ORIGINAL RESEARCH

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Prevalence of Haller's Cells in OPG and Its Clinical Correlation: A Retrospective Study

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ABSTRACT

INTRODUCTION: Haller's cells arise with the pneumatization of the lateral crus. Although Haller's cells are anatomical variations in the development of the nose and paranasal sinuses, they are found responsible for the patient's symptoms and are thus clinically significant.
AIM: The purpose of the present study is to emphasize the appearance of Haller's cells on panoramic radiographs and their clinical correlation.
MATERIALS AND METHOD: OPG scans of 700 subjects of either gender in the age range of 16 to 60 years were evaluated for the presence of Haller's cells and retrospectively patient's clinical features were seen. Gender, age, and clinical relevance were observed. A Chi-square test was used to evaluate the prevalence of Haller's cell in panoramic radiograph (OPG), its occurrence in males and females, and its clinical correlation. The software used for statistical analysis was SPSS version 21.0 and the p-value, of less than 0.05 was considered significant.
RESULTS: Haller's cells were detected in 95 scans of 700 OPGs, the overall prevalence of Haller's cells was 13.5 % with an overall p-value less than 0.05 rendering it significant. Of the 95 cases with Haller's cells, 55 (57.89%) were in males and 40 (42.10%) were found in females. The p-value was 0.32 (> 0.05) rendering it non-significant.
CONCLUSION: . More prospective analysis with thorough medical history and examination, with the larger group of the population, might further confirm the appearance of Haller's cells on panoramic radiographs.

KEYWORDS: Haller's cells, Radiograph, Panoramic

INTRODUCTION

Infraorbital ethmoid cells are extensions of the anterior ethmoid sinus into the floor of the orbit and superior aspect of the maxillary sinus. This entity is also known as Haller's cell, named after anatomist Albrecht von Haller, who in 1765 had described this ethmoidal pneumatization of the floor of the orbit, also named as orbitoethmoidal cells or maxillo-ethmoidal cells. However, the name infraorbital ethmoid cell is recommended because it describes the location and origin of the entity.[1,2] Infraorbital ethmoid cells have been described as well-defined, round, oval, or teardrop-shaped radiolucencies (single or multiple), unilocular or multilocular with a smooth border that may or may not appear corticated, and are located medial to the infraorbital foramen according to a solitary panoramic radiographic study.[3]

In addition to distressing oro-facial pain and sinusitis, numerous pathologies and symptoms associated with this entity include nasal obstruction, impaired nasal breathing, headache, chronic cough, and mucoceles.[1,3,4] Haller's cells can also restrict access to the maxillary sinus or the anterior ethmoidal cells during endonasal procedures, making it imperative for the surgeon to be aware of such variations that may incline the patient to increased risk of intraoperative complications.[1,5]

Haller's cells are usually detected radiologically as they cannot be seen during a normal nasal endoscopy, except one performs in addition to maxillary sinoscopy. They may not only contribute to the development of maxillary sinusitis by narrowing the natural sinus ostium but they can also be diseased themselves as well.

CT is commonly used for imaging infraorbital ethmoid cells[6], although maxillary sinus endoscopy4 may also reveal this structure. Panoramic radiographs often show Haller's cells and as a dental professional panoramic radiograph is the basic radiographic investigation that we can perform for screening purposes. Therefore, panoramic radiographs can be used to identify these anatomic variations avoiding other imaging modalities which are rather expensive, involve higher patient radiation exposure, and are invasive.

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MATERIALS AND METHOD

Panoramic radiographs of dental outpatients visiting the Department of Oral Medicine and Radiology, I.T.S Dental College And Hospital, Greater Noida, U.P. The study group comprised 700 subjects of either gender in the age range of 16 to 60 years selected by simple random sampling. OPGs with normal dentition and bone trabecular patterns were selected and the Exclusion criteria were OPGs with an altered trabecular pattern suggestive of systemic diseases which had/have affected the growth. OPGs with clinical or radiographic evidence of developmental anomalies of the maxillofacial region. OPGs with clinical or radiographic evidence of bony pathologies involving the maxillofacial region. OPGs with clinical or radiographic evidence of fractures of the oral and maxillofacial region and/or treatment received for the same. OPGs with the clinical or radiographic evidence of tumors/cysts of the odontogenic region.

Ethical clearance was obtained from the institution prior to conducting the study. Digital Panoramic radiographs were obtained from Planmeca Proline XC panoramic X-rays unit. Analysis of the same was done with the Planmeca Romexis imaging software on LED screens.

Retrospectively digital panoramic radiographs which falls within the criteria mentioned in the study were selected and viewed. The presence of Haller's cells on the panoramic radiograph was carefully studied on screens of LCD monitors.

The identification of the same was made if an anatomic variation fulfilled all of the following criteria as suggested by Ahmad et al.[3]:

1. Well-defined round, oval, or tear-drop-shaped radiolucency, single or multiple, unilocular or multilocular, with a smooth border, which may or may not appear corticated.
2. Located medially to the infraorbital foramen.
3. All or most of the border of the entity in the panoramic section is visible.
4. The inferior border of the orbit lacks cortication or remains indistinguishable in areas superimposed by this entity.

The data collected were tabulated and subjected to statistical analysis namely Frequencies/percentages, Descriptive Statistics, Chi-square test, and Cross tabulation (contingency table analysis) using SPSS for windows to obtain the results.

RESULTS

The study group comprised of 700 subjects of either gender in the age range of 16 to 60 years, from the outpatients visiting the Department of Oral Medicine and Radiology, I.T.S. Dental College and Hospital, Greater Noida.

The data were tabulated and subjected to statistical analysis. The results obtained and the observations are as follows: Overall Distribution of Study subjects with respect to gender was like the total sample size of the study was 700, consisting of 455 males and 245 females, with male to the female ratio being 1.8:1. (figure 1)

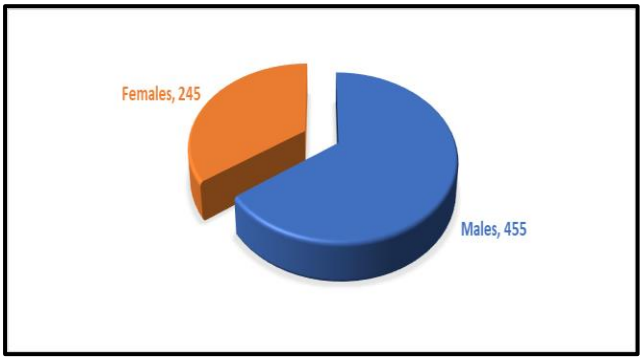

Figure 1. Overall distribution of study subjects with respect to gender

Of the 700 study subjects, Haller's cells were found in 96 subjects. The overall prevalence of Haller's cells was 13.5 % and the p-value was found to be 0.00(< 0.05) which is significant. (Table 1)

	Frequency	Percentage
Absent	605	84.0
Present	95	13.5
Total	700	100
Chi sq = 277.4 , degree of freedom = 2 , p = 0.00(< 0.05)		

Table 1. Overall distribution of study subjects with respect to gender

Of the 95 cases with Haller's cells, 55 (57.89%) were in males and 40 (42.10%) were found in females. The p-value was 0.32 (> 0.05) rendering it non-significant,

which was consistent with the findings of Solanki. J et al.[7] (Table. 2)

GENDER	Haller's cells present		Total
	Absent	Present	
Male Count % within sex	400 66.2%	55 57.89%	455 63.8%
Female Count % within sex	205 33.8 %	40 42.10 %	245 36.2%
Total Count % within sex	605 100 %	95 100 %	700 100%
Contingency coefficient value 0.040, P = 0.320 (> 0.05)			

Table 2. Overall distribution of Haller's cells with respect to gender

Out of 95 cases of Haller's cells, only 18 (18.94%) gave a positive history of clinical disease whereas 77 (81.05%) were asymptomatic. The p-value was 0.366 and was found non-significant (Table 3).

Presence of Clinical Symptoms	18	18.94%
Absence of Clinical Symptoms	77	81.05%
Total	95	100%

Table 3. Correlation of Clinical symptoms and Haller's Cells

Among 65 cases that gave a positive history of clinical diseases only 18 (27.69%) showed the presence of Haller's cells whereas in 47 (72.30%) Haller's cells were absent (Table 4).

Presence of Haller's Cells	18	27.69%
Absence of Haller's Cells	47	72.30%
	65	100%

Table 4. Presence or absence of Haller's Cells

DISCUSSION

Previous studies using panoramic radiographs, done by Ahmad et al.[3] in 2006 showed 38.2 %, Raina et al.[8] in 2012 showed 16%, Khayam et al.[9] in 2013 showed 32.5% and Solanki et al.[7] in 2014 was 19.2%. The overall prevalence in our study was only 13.5% which was very less. This variation can be due to different groups of the population.

Out of 95 cases of Haller's cells, only 18 (18.94%) gave a positive history of clinical disease whereas 77 (81.05%) were asymptomatic, the p-value was non-significant. Alkire and Bhattacharyya10 evaluated the effects of septum deviation, conchae bullusa, and Haller's cells on the occurrence of acute rhinosinusitis, and their results showed that just obstruction caused by Haller's cells can lead to the disease. Also, are view article reported the headache related to Haller's cells, and also has been said that Haller cells may also cause sinus disease such as mucocele. Sebrechts et al.[11] acknowledged Haller cell inflammation can be as a potential reason for orbital unilateral edema and can be the main reason for it.

On the other hand, some studies suggested that the presence of Haller's cells automatically doesn`t predispose an individual to sinus disease.[2,12,13,14] In our study, 65 cases reported the presence of clinical symptoms like chronic orofacial pain, chronic headache, chronic rhinitis, and chronic sinusitis but among these only 18 (27.69%) cases showed the prevalence of Haller's cells whereas in 47 cases (72.30%) it was absent.

The present study was unique as the prevalence of Haller's cells on panoramic imaging was correlated retrospectively with the clinical case history data. The prevalence was low, which can be attributed to a different group of the population and different methods of scanning OPG than previous studies on OPG. Large variation between the prevalence of Haller's cells on CT and Panoramic images can be attributed to the specific criteria which were followed3 and also it is 3-dimensional imaging with more specification.

CONCLUSION

Though in literature the appearance of Haller's cells has been associated with some type of chronic inflammation of the osteo-meatal complex but result obtained in this study was non-significant. More prospective analysis with thorough medical history and examination, with the larger group of the population, might further show a clear picture.

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