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PATTERNS AND PREVALENCE OF MUCOCELES AMONG PATIENTS REFERRED FOR CRANIO-FACIAL COMPUTED TOMOGRAPHY IN PORT HARCOURT METROPOLIS.

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ABSTRACT

Background: Mucocele is rare benign, expansile pseudocystic pathology of the nasal and paranasal sinuses. This study aimed at evaluating the patterns and prevalence of mucoceles among patients referred for cranio-facial computed tomography in Port Harcourt metropolis. **Materials and Methods:** We performed a retrospective review of all the radiological reports of patients that underwent cranio-facial CT scan(n =1,443) between January, 2014 and August, 2017 using data capture sheet. The prevalence, and demographic variables were evaluated. The obtained data were analyzed using descriptive statistics. **Results**: Out of the 1,443 subject records included in this study, only 2.6% (n = 38) had mucocele. The highest percent of mucocele was seen among subjects of age group 16-30years 1.11% (n = 16) followed by 31-45 years 0.77% (n = 11). Males had the highest percentage of mucocele 1.5% (n = 22) when compared to the female population 1.1% (n = 16).Nasal obstruction was the highest presenting symptom 32.69% (n = 17) and the least was toothache 1.92% (n = 1). Paranasal sinuses was highly involved 65.43% (n = 53) and the least was nasal involvement 12.35% (n = 10). Frontal sinus was the most common affected sinus 23.46% (n = 19) and the least was sphenoid sinus 6.17% (n = 5). **Conclusion:** The incidence of mucocele pathology was quite low in Port Harcourt. Young adults were more commonly affected by mucocele pathology with male preponderance. Frontal sinuses were the most affected paranasal sinus in this study.

Key words: Mucocele, cranial, paranasal sinuses and computed tomography.

INTRODUCTION

Mucoceles are rare benign, expansile pseudocystic pathology of the nasal and paranasal sinuses with extensionto the intracranial regions (Ahmad and Abdullah, 2013; Beldzinski, Sloniewski and Reclawowicz, 2009; Chew et al., 2009; Joel et al., 2017; koshing etal., 2004). This pathology is slow-growing lesion that occur after sinus ostium obstruction (Ahamed and Abdulah, 2013; Lee etal. 2009).According to Ahmad and Abdullah (2013), Casteels et al(1992); Lachanasa et al. (2005), the pathology usually occur in the fronto-ethmoidal area of the face, which they attributed to the complexity of these areas anatomy and drainage. Mucoceles pathology although commonly found in the fronto-ethmoidal region, may also expand progressively and occupy

nearby structures such as the orbit and skull base resulting in intracranial and orbital complications (Ahmad and Abdullah, 2013; Kharrat et al., 2011; Sellars and De Villiers, 1981; Starton, 1990). There are multifactorial causes of mucoceles including; inflammation, sinuses obstruction, anatomic abnormalities, fibrous dysplasia, osteoma, previous surgery as well as cystic dilation of the glandular structures(Ahmad and Abdullah,2013; Lee et al., 2009; Friedman et al., 2005;Hejazi, Witzmann and Hassder, 2007., Joel et al., 2017). The sinus obstruction may be due to trauma, infection, allergy, congenital abnormalities, radiation exposure and neoplasm (Chew et al., 2009; Darouassi, Righim and Reyt, 2007). The clinical manifestations of the nucoceles depends largely on the areas of its involvement as well as the direction of the expansion toward nearby structures which include headache, amaurosis, occulomotor palsies, nasal symptoms, endocrine disorders and panhypopituitarism (Joel et al; 2017; Kumagai et al., 2003; Mora-Horna et al; 2005). Computed tomography (CT) scan and magnetic resonance imaging (MRI) are the modalities of choice for the diagnosis of mucocele pathology. Magnetic resonance imaging is an essential imaging tool used for the differentiation of mucoceles from neoplasms with contrast enhancement (Ahmad and Abdullah, 2013; Lee etal., 2009). Computed tomography scan is the gold standard modality for radiographic assessment of paranasal sinuses mucoceles, as it allows for the evaluation of patency among the intercommunicating pathways of the sinuses and provides the ear, nose and throat (ENT) surgeons the opportunity to clearly visualize the impact of an obstruction and anatomical variations in the pathway (Muhlis et al., 2016; Schuknecht and Lindsay, 1949).CT scan also allows for the evaluation of the regional anatomy and the extent of the pathology and bony erosion (Ahmad and Abdullah, 2013; Chew et al., 2009). Port Harcourt city is the capital of Rivers State, Nigeria with over one million people living in the city according to the 2006 national census. It is major host to many oil and gas companies whose activities contributes greatly to environmental pollution which is a predisposing factor for paranasal sinuses pathologies including mucoceles. A good knowledge of the prevalence of mucoceles pathology in the city could be a useful information to the ear, nose and throat (ENT)surgeons managing these conditions.To the best of our knowledge, there is no study on the patterns and prevalence of mucoceles among patients referred for cranio-facial CT in Port Harcourt, Nigeria, hence, this study.This study was designed to evaluate the patterns and prevalence of mucoceles among patients referred for cranio-facial CT in Port Harcourt metropolis, Rivers State, Nigeria.

MATERIALS AND METHODS

The CT examinations were performed with third generation multislice general electric (GE) machines. Standard CT scanning protocols and parameters for cranio-facial were adopted in performing the CT scan by qualified Radiographers. This was cross-sectional retrospective review of radiological reports of patients who underwent cranio-facial CT scan.

Convenience sample size of 1,443 was used and they were selected randomly based on the inclusion criteria from the radiology department database of the selected study centers from January, 2014 to August, 2017.Radiological reports with complete subjects' information such as age, sex, clinical indications and radiological findings were included. Ethical approval for this study was obtained from the management of the study centers and all patient's information obtained were treated with high level of confidentiality and was used for the purpose of this research only. This study was conducted between May to December 2017.Information retrieved include patient's sex, age, presenting clinical indications/symptoms and the radiological findings.

The obtained data were processed using excel 2013 version and Statistical Package for Social Sciences (SPSS) version 20(IBM Corporation, Chicago, IL,USA).The data were analyzed in line with the study objectives using descriptive statistics.

RESULTS

A total of 1,443 subjects met the inclusion criteria set for this study and out of which 2.6% (n = 38) cases were identified as mucoceles while the remaining 97.4% (n = 1405) cases were non-mucoceles (table 1)

Table 1: Frequency and percentage distribution of mucoceles

MUCOCELE PATHOLOGY	FREQUENCY (N)	PERCENTAGE (%)
Presence	38	2.6
Absence	1,405	97.4
Total	**1,443**	**100**

Table 2: Frequency and percentage distribution of mucocele pathology among age group and sex

AGE GROUP (YEARS)	SEX(%, n) MALE	FEMALE	TOTAL (%, No)
0 – 15	0.07%(n=1)	0%(n=0)	0.07%(n=1)
16 – 30	0.62%(n=9)	0.49%(n=7)	1.11%(n=16)
31 – 45	0.42%(n=6)	0.35%(n=5)	0.77%(n=11)
46 – 60	0.28%(n=4)	0.14%(n=2)	0.42%(n=6)
61 – 75	0.07%(n=1)	0.07%(n=1)	0.14%(n=2)
76 – 90	0.07%(n=1)	0.07%(n=1)	0.14%(n=2)
TOTAL	1.50(n=22)	1.10%(n=16)	2.6%(n=38)

Table 2 above, shows the distribution of mucocele among the various age groups and sex. Out of 2.6% (n=38) cases of mucocele identified, the male to female ratio was 1.4:1 which is 1.5% (n=22) males and 1.1% (n=16) females. The age group distribution of mococele in table 2, shows 16 – 30 years 1.11% (n = 16) as highest followed by31 – 45 years 0.77% (n = 11) and the least was 0-15 years 0.07% (n=1). Out of 1.11% (n = 16) cases of mococeles within age group 16 – 30 years, males were 0.62% (n = 9) while females were 0.49% (n = 7).

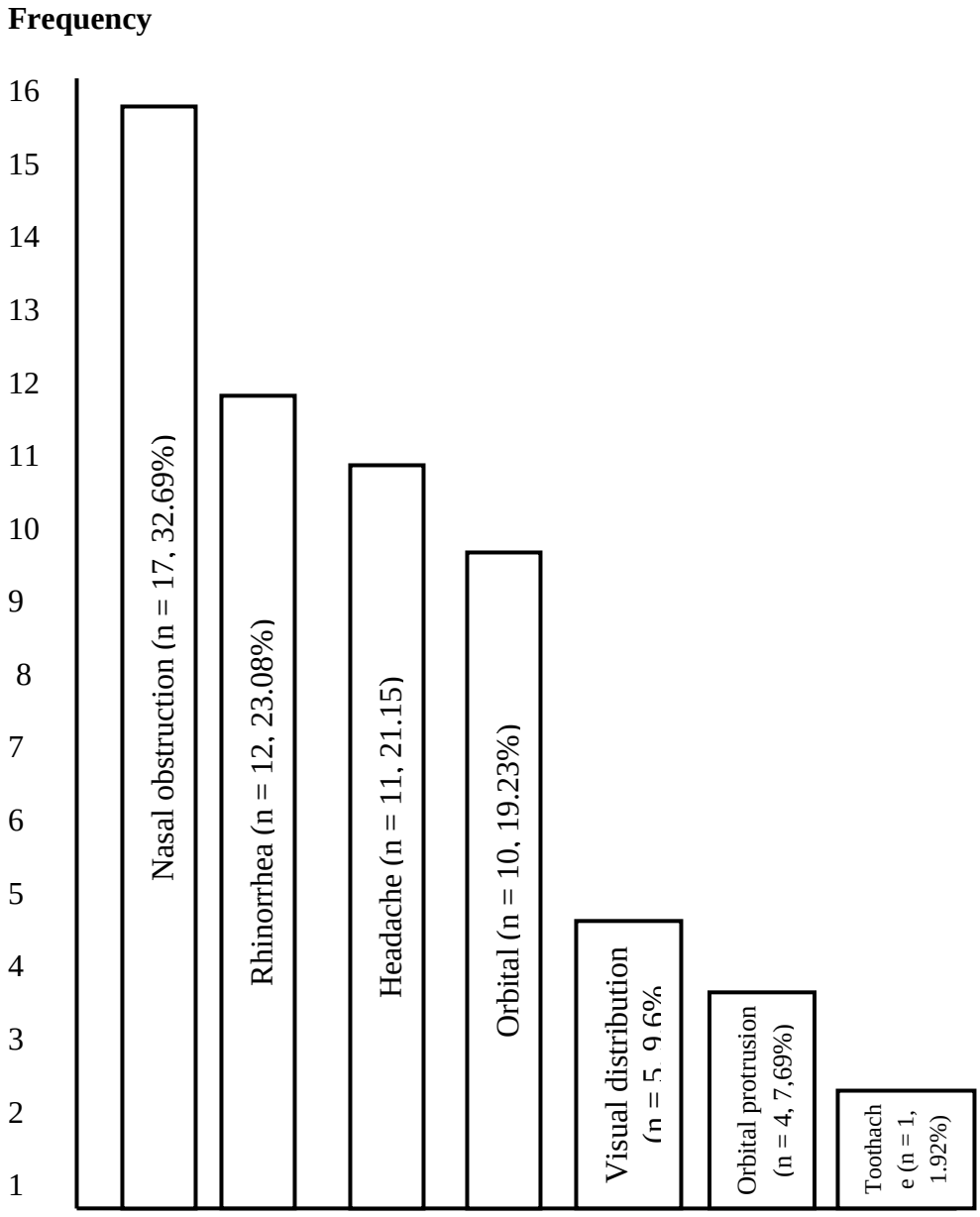

Fig 1.0 Frequency and percentage distribution of the presenting symptoms/clinical indications of mucoceles.

From fig.1.0 above, the most common presenting symptom of mucoceles in this study was nasal obstruction 32.69% (n = 17) followed by rhinorrhea 23.08% (n = 12) and the least was toothache which is 1.92% (n = 1).

Table 3: Frequency and percentage distribution of the mococeles pathology between genders based on the areas of involvement.

Areas of involvement of mucocele pathology (n, %)

Genders	**Sinuses**	**Nasal**	**Sino nasal**	**Total**
Males	(n = 36,44.14%)	(n = 4, 4.94%)	(n = 11, 13.58%)	51 (62.96%)
Females	(n = 17, 20.99%)	(n = 6, 7.41%)	(n = 7, 8.64%)	30 (37.06%)
TOTAL	53(65.43%)	10 (2.35%)	18 (22.22%)	81 (100%)

Table 3.0 above, shows the distribution of mucoceles between genders based on the areas of involvement. Out of 38 cases of mucoceles pathology identified in this study, a total of 81 areas of involvement were identified. The highest area of involvement of this pathology was sinuses 65.43% (n = 53) and the least was nasal involvement 12.35% (n = 10) as more than one sinus were involved in more than 80% of the cases. The areas of involvement of mucoceles pathology was found highest in male 62.96% (n = 51) when compared to the female counterpart which is 37.06% (n = 30).

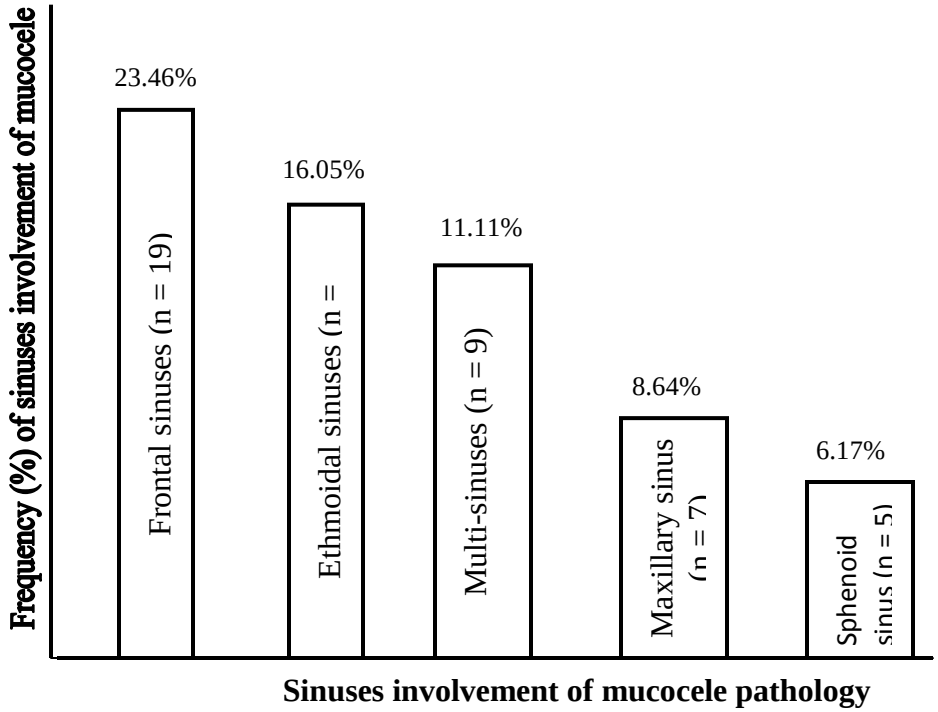

Figure 2.0. **Frequency distribution of sinuses involvement of mucocele pathology**.

From fig 2.0 above, showing the frequency of sinuses involvement of mucoceles, out of 65.43% (n = 53) sinuses areas involved by the pathology, the most common involved sinus was frontal sinuses 23.46% (n = 19) followed by ethmoid sinus 14.81% (n = 12) and the least was sphenoid sinuses 6.17% (n = 5).

Table 4. Frequency and percentage distribution of mucoceles in paranasal sinuses involvement.

	Patterns of involvement (n, %)			
Paranasal sinuses	**Bilateral**	**Right**	**Left**	**Total(%, n)**
Frontal	(n=9, 11.11%)	(n=6, 7.41%)	(n=4 ,4.94%)	23.46%(n=19)
Maxillary	(n=2, 2.47%)	(n=1, 1.23%)	(n=4,4.94%)	(8.64%(n=7)
Ethmoid	(n=4, 4.94%)	(n=6, 7.41%)	(n=3, 3.70%)	16.05%(n=13)
Sphenoid	(n=0, 0%)	(n=2, 2.4%)	(n=3, 3.70%)	6.17%(n=5)
TOTAL	**18.52%(n=15)**	**18.52%(n=15)**	**17.28%(n=14)**	**54.32%(n=44)**

From table 4 above, out 54.32% (n = 44) sinuses involved areas, both bilateral and right sided sinuses involvement had the highest percentage 18.52% (n = 15) respectively and the least was left sided involvement 17.28% (n = 14). This table also shows that, out of 23.4 % (n = 19) cases of frontal sinuses involvement, 11.11% (n = 9) were bilateral involvement as highest and the least was left sided involvement 4.94% (n = 4).

DISCUSSION

Mucoceles are rare benign, expansile pseudocystic pathologies of the nasal and paranasal sinuses which is capable of extending into nearby structures. These pathologies are slow-growing lesions that normally occurs due to sinus ostium obstruction (Ahmad and Abdullah, 2013, Lee et al., 2009).The incidence of mucoceles pathology in our study is quite low 2.6% (n = 38) when compared to the non-mucoceles cases of 97.4% (n = 1,405). This small percentage of mucocele pathology is also in agreement with small sample study conducted by Murat et al (2015). In their study, 18 patients had mucocele pathology. The slight increase in our value might be due to geographical variation. In this study, young adults were more commonly affected by the pathology. The finding among these age groups have been attributed to their high level of exposure to mucocele predisposing factors (Abbas et al, 2014) and this finding is in agreement with the studies conducted by Gregory et al (2012), Lee et al (2009), Murat et al (2015) and Obeso et al (2009). In Gregory et al (2012) study, majority of the mucoceles cases were within the 3rd and 4th decade ages. Murat et al (2015) also reported the age group of among 2nd and 4th decade ages with means age 41.7 ±21.8. The finding also shows that people within the age group of 0-15 years had the least incidence of mucoceles in this study. This is also in agreement with the study conducted by Kyung and Nam (2010). In their study, people within this age group were not included, which we think could be due to the absence of mucoceles pathology among that age group as of time of their study. This small percentage of mucoceles among people within age group 0 – 15 years in this study could be attributed to the fact that majority of their sinuses were not fully formed and their Ostia are usually very wide (Abbas et al.; 2014). Also males had the highest percentage of mucoceles when compared to their female counterpart. This finding is consistent with findings of studies conducted by Gregory et al (2012), Lee et al (2009), and Obeso et al (2009). Our finding is inconsistent with the finding in the study conducted by Murat et al. (2015). In Murat et al (2015) study, females were highest 61.61% (n = 11) when compared to male population 38.89% (n = 7).Nasal obstruction was the most common presenting symptoms in this study followed by rhinorrhea and the least was toothache. This finding is consistent with the finding in a study conducted by Kyung and Nam (2010). In their findings, nasal obstruction was the highest presenting symptoms of this pathology with percent of 19.4%

(n = 12) followed by rhinorrhea 17.7% (n = 11) and the least was toothache 1.6% (n = 1). There is a disagreement between this finding in our study and that of Murat etal (2015). In their study, headache 66% (n = 12) was the highest presenting symptom of mucoceles. The differences in our findings could be attributed to the sample size used in the different studies as well as the geographical variation. Paranasal sinuses were the most common area of involvement of mucoceles pathology in this study followed by sinonasal involvement. This was attributed to the fact that majority of the mucoceles pathology originated from the paranasal sinuses due to sinuses obstruction (Ahmad and Abdullah, 2013; Lee et al., 2009; Friedman et al., 2005; Joel et al., 2017). The finding in this study shows that frontal sinuses were the most commonly involved sinus followed by ethmoid sinuses and the least was sphenoid sinuses. This result is consistent with other studies conducted by Amaud et al (1989), Gregory et al (2012), Kao et al (2006), Lee et al (2009), Nazar et al(2011), Obeso et al (2009) and Yue, Mann and Chan (1986). According to their findings, frontal and ethmoid sinuses account for over 70% of the areas of involvement by mucoceles pathology followed by maxillary sinuses. In another related studies conducted by Kyung and Nam (2010) and Murat et al. (2015) shows inconsistent findings with our findings. In Kyung and Nam (2010) findings, they grouped the mucoceles into primary mucocele and secondary mucoceles and according to them, ethmoid sinuses was the highest involved sinus among the primary classified mucocele 45.5% followed by maxillary (18.2%) while maxillary sinus was the highest (86%) and ethmoid was 7.17% in the secondary classified mucocele. In Murat et al, study maxillary sinuses was the highest involved area by mucocele 60% (n = 9) followed by frontal sinus 33% (n = 6). The differences in our findings could be attributed to the different sample size employed for the studies. Both bilateral and right sided paranasal sinuses were the commonest areas of involvement of mucoceles pathology in this study. Further study should be conducted in this locality using both CT and MRI findings in this pathology so as to increase the sample size.

CONCLUSION

Contrary to expectations, the incidence of mucoceles pathology was quite low in Port Harcourt metropolis. Young adults of 2^{nd} to 4^{th} decade ages were more prone to mucoceles .The most affected gender by mucoceles pathology in this study was males and paranasal sinuses was the commonest involved site by this pathology.

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