

PREVALENCE OF OSTEOMYELITIS AMONG PATIENTS VISITING PRIVATE DENTAL HOSPITAL - An Institutional study

Running title : Evaluation of osteomyelitis in patients visiting private dental hospital in Chennai.

Abstract

Introduction: Osteomyelitis is an inflammatory condition of bone that involves the medullary cavity and periosteum. The prevalence rate of this disease was found predominantly among the males than females with an incidence of 30-39 years. This condition involves one or more facial bones in the head and neck, mainly mandible, frontal bone, cervical spine, maxilla and nasal bones. Various types of osteomyelitis are acute, primary chronic suppurative and secondary chronic and fungal osteomyelitis.

Aim : To assess the prevalence rate of osteomyelitis among the patients visiting private dental hospital in Chennai.

Materials and methods : The present study was carried out in a private dental hospital under a university setting in Chennai. About n = 535951 cases were collected using the Dental hospital management system from Jun 2019 to Apr 2020. Out of which totally n = 5 cases of osteomyelitis were obtained. Each case sheet represents the patient's demographic details such as name, age, gender, medical history, examination findings and type of osteomyelitis were noted. The collected data was verified and statistically analysed using SPSS software.

Results : Among the total patients, 40 % of them were males and 60 % of them were females. It was observed that 60 % of the subjects had acute osteomyelitis, 20 % with chronic suppurative and fungus associated osteomyelitis and found to be more prevalent among the individuals who were aged between 41-50 years. Majority of the females, 40% were highly affected with acute osteomyelitis than males, 20% of them were affected. However this is not statistically significant as the chi square test p value = 0.329, as ($p > 0.05$).

Conclusion: The prevalence of osteomyelitis has been recently decreased in developing countries, as attributed to the improvement in the oral and dental care with standard antibiotic treatment. However, from the results of our study it is evident that the incidence of osteomyelitis

is high among the patients in the Chennai region as a result of the impaired health, poor oral hygiene and lack of awareness among the patients.

Key words : Osteomyelitis ; prevalence; dental hospital, innovative technology, novel method.

Introduction

Osteomyelitis is an inflammatory condition of bone that involves the medullary cavity and periosteum. The prevalence rate of this disease was found to be predominantly among the males than females with an incidence of 30-39 years (1,2). It is more commonly encountered in areas of poor socioeconomic status as a critical disorder in developing countries. As osteomyelitis condition may involve one or more facial bones in head and neck, mainly mandible, frontal bone, cervical spine, maxilla and nasal bones, but maxilla is less commonly affected than that of mandible due to its high vascular nature (3,4). In some instances, there may be a lack of awareness of osteomyelitis, its clinical features which often leads to misdiagnosis and delay in the treatment. The etiological factors associated with osteomyelitis include traumatic injuries, fungal infections, radiation, poor oral hygiene, chemical agents etc (5). Several systemic diseases like diabetes, anemia, malnutrition also influence the progression of osteomyelitis (6,7). This disorder mainly involves the mandible which is rarely attributed to the bisphosphonates therapy or radiotherapy or from bacterial infection from odontogenic origin. Other disease conditions which predispose to osteomyelitis are malignancy, osteoporosis and Paget's disease (8).

Various types of osteomyelitis include acute, primary chronic and secondary chronic suppurative, and fungal osteomyelitis. The acute and secondary chronic suppurative osteomyelitis of the jaws mostly developed from the existing pulpal or periodontal infections, extracted wounds and odontogenic disease (9,10). Abrupt events of signs and symptoms indicated during the initial stage of infection may lead to acute osteomyelitis. If this condition passes without the removal of infection, it results in subacute or chronic suppurative osteomyelitis (11). Few studies have reported that, bacterial species also implicated in spread of

osteomyelitis, most common pathogens are staphylococci and streptococcal species. These organisms may also result in contagious spread of disease from the soft tissues to the bones through direct infusion of microbes into the bone leading to osteomyelitis (12).

The typical clinical features seen in osteomyelitis affected individuals are edema, pain and formation of fistula. Radiologically, this condition illustrates a fine radiopaque image with an unclear margin with bony destructions (13,14). Early diagnosis of osteomyelitis is reliable by tissue biopsy and a surgical approach by an excision or removal of infection with concurrent antibiotics. Several retrospective studies have reported the prevalence rate, risk factors and management of osteomyelitis (15),(16). A clinical study done among 34 adult patients, with chronic suppurative osteomyelitis of the mandible reported that periodontal lesions are found to be the main etiological factor associated with osteomyelitis (17,18). Our team has extensive knowledge and research experience that has translate into high quality publications (19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30),(31),(32),(33),(34),(35),(36),(37),(38). Thus our present study aims to assess the prevalence rate of osteomyelitis among the patients visiting the private dental hospital in Chennai.

Materials and methods

The present study was carried out in a private dental hospital under a university setting , Chennai. About n= 535951 cases were collected using the Dental hospital management system from Jun 2019 to Apr 2020. Out of which totally n= 5 cases of osteomyelitis were obtained. Each case sheet represents the patient's demographic details such as name, age, gender, medical history, examination findings and type of osteomyelitis were noted. The diagnosis was confirmed with the help of orthopantomogram, X rays of skull bones and biopsy with histopathological findings. Each case sheet was verified by reviewing experts. The validity of data collected was checked by internal and external reviewers. Then all the data collected was verified and tabulated in excel and statistically analysed using SPSS software.

Results

In our present study, a total of $n= 5$ patients who are diagnosed with osteomyelitis were collected. The age, sex and site predilection were analysed. The patient's age ranged from 30 to 70 years. We assessed the prevalence and type of osteomyelitis affected in the patients. Among the total patients, 40 % of them were males and 60 % of them were females. It was observed that 60 % of the patients had been diagnosed with acute osteomyelitis, 20% of them diagnosed as chronic suppurative and fungal osteomyelitis [Figure 1]. From the results obtained, we found that 20% of the patients who had fungal osteomyelitis, have a medical history of diabetes. And 20 % of them were diagnosed with chronic suppurative type of osteomyelitis. In our study, maxilla is the most commonly affected site when compared to mandible. The predilection of sites affected in all the 5 patients with osteomyelitis were found to be 40% of the patients were affected in maxillary left posteriors, 20% of those patients were diagnosed in the mandibular anterior and posterior regions [Figure 2]. The prevalence of osteomyelitis among different age groups of people visiting private dental hospitals in Chennai. It was observed that osteomyelitis was more prevalent among the patients who are aged between 41-50 years [Figure 3]. The correlation between the gender of the patients and type of osteomyelitis affected them was analysed. Majority of the females, 40% were highly affected with acute osteomyelitis than males, 20% of them were affected. However, this is not statistically significant as the chi square test p value = 0.329, as ($p > 0.05$) hence it shows not significant [Figure 4]. This shows that acute osteomyelitis is more prevalent in patients than other types such as chronic suppurative and fungal osteomyelitis.

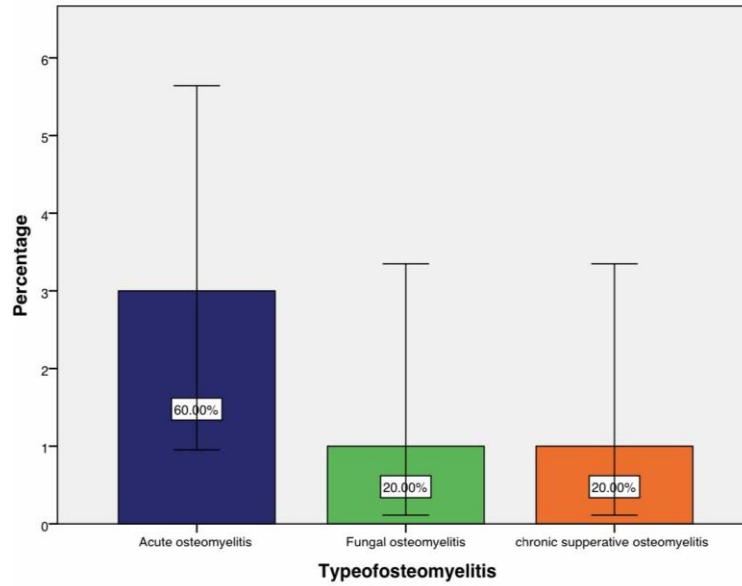


Figure 1: This bar graph represents the prevalence rate and type of osteomyelitis in patients visiting the dental hospital in Chennai. It shows that 60% of the patients were diagnosed with acute osteomyelitis, 20% of them with chronic suppurative and fungus associated osteomyelitis.

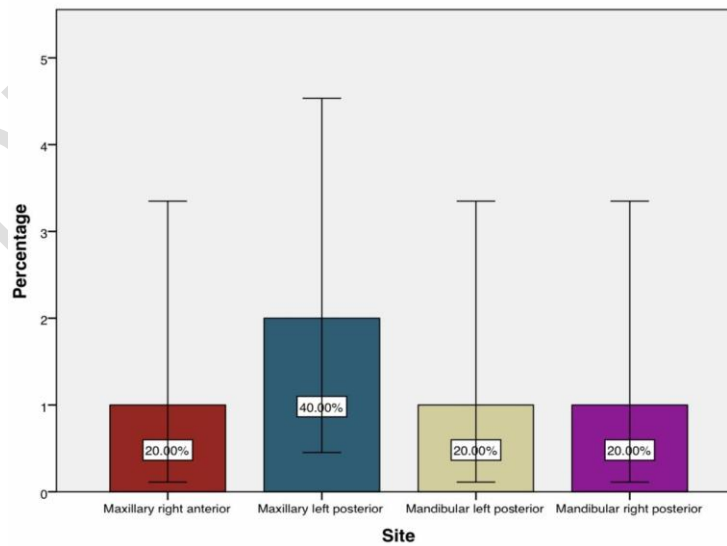


Figure 2 : This bar graph represents the most common site affected in each type of osteomyelitis. It shows that 60 % of the patients have osteomyelitis in maxillary posteriors and 20% of the individuals with mandibular posteriors affected.

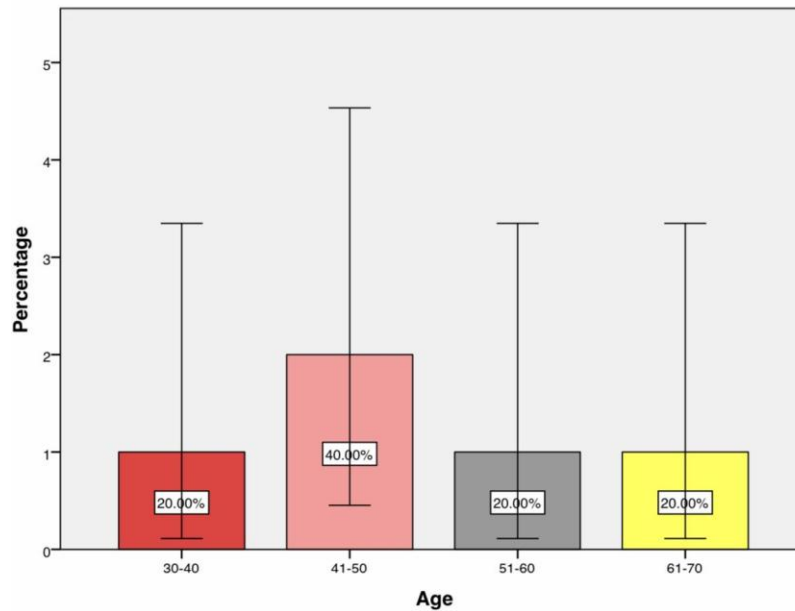


Figure 3: Bar graph represents the prevalence of osteomyelitis among different age groups of people visiting private dental hospitals in Chennai. X axis represents the four different age groups which are plotted on a scale from 30 to 70, Y axis represents the percentage of age affected with osteomyelitis. In this graph, red denotes the 30-40 years of age, pink denotes the 41-50 years, grey denotes the 51-60 years and yellow represents the 61-70 years of the age group of the patients taken for our study. Here, the graph shows that osteomyelitis was found to be more prevalent among the individuals who are aged between 41-50 years (40%).

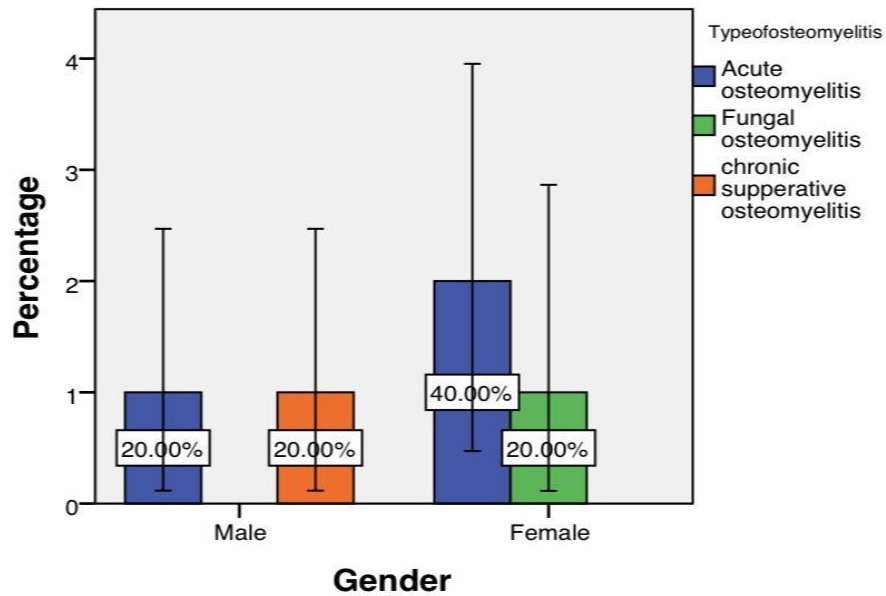


Figure 4 : Bar graph represents the association between the gender of the patients and type of osteomyelitis affected in them. X axis represents the gender of the patients visiting private dental hospitals and Y axis plotted from the scale as 0 to 2 represents the percentage of the osteomyelitis type affected. Blue denotes acute osteomyelitis, green denotes fungal osteomyelitis and orange denotes chronic suppurative osteomyelitis. The Chi square test ; p value = 0.329 ; which is $p > 0.05$, hence it shows statistically insignificant. It shows that the majority of females (40%) are highly affected with acute osteomyelitis when compared to males (20%).

An epidemiological study done by Kremers et al, reported that osteomyelitis in the patients diagnosed in a tertiary centre shows an incidence of infection in the patients aged 36- 45 years. It also concluded that the maxilla was more commonly affected than the mandible in the patient suffering with osteomyelitis (39). From the results obtained in our study, it has also been found that osteomyelitis is more prevalent among the age group 41-50 years. Another study done by Koorbusch et al detailed that females are more affected with osteomyelitis with a younger age group than males. So, consequently the younger age group, less than 40 years is more predisposed to osteomyelitis when exposed to the same risk factors. Likewise, in our study we observed that osteomyelitis is more predominantly in females when it was compared to male patients (40).

A similar study done by Prasad et al, reported the prevalence rate of osteomyelitis in head and neck. For which, 88 patients with osteomyelitis, nine of them were diagnosed as acute osteomyelitis [11%], 75 were diagnosed as chronic osteomyelitis [89%] (41),(42). So the clinical conditions reported with osteomyelitis seem to present with abrupt symptoms such as pain, fever, swelling over the cheek, reduced joint movement with early radiological changes. As contrast to our findings, a similar study reported that the mandible was the most common bone affected in radiation induced ORN osteomyelitis (43,44). Another study has found that in both acute and chronic forms of osteomyelitis, posterior mandible and maxillary regions are often affected (45). In our study it has been illustrated that 20% of female patients are diagnosed with fungal osteomyelitis in the maxillary anterior region. Likewise similar findings with a case report study done on mucormycotic osteomyelitis involving the maxilla. It was found that the majority of the patients are diagnosed with the fungal osteomyelitis involving the maxillary sinusitis and it is associated with diabetes (46).

A clinical study done related to the osteomyelitis of the mandible, reported that trauma is the most common cause for osteomyelitis (47,48). In our study, we observed that odontogenic infections, tooth extractions were found to be the predisposing factor for chronic osteomyelitis which was diagnosed and treated with antibiotics. A previous study done by Wurman LH, et al, found that osteomyelitis of the mandible caused secondary to dental extraction, were treated with surgical method and long term antibiotics (49). An earlier study reported that contagious infections such as maxillary sinusitis, odontogenic diseases indicated to be the reliable factor associated with the maxillary osteomyelitis (50,51). Despite the fact that there is a rare occurrence of osteomyelitis, it's differential diagnosis includes tumours, which can be radiologically comparative. Furthermore it impersonates the scintigraphic findings just as the other disorders of bone such as fibrodysplasia, paget's disease and osteosarcoma (52).

Our present study had certain limitations, as it is being done in a single university setting, with small sample size and a limited time period. Also incomplete data records might be excluded from the study. Therefore an exact number of patients or the prevalence rate of osteomyelitis cannot be assessed accurately. Thus the future extent of our study relies on better knowledge of osteomyelitis, it's features and management. However, our study should have a long term follow

up with the patients for better understanding of this disease condition in terms of its prevalence rate, radiological and histological findings of osteomyelitis.

Conclusion

The prevalence of osteomyelitis has recently decreased in developing countries, as attributed to the improvement in the oral and dental care and with standard antibiotic treatment. However from the results of our study it is evident that the incidence of osteomyelitis is high among the patients in Chennai region as a result of the impaired health, poor oral hygiene and lack of awareness among the patients. So effective treatments like systemic antimicrobials, surgical approach with incision and drainage, sequestrectomy can be executed in the field of dentistry to prevent the occurrence of osteomyelitis.

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