INTRODUCTION

The tooth formation occurs inside a dental sac or dental follicle (DF) which originates from odontogenic mesenchyme. The DF circumscribes the crown of an unerupted tooth and is involved in the process of odontogenesis. The follicle is also involved in the formation of the periodontal ligament, cementum, and alveolar bone. Radiographically, the follicle presents as thin homogenous peri-coronal radiolucency (PR) around the impacted tooth. Histopathologically, it is comprised of fibrous connective tissue and remnants of epithelial residues of odontogenesis, which could be the initial point for pathological transformation.

It is stated that about one-third of the completely or partially unerupted third molars are associated with pathosis. Pathic alterations may exist in the pericoronal tissues of impacted third molars (ITM), even when the radiographic follicle appears normal. These pathologies can be easily identified radiographically when it is associated with the enlargement of the peri-coronal space.

METHODS

The main objective of this study was to assess and evaluate the incidence of pathological conditions associated with impacted third molars (ITM) and to determine the association between the pathological conditions with patient’s age, gender, site and angular position.

RESULTS

Out of 80 follicles which were evaluated histopathologically, 37 were of male and 43 were of female patients with their age ranging between 18 and 50 years with a mean age of about 34 years. The pathological alteration was found associated with 26 (32.5%) follicles which were found to be statistically significant. The pathologies were almost equally reported in both the genders with slight female predominance and a bit higher in the mandible than maxilla but could not gain statistical significance. On comparing ITM with their angular position, the results were statistically significant.

Pathological lesions were most commonly associated distoangular and horizontally ITM.

CONCLUSION

The results of this study justify that radiographically normal appearing follicle may not suggest the absence of disease in the peri-coronal area. Therefore, it is recommended that regular evaluation of all ITM is required to prevent future development of pathologies.

Key words: Ameloblastoma, dental follicle, dentigerous cyst, impacted third molars, odontogenic keratocyst
METHODOLOGY

The present case–control study was conducted on the patients enrolled in Oral Maxillofacial Dental Clinic, in Ranchi, from February 2014 to December 2015 to have their ITM removed for either orthodontic or preventive reasons. The study was approved by a local Ethical Committee, and an informed consent form was signed by all the subjects included in the study. Inclusion criteria were the presence of at least one ITM with a follicular space ≤2.5 mm in greatest dimension when measured by digital panoramic radiograph. An exclusion criterion was kept as partially erupted third molars, ITM with radiographic follicular width more than 2.5 mm and the cases in which follicular tissue was insufficient for histopathological evaluation. Initially, all the patients underwent a panoramic radiograph to assess that they met the study criteria or not [Figure 1].

A total of 80 PF associated with ITM were collected from 68 patients (in few patients more than one tooth was extracted) who qualified the criteria to be included in the study. The peri-coronal soft tissue was carefully curetted from the extraction socket and was immediately fixed in 10% formalin and send for histopathological examination in an oral and maxillofacial diagnostic center. Normal DF presents as fibro-collagenous tissue without any epithelial lining or those lined by few layers of reduced enamel epithelium without proper squamous differentiation. Whereas the follicles demonstrating hyperplastic nonkeratinized squamous epithelium with chronic, nonspecific inflammatory cells, were also not considered as an independent pathological case [Figure 2a]. The cases considered as pathological alteration were, the presence of continuous stratified squamous epithelium 3-4 cell layers in thickness as dentigerous cyst [Figure 2b] and the connective tissue lined by few layers orthokeratinized stratified squamous epithelium [Figure 2c]. The presence of odontogenic islands and chords in connective tissue, with cells showing reverse polarity of nucleus was diagnosed as an ameloblastoma [Figure 2d].

The clinical data of each patient were tabulated and were then correlated with histopathological alterations. Chi-square analysis was used to determine the factor of significance ($P < 0.001$).

RESULTS

Pathosis was found associated with 26 (32.5%) cases out of 80 PF which were evaluated histopathologically. The majority of cases were fibro-collagenous tissues (26.2%) and nonspecific chronic inflammation (41.2%) showing predominant lymphocytic infiltration. Pathological alteration constituted of the dentigerous cyst (22.5%) followed by odontogenic keratocyst (6.3%) and ameloblastoma (3.7%). On comparing normal tissue changes with pathological changes the Chi-square value obtained were 22.849 with $P < 0.001$, thus the result was highly significant [Table 1].

About 43 (60%) cases were present in the mandible and 37 (40%) involved the maxilla. Among 37 (46.3%) males pathological alterations were noticed in 11 (29.7%) cases and among 43 (53.7%) females pathologic lesions were seen in 15 (34.9%) cases, with Chi-square value 0.241 and $P = 0.624$ (not significant), thus showing the almost equal involvement of both genders. The cases were lying in the age range of 18-50 years with a mean age of about 34 years. The incidence of pathosis was higher in the age group of 20-40 years and slightly more in females compared to males and in mandibular jaw compared to the maxillary jaw [Table 2].

On comparing angular positions normal follicular tissue and inflamed follicles were most commonly associated with mesioangular (44.4%) and vertical (25.9%) ITM, while cystic changes were commonly seen in association with distoangular, (39.1%) and horizontally (43.4%) ITM and odontogenic tumors were more often associated with horizontally (66.6%) ITM. On comparing angular position in pathological and non-pathological cases a Chi–square value 27.63 and $P < 0.001$ was reported which was highly significant [Table 3].
DISCUSSION

The most common complaint of patients coming to the dentist is ITM. The association of peri-coronal pathologies with ITM is one of the most common reasons for extraction of impacted tooth. Many reports in the literature have discussed the development of cyst and tumor associated with ITM. Therefore, recommending extraction of the third molar is far easier when the impacted tooth is associated with any pathology, but the judgment for prophylactic extraction always remained controversial.

Various previous reports have defended the prophylactic removal as a precautionary measure to prevent future complications due to retained ITM. Although many authors have debated the fact due to lack of authentic scientific proof, rather they believe this should not be the line of treatment in all the cases. As it is possible that some of the follicles may regress later with advancing age and thus may not convert into pathological conditions. Thus before coming to any consensus regarding third molar extraction, its risk, and benefit ratio both of its removal and retention should be reviewed beforehand.

A pathological condition associated with ITM is a clear indication for its extraction. However, the rationale for prophylactic removal of ITMs has always been uncertain and has been argued for many years. As the potential for a pathological alteration within the follicular tissue is still not clear. A major problem which dental surgeons are facing today is the minimal data available regarding pathological changes which may arise in radiographically normal-appearing follicles surrounding ITMs. Many reports have discussed the prevalence of various pathological changes derived from the epithelial remnants residing in the follicular tissue surrounding ITM, the majority being reported as odontogenic cyst and tumors. The most frequently reported odontogenic cyst is dentigerous cyst followed by odontogenic keratocyst, and the frequently encountered odontogenic tumor is ameloblastoma.

It is rarely seen that an unattended dentigerous cyst may transform into an ameloblastoma, squamous cell carcinoma, or an intraosseous mucoepidermoid carcinoma which arise mainly from epithelial rests. Leitner et al. have reported a malignant low-grade fibrosarcoma associated with ITM, in a clinically
and radiographically asymptomatic follicle. Some suggest prolonged inflammation might be the provoking factor behind the development of intraosseous carcinoma developing within the pericoronal follicle (PF) or cyst epithelium of ITMs. Adelsperger et al., henceforth, age may be used as an indicator who have reported pathological changes as 32% and 34%, respectively. Many previous studies have reported a higher prevalence of pathological conditions as 59% and 50%, respectively. The results of the current study are in favor with other studies as the dentigerous cyst is the most frequently reported pathosis followed by odontogenic keratocyst and ameloblastoma, developing in a clinically and radiographically normal PF of ITM.

In this study, the correlation between follicular tissue pathosis with tooth site and gender wise involvement has also been assessed. It was found that pathologies were more frequently associated with mandibular jaw than the maxilla which is consistently reported in previous studies as well. However on correlating gender with pathological changes within the follicular tissue of ITM, a slight female preponderance was reported. Although, several studies have reported higher pathologies in males. The reason behind this difference in gender distribution is still not known. Some suspect prophylactic extraction of third molars in many at an early age might be the reason behind this.

A significant association has been found between asymptomatic ITM pathologies with young age group in between 20 and 40 years. A previous study has reported similar results of a higher incidence of pathological changes in second and third decades of life. Henceforth, age may be used as an indicator for prophylactic extraction of ITM, as the risk of morbidity may increase with increasing age. On comparing pathological changes with angular position, higher incidence of pathology was found associated with distoangular and horizontal impaction later followed by vertical and mesioangular angulations. The previous studies have reported a higher risk of pathosis with distoangular and horizontal impaction suggesting these are the favorable position for food lodgment. On further investigation, it was observed that the non-pathological tissues were commonly associated with mesioangular and vertical impactions.

The inference from the above result comes out, as the clinical and radiographic features alone may not be a reliable indicator of the absence of pathology, so all the dental follicular tissues associated with ITM with follicular width ≤2.5 mm should not be discarded rather it should be sent for histopathological examination for early therapeutic intervention and treatment planning.

CONCLUSION

Considering the above facts, it is imperative for all dental professionals to scrutinize all the above factors and pre-evaluate its long-term benefits or risk before making any decision about the management of ITMs thus to prevent any morbidity in future.

REFERENCES