Original Research Article

A Retrospective Analysis of Biopsied Infectious Jaw Lesions in Eastern Indian population

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Abstract

Background: Reports of a series of central jaw tumours in children are uncommon. Hence, there is no way to forecast their biological behaviour, treatment, or prognosis in this region of the world. **Purpose**: The goal of this study was to find out how common jaw lesions are in Eastern India. **Methods**: From January 2020 to December 2021, biopsy data and microscopic sections of all jaw biopsies seen in a selected hospital in Eastern India were reviewed. The three primary groups included Group 1 as developmental/inflammatory/reactive lesions, Group 2 as cystic lesions, and Group 3 as tumours and tumour-like lesions. Odontogenic and nonodontogenic subgroups were created from Groups 2 and 3. **Results**: A total of 385 instances were looked at. There were 385 cases in all, with 115 (29.9%) in group 1, 178 (46.2%) in group 2, and 92 (23.9%) in group 3. Radicular cysts were the most often biopsied jaw lesions (n = 95; 24.7 percent), followed by chronic apical periodontitis (n = 59; 15.3 percent), dentigerous cysts (n = 51; 13.2 percent), and keratocystic odontogenic tumours (n = 30; 7.8%). Chronic apical periodontitis was the most common lesion in group 1 (n = 59; 51.3 percent). Odontogenic cysts (n = 166; 93.3 percent) were more common than nonodontogenic cysts (n = 12; 6.7 percent) in group 2, with radicular cysts (n = 95; 53.4%) being the most common lesions. In group 3, odontogenic tumours (n = 61; 66.3%) were more common than nonodontogenic tumours (n = 31; 33.7%). Keratocystic odontogenic tumours were the most common kind of lesion in this group (n = 30; 32.6 percent), followed by ameloblastoma (n = 17; 18.5 percent). In this study, only three malignant tumours were discovered. **Conclusions**: Cystic and inflammatory jaw lesions are more common than tumours and tumour-like lesions in India. Periapical inflammation was found to be the most common cause of inflammatory lesions in the jaw. The majority of cystic and tumorous jaw lesions were caused by odontogenic factors. Odontogenic tumours that were locally aggressive were more common than those that were not. Jaw tumours that were malignant were uncommon.

Keywords: Odontogenic and nonodontogenic lesions, Odontogenic, Central jaw tumours, tumour-like lesions

Introduction

Children's central jaw tumours (intraosseous) are uncommon, and few oral pathologists have had the chance or expertise in identifying and forecasting the biological behaviour of these lesions. Some youngsters are misdiagnosed as having a neoplasm in the early stages and are treated for infections incorrectly with antibiotics[1]. After an antibiotic treatment that isn't working, radiographs are taken to see if there is a radiolucent or radio-dense lesion in the jaws. Finally, in order to diagnose and begin proper therapy, a tissue diagnosis is required. Unfortunately, the number of organised courses available to clinicians, radiologists, and pathologists discussing various aspects of tumour and tumour-like lesions of the jaws in children is limited[2, 3]. Because of these restrictions, we decided to do a study on paediatric jaw tumours, which we published in our Institute. The data was divided into two categories: odontogenic and nonodontogenic, and the most prevalent tumours in children were discovered.

MRI can efficiently differentiate between cysts and tumours, assess the infiltration of malignant tumours in the jaw and surrounding soft tissue, and detect changes in the jaw's bone marrow[4]. The ability of MRI to distinguish calcified components of lesions or characterise the cortex of the jaw is somewhat limited. MRI, on the other hand, is more sensitive than CT for detecting bone marrow evaluation in inflammatory or infected lesions[5]. As a result, MRI is mostly employed as a supplement to CT. The ability to recognise the distinctive imaging features of mandibular lesions narrows the differential diagnosis and is critical for identifying those lesions that require biopsy for conclusive histology[6]. Imaging is important not only for diagnosing mandibular abnormalities, but also for guiding therapy and monitoring response to treatment. In odontogenic lesions with identical radiologic appearances, punch and incisional samples are commonly utilised to determine the final diagnosis[7, 8]. These treatments, however, have certain drawbacks: punch biopsy is usually inconclusive, and aspiration is sometimes impossible due to the dense material of some tumours. Because of the risk of misdiagnosis depending on the area biopsied, incisional biopsy is a vital operation in lesions with both cystic and solid areas in the same tumour[5]. An attempt was made to compare the incidence, prevalence, location of occurrence with a credible explanation for their aetiology, and pathogenesis of adult jaw tumours. The goal of this study is to offer information on jaw lesions as well as to evaluate the usefulness of X-ray, CT, and MRI in evaluating jaw lesions, consequently assisting in the development of a diagnostic protocol. The goal of this research is to explain the best imaging studies for various jaw tumours and lesions that resemble tumours.

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Methods

The study group included all patients under the age of 18 who were histologically identified with an intraosseous tumour or tumour-like abnormalities. The information was gathered between 2020 and 2021. Clinical information such as age, gender, and lesion site were gathered. The study did not include re-excised or recurring lesions. The Statistical Package for the Social Sciences for Windows 17.0 was used to collect and analyse data (SPSS Inc, Chicago, Ill., USA).

The following were the selection criteria:

1. All lesions that caused radiological alterations in the bone were included in the study.

2. Bone erosion in soft tissue tumours was ruled out.
3. Cysts that are aggressive, such as OKC, CEOC, and aneurysmal bone cyst, were included. For logical conclusions, the complete study material was examined and categorised into numerous categories.

Results

There were 1,280 oral biopsies found in total, with 37 of them being for re-excised and recurrent lesions. 385 (31.6%) of the remaining 1,243 primary oral biopsies were detected in the jaw. 248 (64.4%) of the 385 occurrences occurred in the mandible, while 127 (33.3%) occurred in the maxilla. In addition, 202 (52.5%) of the 385 instances were detected in men, while 183 (47.5%) were found in women. Patients ranged in age from 4 to 91 years old, with a mean age of 32.9 8 15.2 years. The following were the group distributions: group 1 115 (29.9%), group 2 178 (46.2%), and group 3 92. (23.9 percent).

Table 1: Frequencies of Group 1

Diagnosis	Location				Gender		Mean age ± SD, years
	n (%)	Man	Max	NS	male	female	
Chronic apical periodontitis	59 (51.3)	34	23	2	28	31	35.4 ± 15.4
Osteomyelitis	12 (10.4)	10	2		8	4	41.9 ± 20.0
Condylar hyperplasia	9 (7.8)	9	–		5	4	22.6 ± 6.6
Dental abscess	6 (5.2)	4	2		4	2	38.2 ± 16.3
Perio-endo defect	4 (3.5)	3	1		2	2	41.3 ± 12.3
Foreign body granuloma	3 (2.6)	1	2		2	1	39.3 ± 10.8
Exostosis	3 (2.6)	2	1		2	1	41.7 ± 1.5
Condensing osteitis	3 (2.6)	3	0		1	2	35.7 ± 6.7
Idiopathic osteosclerosis	3 (2.6)	2	1		1	2	43.7 ± 19.1
Oroantral fistula	3 (2.6)	–	3		2	1	32.0 ± 4.4
Bone marrow defect	3 (2.6)	3	0		2	1	34.7 ± 0.6
Others[1]	7 (6.1)	6	1		4	3	
Total	115 (100)	77	36	2	61	54	

Man = Mandible; Max = maxilla; NS = not specified.
[1] Traumatic bone cyst (n = 2), tuberculosis (n = 1), traumatic neuroma (n = 1), bisphosphonate-induced osteonecrosis (n = 1), actinomycosis (n = 1), mucormycosis (n = 1).

Radicular cysts were the most prevalent biopsied jaw lesion (n = 95; 24.7 percent), followed by chronic apical periodontitis (n = 59; 15.3 percent), dentigerous cysts (n = 51; 13.2 percent), and keratocystic odontogenic tumours (n = 30; 7.8%).

Table 2: Frequencies of cystic lesions

Diagnosis	Location				Gender		Mean age ± SD, years
	n (%)	Man	Max	NS	male	female	
Odontogenic	166 (93.3)						
Radicular cyst	95 (53.4)	45	44	6	55	40	32.8 ± 14.3
Dentigerous cyst	51 (28.7)	43	8		30	21	27.4 ± 14.1
Residual cyst	8 (4.5)	6	2		6	2	41.3 ± 15.4
Odontogenic cyst NS	6 (3.4)	3	3		3	3	44.3 ± 9.3
Glandular odontogenic cyst	3 (1.7)	1	2		3	0	32.7 ± 11.1
Orthokeratinized odontogenic cyst	3 (1.7)	3	0		2	1	34 ± 14.9
Nonodontogenic	12 (6.7)						
Nasopalatine duct cyst	11 (6.2)	0	11		6	5	38.7 ± 20.1
Surgical ciliated cyst	1 (0.6)	0	1		0	1	27
Total	178 (100)	101	71	6	105	73	

Man = Mandible; Max = maxilla; NS = not specified.

Of the 115 cases in group 1 (table 1), 59 (51.3%) had chronic apical periodontitis, 12 (10.4%) had osteomyelitis, and 9 (7.8%) had condylar hyperplasia. 166 (93.3 percent) of the 178 cystic lesions in group 2 (table 2) were odontogenic. Radicular cysts accounted for 95 (53.4%) of the patients, dentigerous cysts for 51 (28.7%), and nasopalatine duct cysts for 11 (6.2%). Of the 92 tumour and tumour-

like lesions in group 3, 61 (66.3 percent) were odontogenic. Keratocystic odontogenic tumours accounted for 30 (32.6%) of the cases, followed by 17 (18.5%) ameloblastomas, 10 (10.9%) central giant cell granulomas, and 9 (9.8%) odontomas. Only three (0.8 percent) of the 385 jaw lesions were revealed to be malignant nonodontogenic tumours.

Discussion

Tumours and tumour-like lesions of the jaw can be caused by a range of lesions ranging from cysts to malignant tumours[8]. The majority of patients report of nonspecific symptoms such as edoema without discomfort or swelling with pain. As a result, radiological imaging in the form of a CT scan is critical in the diagnosing process[9, 10]. The findings of Dhanuthai et al.[9] in Thai children and Utsumi et al.[11] in Japanese kids that cystic lesions were the most common among the three groups in our investigation are consistent. Weir et al.[11] found that reactive and cystic lesions were more common than neoplasms in their investigation. Our findings that radicular cysts were the most often biopsied lesions in our study are in line with those of Skiavounou et al.[10] in Greek children and adolescents and Satorres Nieto et al.[13] in Spanish patients. Chronic apical periodontitis was found to be more prevalent than radicular cysts in reports from the United Kingdom and Singapore. Dentigerous cysts were shown to be more common than radicular cysts in a study of juvenile oral lesions in Thailand by Dhanuthai et al.[9], however this conclusion was likely due to the high number of referred cases of dentigerous cysts, as the study was conducted at a prominent referral hospital[14]. The mandible was the most often impacted site in all three groups, similar to prior research in which jaw diseases such as odontogenic cysts and odontogenic tumours were more frequently observed in the mandible[15]. Lima et al.[8] discovered that jaw lesions were slightly more common in the maxilla than the mandible in Brazilian children, but this is likely due to the fact that lesions with a distinct predilection for the mandible, such as ameloblastoma and osteomyelitis, were not observed in this study due to their rarity in the paediatric population[16].

The majority of cystic lesions in the current study were odontogenic cysts, which is similar with the findings of many other researchers[17]. Cystic lesions accounted for 14.3 percent of all acceptable oral biopsies, which is within the range of 13.8–21.1 percent seen in previous studies[18]. Odontogenic cysts accounted for 93.3 percent of cystic lesions in this study, which is slightly less than the 95.6–97.2 percent found in Sicilian and Greek participants[19]. This disparity could be explained by the fact that odontogenic keratocysts and calcifying odontogenic cysts were not included in the cystic group in this study, but rather in the tumours and tumor-like lesions group. In the most recent World Health Organization (WHO) classification of odontogenic tumours, the lesions were reclassified as odontogenic tumours rather than cysts due to their aggressive tendency[20]. The calcifying odontogenic cyst is now known as a calcifying cystic odontogenic tumour, and the odontogenic keratocyst is now known as a keratocystic odontogenic tumour[21]. The nasopalatine duct cyst was the most common nonodontogenic cyst in this investigation, which is consistent with prior results from Canada and the United Kingdom[21].

The majority of tumours and tumor-like lesions were found to be odontogenic in origin, which is consistent with the findings of most previous studies. Nonodontogenic tumours were somewhat more common in research by Parkins et al.[22] from Ghana, although this could be because nonaggressive odontogenic lesions like odontomas were not discovered in this investigation because only symptomatic patients and patients who presented with facial edoema were included. The most prevalent nonodontogenic tumour in this investigation was central giant cell granuloma, which is consistent with prior results from Libya and Brazil[23].

Odontogenic tumours and tumour-like lesions made up 4.9 percent of all acceptable oral biopsies, which is in line with prior research' findings of 0.8–9.6 percent. Ameloblastoma and odontoma were the most prevalent odontogenic tumours in most studies before the inclusion of keratocystic odontogenic tumours and calcifying cystic odontogenic tumours in the WHO list of odontogenic cancers[17, 18]. Keratocystic odontogenic tumours were the most common odontogenic tumours in this study, followed by ameloblastomas, which is consistent with recent reports, but ameloblastomas (40.3 percent) were somewhat more common than keratocystic odontogenic tumours in another study from China by Jing et al (35.8 percent)[6]. In this study, this type of tumour accounted for 49.2% of all odontogenic tumours, which is higher than the 35.1 percent reported by El Gehani et al.[23] and the 38.7% reported by Luo and Li. This study found that benign tumours were considerably more common than malignant tumours, which is consistent with previous research[10, 22]. The current study showed no malignant odontogenic tumours. This discovery supports recent findings from other nations[17] showing the rarity of similar lesions in the jaw. In previous findings from other nations, the percentage of malignant odontogenic tumours ranged from 0.3 to 3.4 percent of all odontogenic tumours.

Conclusion

Lesions of the jaw that were cystic or inflammatory were more prevalent than tumours and tumor-like lesions. Periapical inflammation was found to be the most common cause of inflammatory lesions in the jaw. The majority of cystic and tumorous lesions in the jaw were caused by odontogenic factors. Locally aggressive odontogenic cancers such keratocystic odontogenic tumours and ameloblastomas were more common than non-aggressive odontogenic tumours like odontomas. The majority of benign jaw tumours were odontogenic in origin, while the majority of malignant tumours were nonodontogenic.

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