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Study of CD10 Expression as Predictive Factors of Recurrence in Ameloblastoma

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ABSTRACT

Introduction: Ameloblastoma is characterized by a benign but locally invasive behavior with a high risk of recurrence. The invasion of surrounding healthy tissues by tumor cells is one of the essential steps in tumor progression. Identification of invasive activities in ameloblastomas may be useful to predict their biological behavior and aids in constituting proper treatment of choice at an early stage, preventing morbidity associated with extensive therapy.
the invasion phenomenon in ameloblastomas is complicated process that need multiple steps and interaction between cells and molecules to release mediators that have direct and indirect effect in invasion .
Objective: The aim of the present article was evaluate the role of immunomarkers (CD10) in analysis of the invasive potential in ameloblastoma and rate of recurrence.
Method: An Immunohistochemical study using CD10 antibodies was performed on 23 paraffin blocks obtained from the archives of oral pathology laboratory of the oral diagnosis department at the college of dentistry/ Baghdad University and the general pathology in Al hussain teaching hospital in Dhi-qar and private laboratory .Statistical analysis was performed with Statistical Package for Social Sciences (SPSS) software version 25.1
Results: This series of 23 cases comprised 16 males and 7 females with mean age of 31.13 years (range: 14 to 60 years), corresponding to 23 cases of intraosseous ameloblastoma (15 cases of follicular ameloblastoma and 8 cases cystic ameloblastoma), 5 cases of local recurrence were observed. No correlation was demonstrated between recurrence and the various clinical and histological parameters and the type of therapy. However, a significant correlation was demonstrated between recurrence and stromal cells expression of CD10 (0.04) but no significant correlation between tumor cells and recurrence (0.07).
Conclusion: The stromal CD10 expression can be considered to be predictive factors of ameloblastoma recurrence.
Key words:
CD10, Diabetes, Ameloblastoma, C-JNK, PCBs, Vitamin C, Vitamin E, Adipose Tissue, Innovative technology, Novel method

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INTRODUCTION

The ameloblastoma is the most common clinically significant odontogenic tumour. Ameloblastomas are tumours of odontogenic epithelial origin. Theoretically, they may arise from rests of dental lamina, from a developing enamel organ, from the epithelial lining of an odontogenic cyst, or from the basal cells of the oral mucosa. Slow-growing, locally invasive tumours that run a benign course in most cases [1].

According to WHO classification 2017, ameloblastoma classified in to convential ameloblastoma, unicystic, extraossesous ameloblastoma [2].

A high tendency to recurrence and even metastasis in rare cases. It is an aggressive odontogenic tumour, which is locally invasive and highly recurrent [3].

This invasive nature of ameloblastoma has consequences for treatment, ranging from simple tumours resection to wide or even radical resection [4]

many studies have suggested that mmp2 and CD10 expression in tumour tissue may be associated with a more invasive profile and high risk of recurrence of certain tumours', including ameloblastoma [5,6].

The objectives of this study were to study the Immunohistochemical expression of CD10 in ameloblastoma, and investigate a possible correlation between this marker and the recurrence rate of this tumour.

MATERIAL AND METHOD

A 23cases of ameloblastoma were retrieved from the archives of oral pathology laboratory of the oral diagnosis department at the college of dentistry/ Baghdad University and the general pathology in Al hussain teaching hospital in Dhi-qar and city medicine in Baghdad.

The objectives of this study were to explain the effectiveness of this marker (CD10) in evaluating the local invasiveness in ameloblastoma and rate of recurrence. Formalin fixed–paraffin embedded tissue specimens of the cases were collected along with their pertinent clinical data (age, sex and site, histopathological subtypes) as provided within surgical notes and laboratory records, Histological slides were reviewed and tumours were classified according to the WHO 2017 classification [2]. Slides comprising the largest amount of tumours tissue and not containing any bone fragments were selected in each case, The three-layer immunoperoxidase staining protocol was used, comprising a E-IR-R 221 kit (ELAB SCIENCE) with revelation by DAB (diaminobenzidine) chromogen.

CD10 was expressed in both stromal and tumour cells that scord semiquantitavely based on the percentage of positive cells was performed according to the following staining criteria: -, negative (<5%); 1 ± 5-50%); and 2 ± (>50%) [7].

Statistical analysis was performed with Statistical Package for Social Sciences (SPSS) software version 24.1. A descriptive and analytical study of the series was performed.

RESULTS

23 cases were15 males and 8 were females with sex ratio 1:8.2 , Age ranged from 14 to 60 years old with mean age 31.13 , The tumour involved the mandible in 18cases (82.6%) and the maxilla in 1 cases(4.3%) and maxilla or mandible with other bone 4 cases (13.1 %) , This series comprised15 cases follicular ameloblastoma (62.5) 8 cases cystic ameloblatoma (37.5) , Five cases (21.7%) showed local recurrence and in 15 cases showed no recurrence (65.2%) and there's 3 cases missed their information about recurrence.

CD10 Expression

Cytoplasmic expression was showed in both tumour and stromal cells of ameloblastoma as brown colour, Among cases, the percentage of expression level was ranged from negative (%) in 36.8% of tumour cells in studied non recurrent cases of ameloblastoma and up to 60% show positivity and in stromal cell was show negativity in 52.6 % and positivity up to 40% while in recurrent cases show (100%) positivity in tumour cells and stromal cells. spearman correlation show not significant weak positive recurrence relationship in tumour cells of ameloblastoma (0.07) and significant strong positive relationship with recurrence in stromal cells of ameloblastomas (0.04).

No statistically significant Comparison was observed between CD10 expression and tumour site, histological type and the various architectural variants.

Table 1: Spearman correlation between CD10 and recurrence in ameloblastoma.

CD10		Recurrence	
		R	P
	TP	0.414	0.07
	ST	0.655*	0.02*
*Correlation is significant at 0.05 level (2 tailed)			

Table 2: Difference between recurrence and various parameters predictive of recurrence in ameloblastoma.

Parameters		No.of non-recurrent cases	No of recurrent cases	F	Pvalue
Age group	10-30y	10	3	35.5	0.861
	30-60y	9	2		
Site of lesion	mandible	15	3	28.5	0.26
	maxilla	1	0		
	others	3	2		
Histopathological subtypes	Follicular	12	4	32.5	0.59
	cystic	7	1		
Type of operation	Partial bone	16	4	35.5	0.78
	resection				
	marsuplization	1	1		
	enucleasion	2	0		

TP (CD10)	0	7	0	18	0.007
	1	6	2		
	2	6	3		
ST(CD10)	0	10	0	7.5	0.04*
	1	6	2		
	2	3	3		

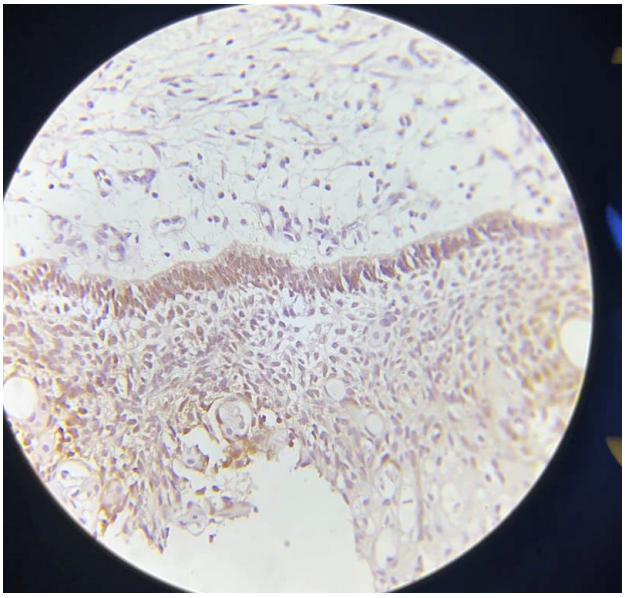

Figure 1: CD10 expression (more than50% in tumor cell and less than5% in stromal cells in unicystic ameloblastoma.

DISCUSSION

The ameloblastoma is the most common clinically significant odontogenic tumour [1]. Mostly benign [8], it is an aggressive odontogenic tumour, which is locally invasive and highly recurrent [3].This tumour is usually observed in young adults, but can occur at any age with a mean of age of onset of 40 years, with no sex predilection [9]. The mean age of the patients in the present study was 31.13 years with a slight male predominance (sex ratio=1.3). In line with published series that have reported a predominantly mandibular site of ameloblastoma (80 to 99% of cases), and more rarely a maxillary site (3 to 20% of cases) [10], a mandibular site was observed in 82.6% of cases and a maxillary site was observed in 4.1% of cases and maxillary or mandible with other bone 13.1 in our series.

According to the 2017 WHO classification [2], ameloblastoma is subdivided according to intraosseous convential ameloblastoma and uncystic ameoblastoma and extraosseous (tissue or peripheral) ameloblastoma. Our series was composed of 23cases (100%) of intraosseous ameloblastoma and no case of gingival ameloblastoma. The distribution of architectural variants in our series was 62.5% and cystic ameloblastoma 37.5 % showing a predominance of the follicular variant.

Treatment is surgical and is primarily designed to ensure recurrence-free tumour resection with acceptable cosmetic and functional results partial bone resection was the preferred technique in our study 82.6 %

Ameloblastoma, is tumours located in the jaw, grows slowly but locally invasive. Ameloblastoma expands in the jaw based on a mechanism resorbing the surrounding bone [11]. It is also characterized by a very high recurrence rate, even following complete resection with negative surgical margins [12].

Age and gender were not considered to be predictive factors of tumour recurrence according to published studies [13], as confirmed by the present study.

It is most commonly located in the mandible, with 75% occurring in the molar and ascending ramus areas. The ratio between maxillary and mandibular tumors is reported to be about 1:5 [14].

In our series,96% of recurrences concerned mandibular tumours, while 4% of recurrences concerned maxillary tumors, but with no significant difference between the two groups .

CD10 (common acute lymphoblastic leukaemia antigen, CALLA) is a 100-kDa trans membrane glycoprotein, also known as neutral end peptidase (NEP). CD10 is expressed by a variety of normal cell types, including lymphoid precursor cells, germinal centre B lymphocytes and some epithelial cells as gastric mucosa. First, CD10 was reported in relation to lymphoid neoplasms. However, its expression is also reported in malignant epithelial neoplasm and melanoma. Although CD10 expression is observed in neoplastic cells [5].

CD 10 immunostaining may be useful to identify areas with locally aggressive behaviour even in low-risk ameloblastoma [15].

CD10 might be a good marker for differentiating between primary tumours and metastases, and therefore this marker is likely useful for evaluating tumour progression. Elevated CD10 expression indicates poor prognosis in numerous solid tumours', as it is associated with disease progression and metastatic potential (gastric, pancreatic, colorectal tumour's and melanoma, oral squamous and basal cell carcinomas)

The results of the present study agree those of the literature showing a significant correlation between CD10 expression and recurrence rate (P = 0.04) because there was most of cases in our study show no recurrence had negative expression of stromal cells in

ameloblastoma. Therefore, CD10 might be a useful marker for tumours behaviours for ameloblastoma, and inhibition of CD10 activity may be a viable therapeutic, although students in patients are needed to determine the efficacy of this approach [16].

CONCLUSION

This series, in line with the various series published in the literature, showed that the Ki67 proliferation index and CD10 expression by stromal cells appear to be significant markers of local invasiveness and recurrence of ameloblastoma and therefore constitute prognostic factors.

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