Original Research Paper

Pathology

STROMAL EXPRESSION OF CD10 IN BREAST LESIONS: AN INSTITUTIONAL STUDY

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ABSTRACT

BACKGROUND: Breast carcinoma 2nd most common cancer in India. Incidence of breast cancer in India is on raise and rapidly overtaking the position of cervical cancers in females. Immunochemistry is very important role in confirming the diagnosis. The main aim of this study to correlate immunohistochemistry and histopathological grades of breast carcinoma using the modified Bloom-Richardson system and TNM staging and helps management of breast lesions.

MATERIALS & METHODS: This was a descriptive, cross sectional study carried out for 2 years from November 2013 to August 2015. Total 50 lumpectomy and mastectomy specimens were received to department of pathology Dr.PSIMS & RF, chinnaoutpalli, Vijayawada, A.P. After gross examination biopsies were sections were given and processed, H&E staining, histopathological diagnosis was made out. Immunohistochemistry was done for CD10. This study was approved by the institutional ethical committee.

RESULTS: Total 50 biopsies were analyzed and broadly categorized into non-neoplastic and neoplastic lesions. Most of the lesion commonly presented at 31-40 years of the age. All the lesions showing equal laterality. Benign lesions are more predominant than malignant. Fibroadenoma is the most common benign lesions 18(56%) and infiltrating duct cell carcinoma was the most common malignant lesion 18 (88.9%). Immunohistochemistry with CD10 was done for all the breast lesions shows consistently positive in myoepithelial cells of benign breast lesions and weakly positive in stromal cells of Infiltrating duct cell carcinoma.

CONCLUSION: Immunohistochemistry (IHC) CD10 status provides prognostic, diagnostic and therapeutic information. Stromal CD10 expression had a high specificity for differentiating between benign lesions (fibroadenomas and benign phyllodes tumours) and malignant (borderline and frankly malignant) phyllodes tumours.

INTRODUCTION

Breast cancer is the second most common cancer in women in India. Over 1 lakh new breast cancer patients are estimated to be diagnosed annually in India. The incidence of breast cancer in India is on the rise and is rapidly becoming the number one cancer in females pushing the cervical cancer to the second spot.It is reported that one in 22 women in India is likely to suffer from breast cancer during their lifetime. The rise, being documented mainly in the urban areas but it can be safely said that many cases in rural India go unnoticed. It is most often observed that due to lack of knowledge and ignorance, patients of carcinoma breast clinically present in a late stage of the disease.[1]

Immunohistochemistry has an important role in confirming the diagnosis of breast disease.CD markers provide a cost effective source of valuable data for monitoring the course of breast diseases, determining the prognosis, and aiding in treatment plan of breast neoplasms.[2]

Immunohistochemistry (IHC) CD10 status provides prognostic, diagnostic and therapeutic information. This study was carried out with the aim of helping to correlate IHC and histopathological grade of breast carcinomas using the modified Bloom-Richardson system and TNM staging of breast carcinoma and hence, help in therapeutic management.

Cd10 is a zinc-dependant metalloproteinase, the expression of which can be observed on numerous tissues such as epithelial cells of the lung, intestine, kidney, breast and placenta CD10, also called common acute lymphoblastic leukemia antigen (CALLA), was recently found to be expressed in non hematopoietic tissues.CD10 is clearly detectable in myoepithelial cells, and so they are used as an internal positive control in routine immunohistochemical studies of the human breast tissue.[3]Breast consists of two distinct cell types, the inner layer of epithelial cells lining the lumen, and the other is the outer layer of myoepithelial cells. Myoepithelial cells are rich in myofibrils in their cytoplasm, CD10 expression is seen on cytoplasm of myoepithelial cells.[4]

CD10 clearly highlighted myoepithelial cells in intraductal papilloma, adenosis, ductal hyperplasia, fibroadenoma, and phyllodes. The absence of myoepithelial cells in invasive ductal carcinomas was more clearly highlighted by CD10. CD10 could be another useful marker of breast myoepithelial cells on paraffin sections.[4] Stromal CD10 expression had a high specificity for differentiating between benign lesions (fibroadenomas and benign phyllodes tumours) and malignant (borderline and frankly malignant) phyllodes tumours.

MATERIALS & METHODS

Present study was a descriptive, cross sectional study over a period of 2 years from November 2013 to August 2015. Total 50 lumpectomy and mastectomy specimens received to department of pathology, Dr.PSIMS & RF, chinnaoutpalli, Vijayawada,A.P. All received biopsies were examined, fixed in 10% formalin for 24 to 48 hours and processed by the routine Paraffin embedding techniques. Multiple sections of 4-6 microns thickness were taken and stained with routine Haematoxylin and Eosin. The histological grading of tumor was done on H&E stained sections according to Modified Bloom and Richardson grading whenever needed. Immunohistochemistry was done with monoclonal rabbit anti-human CD10 antibody on paraffin sections. Scoring systems used for CD10 expression in breast neoplasms. Score 0 was negative staining over myoepithelial cells,1+ partial staining (10-90%), and 2+ cytoplasmic circumferential staining (>90%).

RESULTS

All the received specimens categorized into benign and malignant lesions. Out of 50 biopsies benign were 32(64%) and malignant were 18(36%). Age of the patient ranged from 21 to >60 years. Majority of cases present at the age between 31-40 years. In this present study lesional laterality (right& left) showing equal predominance.

Among benign lesions most common lesion was Fibroadenoma 18(56%), followed by tubular adenoma 4(13%), sclerosing adenosis 4(13%) and benign phyllodes 6(18%).

Among malignant breast lesions were infiltrating duct cell carcinoma 16(88.9) and malignant phyllodes 2(11.1%).

Immunohistochemistry with CD10 was done for both benign and malignant lesions. Shows strong myoepithelial staining positivity in all benign lesions and malignant lesions were showing negative staining pattern.

DISCUSSION
In the present study majority of patients belonged to age group between 21-40 years. The youngest patient was of 18 years and oldest was 67 years. The average age of the patients affected was 42.5 years which is in concordance to age of 42.9 years quoted by Maha M.Amin et al[5].

In Present study 50% had right sided and 50% had left sided pathology, showing equal predominance. And in Suzuko Moritani et al[6], which had 53% Right side pathology and 45.80% left side pathology and 1.20% bilateral disease also showed right sided predominance. But in Agatha Kondi et al[7], there were 49% right side and 51% left side pathology in their series.

In the present study majority of breast lesions are benign (64%) and malignant lesions (36%).The distribution of breast lesions was almost similar compared to the study conducted by Suzuko Moritani et al [6], Agatha Kondi et al.[7], Maha M.Amin et al[8]., A N Kalof et al[9].

In the present study fibroadenoma predominated with 18 cases (56%). Next common benign tumour found was Benign Phyllodes, i.e. 6 cases (18%), Both Tubular Adenoma and Sclerosing Adenosis seen in 4 cases each (13%) were recorded. The distribution of benign breast lesions show Fibroadenoma was the most common benign breast diseases similar compared to the study conducted by Suzuko Moritani et al[6], Agatha Kondi et al[7].

In the present study Infiltrating duct cell carcinoma predominated with 16 cases out of 18 cases (88.9%) and Malignant Phyllode show 2 cases out of 16 cases (11.1%).

In the present study CD10 was consistently positive in myoepithelial cells of benign breast lesions. CD10 myoepithelial cells expression was most commonly seen in benign breast lesions (94.5%) higher compared to the study conducted by Suzuko Moritani et al[6], A N kalof et al[9], Wael S.Ibrahim et al[10], and Maha E.Salama et al [11].

In the present study CD10 was consistently positive in Stromal cells of malignant Phyllodes. There is a significant increase in CD10 expression in the stromal cells as the lesions progressed from benign to malignant Phyllodes tumor, compared to the study conducted by Wael S.Ibrahim et al[10].

In the present study CD10 was positive in Stromal cells of Infiltrating duct cell carcinoma (18.5%) and Malignant Phyllodes (100%). Malignant Phyllodes CD10 Stromal expression is higher (100%), compared to study conducted by Suzuko Moritani et al [6], Majid Salavati et al[12], Jayalakshmi P et al[13] and Maha E Salama et al[11].

CONCLUSION
In benign breast lesions CD10 clearly highlighted the myoepithelial cells and CD10 provides exact information about the presence or absence of myoepithelial component. There is a significant increase in CD10 expression in the stromal cells as the lesions progressed from benign to malignant Phyllodes tumor.

CD10 immunoexpression is higher in the desmoplastic stroma of invasive duct carcinoma as well as Phyllodes tumors.

So in our present study confirms that strong correlations between CD10 expression in stromal cells and stage of disease. CD10 expression is only physiologically present in the stromal myoepithelial cells of normal breast tissue. In case of invasive breast carcinoma, the CD10 expression in stromal cells surrounding the infiltrating tumor cells. When cancer cells invade and metastasize, the number of stromal cells increases. Presence of CD10 on stromal cells positively correlates with worse prognosis.

Table 1: Distribution of cases according to Benign and malignant lesions

Lesion type	No of cases
Benign	32(64%)
Malignant	18(36%)

Table 2: Distribution of lesions according to age

Age	Benign	malignant
21-30	11(22%)	---
31-40	15(30%)	----
41-50	6(12%)	
51-60	02(4%)	12(24%)
>60	-------	06(12%)

Table 3: Distribution of Benign breast lesions

Benign breast lesions	No.of cases
Fibroadenoma	18(56%)
Tubular adenoma	4(13%)
Sclerosing adenosis	4(13%)
Benign phyllodes	6(18%)

Table 4: Distribution of Malignant lesions of breast

Malignant breast lesions	No.of cases
Malignant phyllodes	2(11.1%)
Infiltrating duct cell carcinoma	16(88.9%)

Table 5: CD10 stromal expression in benign breast lesions

Benign breast lesions	CD10 stromal expression (%)
Fibroadenoma	61.11%
Tubular adenoma	75%
Sclerosing adenosis	25%
Benign phyllodes	16.7%

Table 6: CD10 stromal expression in malignant breast lesions

Malignant breast lesions	CD10 stromal expression (%)
Malignant phyllodes	0%
Infiltrating duct cell carcinoma	0%

Fig 1: Fibroadenoma showing Strong positive cytoplasmic staining for CD10 in the Myoepithelial cells (40X)
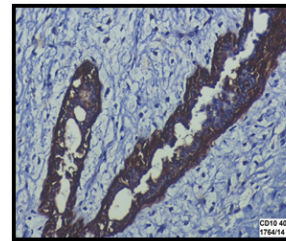

Fig 2:Tubular Adenoma showing Strong positive cytoplasmic staining for CD10 in the Myoepithelial cells (40X)
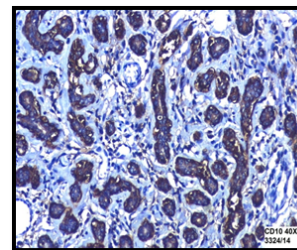

Fig 3: Benign Phyllodes showing Strong positive cytoplasmic staining for CD10 in the Myoepithelial cells (10X)
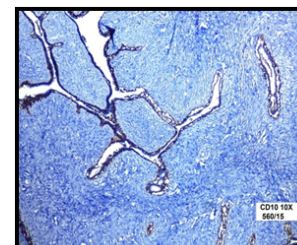
Fig 4: Infiltrating duct cell carcinoma showing weakly positive cytoplasmic staining for CD10 in the stromal cells (40X)
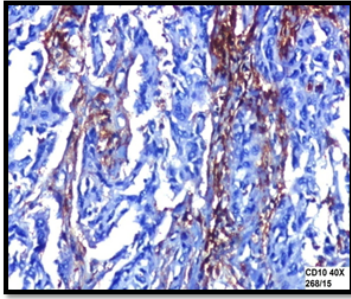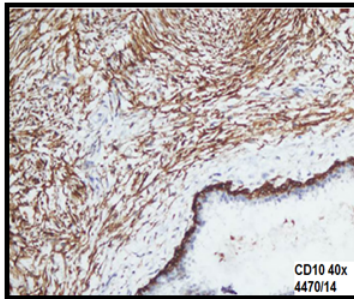

Fig 5: Malignant Phyllodes is showing diffuse and high intensity of stromal CD10 expression (40X)

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