Research Article

STUDY OF CORRELATION OF CYTOMORPHOLOGY OF BREAST LESIONS WITH BODY MASS INDEX OVER A PERIOD OF ONE AND HALF YEARS IN A TERTIARY CARE CENTRE OF MALWA REGION

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ABSTRACT

Background: Though breast lumps are very common, most of the them are benign and prevalence of cancer increases with age. Breast cancer is one of the commonest cancers amongst women in India. Though various studies have implicated overweight and obesity with increased risk of breast cancer the results are still controversial. Even lesser studies have highlighted role of body mass index in benign breast lesions.
Aim of study: The present study emphasizes on evaluating the correlation of cytomorphological diagnosis of benign and malignant breast lesions with body mass index. **Materials and Methods:** Prospective study design was used on total of 80 casesand all necessary statistical analysis was done including the percentages, means, standard deviations, ranges and p values. **Results and Conclusions:** Overall results indicated a strong positive association of higher BMI with malignant breast lesions (Mean 29.92, SD 2.1, p value<0.01) as well as lower BMI with benign breast lesions (Mean 24.25, SD 2.98, pvalue<0.01). Significant correlation has been seen in our study between BMI and breast lesions. Increase in BMI increases risk of breast malignancies, hence the take away message is to adopt healthy lifestyle including nutritious diet and exercise like yoga is the paving stone towards disease free productive life.

INTRODUCTION

Though breast lumps are very common, still their etiologies vary widely from benign to intermediate to malignant spectrum.[1] Most of the lumps are benign, but prevalence of cancer increases with age and BMI.[2] Obesity/overweight is implicated with increased risk of breast cancer. Excess of body weight or Body Mass Index (BMI) more than 25 kg/m^2 increases risk of developing breast cancer.[3]The body mass index (BMI) is the metric currently in use for defining anthropometric height/weight characteristics in adults and for classifying (categorizing) them into groups. The common interpretation is that it represents an index of an individual's fitness. It also is widely used as a risk factor for the development of or the prevalence of several health issues.[4]Increase in BMI is known risk factor for development of breast cancer. Breast cancer risk increases by 3% by every 1 kg/m^2 increase in BMI.[5]Comparing benign and malignant breast lesions in relation to BMI, women with low BMI or normal BMI have benign breast lesions more commonly whereas, on the other hand, women with higher BMI have more chances of having malignant lesions.

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The various studies available indicate an inverse association between BMI and relative risk of developing premenopausal breast cancer, and positive association between BMI and relative risk of developing post menopausal breast cancer. However, the relationship of BMI to benign breast disease is less clear.

Obesity has been shown to effect breast carcinoma prognosis also with more obese ones having higher mortality due to breast carcinomas. Higher risk of lymphatic and nodal invasion is also seen is obese women.

Body mass index may be an important clinical prognostic factor that should be considered in the process of working up breast carcinoma cases and be considered in the treatment and decision making. Thus in present study, the correlation between cytomorphological diagnosis of breast lesions and BMI has been done.

MATERIALS AND METHODS

The study was done in the Department of Pathology, AIMSR, Bathinda, over a period of one and a half year, i.e. 1st January 2017 to 30th June 2018, on the cases of breast lumps on which Fine Needle Aspiration Cytology was done.

Type of Study: Cross- Sectional Study.

Time Frame: Since it was a time bound study, all the Fine Needle Aspiration Cytology cases received during the period of 1 year and 6 months, i.e. 1st January 2017 to 30th June 2018, were considered, satisfying the inclusion and exclusion criteria for prospective cases.

Inclusion Criteria: All females with breast lump undergoing Fine Needle Aspiration Cytology for cytomorphological diagnosis irrespective of their age, in whom BMI was calculated.

Exclusion Criteria: Male patients with breast lumps undergoing FNAC for diagnosis.

METHOD

For prospective study, female patients presenting to the Department of Pathology for FNAC of palpable breast lesions of all age groups were taken for the study.

i. The slides were reviewed by two pathologists microscopically for cytomorphological diagnosis.
ii. Body Mass Index (BMI) of the patient was calculated.
iii. Calculation of BMI was done as per formula: = Weight/height^2
iv. In which weight was measured in kilograms in FNAC laboratory with the help of calibrated weighing scale and height was measured in meters.
v. BMI was categorized as following:-

Under weight :less than 18.5

Healthy :18.5 – 24.9

Overweight :25 -29.9

Obese > 30.

Statistical Analysis: All necessary statistical analysis was done including the percentages, means, standard deviations, ranges and p values.

OBSERVATIONS AND RESULTS

Various observations and results are described as following:

Cytological Diagnosis

Out of total 80 cases studied, 65 were cytologically benign with or without focal atypia and 15 were malignant (carcinomas). (Table No.1)

Age Distribution of Cytological Diagnosis

The age of the patients was in the range of 18 – 70 years with maximum lesions in the age group of 31- 40 years (35%). Out of total of 65 benign lesions, maximum cases were in age group of 31 – 40 years (40%) followed by 21 – 30 years (32.3%) .Out of total 15 malignant lesions, maximum cases were in the age group of 51 – 60 years (40%), followed by 61 – 70 years (26.7%). The mean age of presentations of benign lesions was 36.53years and of malignant lesions was 54.67years. (Table no.4)

Bmi Versus Benign and Malignant Lesions

The BMI was Catagorized in three Catagories

➢ < 18.5 - underweight
➢ 18.5 – 24.9 - healthy individual
➢ 24.9 – 29.9 overweight
➢ >30 obese.

Maximum benign lesions, i.e, 40 (61.5) had BMI in the range of 18.5 -24.5.

Maximum malignant lesions,i.e, 08(53.3%) had BMI above 29.

The mean BMI of benign lesions was 24.25 and mean BMI for malignant lesions was 29.92. (Table no. 5&6)

Table I Showing Percentage of Benign and Malignant Cases

	No of cases	Percentages
Benign	65	81.2
Malignant	15	18.8
Total	80	100%

Table 2 Cytological Diagnosis of Various Lesions With Percentage

Cytological diagnosis	No of cases	Percentage
Benign Proliferative lesions without atypia	36	45%
Benign Proliferative lesions with atypia	01	1.25%
Benign non proliferative epithelial lesions	22	27.5%
Benign inflammatory lesions	06	7.5%
Carcinomas	15	18.75%
Total	**80**	**100%**

Table 3 Age Vise Distribution of Benign and Malignant Lesions

Age Group	Benign		Malignant	
	No of cases	% of cases	No of cases	% of cases
11 -20	02	3.1%	00	0.0%
21 -30	21	32%	01	6.7%
31 -40	26	40%	02	13.3%
41-50	08	12.3%	02	13.3%
51 -60	05	7.7%	06	40%
61 – 70	03	4.6%	04	26.7%
Total	65	100%	15	100%

Table 4 Showing Co-Relation of Bmi with Benign And Malignant Lesions

BMI	Benign		Malignant	
	No of cases	% of cases	No of cases	% of cases
< 18.5	01	1.5%	00	0.0%
18.5 – 24.9	40	61.5%	00	0.0%
24.9 – 29.9	22	33.8%	07	46.7%
>30	02	3.1%	08	53.3%
Total	65	100%	15	100%

Table 5

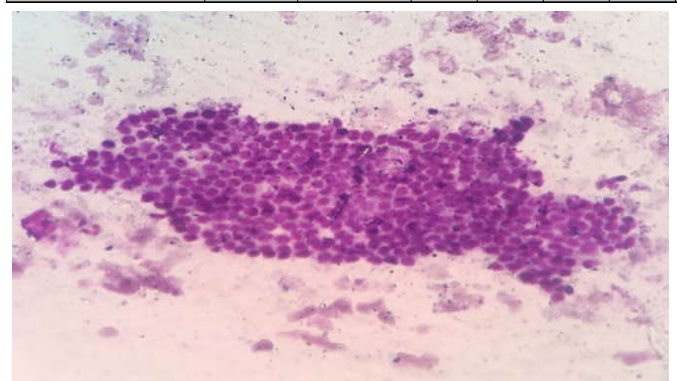|	BENGIN		MALIGANT		t	p-value
	Mean	SD	Mean	SD		
BMI	24.25	2.98	29.92	2.11	-6.300	0.000

Figure 1 Benign proliterative breast lesion - Smears showing tightly cohesive clusters of benign ductal epithelial and myoepithelial cells.
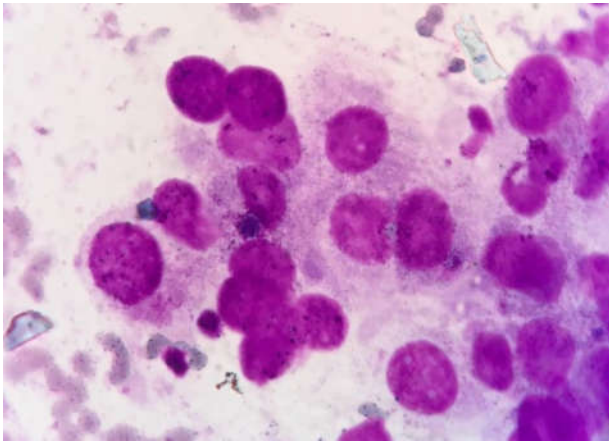
Figure 2 Carcinoma - High power view of malignant cells showing enlarged hyperchromatic cells and visible nucleoli.

DISCUSSION

Body mass index has always been condidered as an important factor in the pathogenesis of breast lesions.

In this study we observed that the patients presenting with malignant lesions had BMI in higher range and mostly patients presenting with benign breast lesions had BMI in lower range results which were seen to be statistically significant. So here we concluded that females who are overweight or obese have more chances of developing malignant breast lesions as compared to females with BMI in normal or lower range.Similar findings were also observed in certain other studies.A study "Relationship of body mass index to tumor markers and survival among young women with invasive ductal breast carcinoma" done by Janet r *et al*[6] concluded that women with breast carcinoma were in the highest quartile of BMI. They also concluded that women with benign breast disease and having BMI high were also 2.5 times likely to develop breast carcinoma in future. So they concluded that BMI is the strong predictor of mortality in women with breast carcinoma. The tumors of heavy women were large with high cellular proliferation than those of thinner women.
These observations are in concordance with our study.

In a study titled "The role of body mass index in the relative risk of developing premenopausal versus postmenopausal breast carcinoma", by Margot P. C *et al*[7]. the breast lesions in both the groups studied were showing same relationship with BMI .They concluded that the overweight/obesity is related with increased incidence of breast carcinomas. They also concluded that body fat distribution, weight at younger age and weight at older age also plays important role for development of breast lesions. Nathan A. Berger[8] explained the various mechanisms by which obesity may promote cancer including 1) increased levels and bioavailability of growth factors such asinsulin and insulin-like growth factor (IGF-1); (2) increased sex steroid hormones such as estrogen and factors affecting their metabolism 3) altered adipocytokine levels such as leptin, adiponectin, and visfatin, all originally thought to primarily affect energy balance, but now known to have growth, immune, and tumor-regulatory functions.

Jennifer Ligibel,MD[9]mentioned that excess of body weight is linked to increased risk of postmenopausal breast cancer, and growing evidence also suggests that obesity is associated with poor prognosis in women diagnosed with early stage breast cancer. In their study they have mentioned that increased BMI is related to1.7 times increased risk of mortality so they concluded that BMI is the important prognostic factor that should be considered in the process of working up breast carcinoma cases.

Thus all the above mentioned studies show a positive correlation between BMI and risk of developing breast maligancies. As the current lifestyle practices lack the proper exercise and healthy eating, our present study gives the goals for healthy life style and keeping in check the BMI levels, so that the major risk factor involved in the pathogenesis of breast malignancies is kept in control.

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