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The effect of number of excised axillary lymph nodes on breast cancer recurrence

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Abstract

Objectives: Breast cancer is the most common malignancy all over the world and its recurrence constitutes a burden on both patients and their managing doctors. The extent of axillary lymph node dissection is a controversial factor that may affect recurrence of breast cancer, this study aimed to find the effect of the number of excised axillary lymph nodes during modified radical mastectomy on breast cancer recurrence.

Methods: A retrospective study that reviewed the medical records of consecutive female patients in Basrah Oncology Centre from January 1, 2010 to December 31, 2019 included a total of 490 female patients who were diagnosed with stage I-III breast cancer and all of them underwent modified radical mastectomy and axillary lymph nodes dissection

Results: A 350 (71.5%) of patients had no recurrence during the study period and 140 (28.5%) patients presented with recurrence and 7.7% of total number of studied patients had loco-regional recurrence.

Conclusion: Factors that had statistically significant association with recurrence of breast cancer after modified radical mastectomy were: age, total number of excised axillary lymph nodes and number of positive lymph nodes.

Keywords: Breast cancer; recurrence; lymph nodes; axillary dissection; oncology.

Introduction

Worldwide, breast cancer is the most common malignancy at 2020 (2.26 million cases), and it is the fifth cause of cancer death (685000 deaths) [1]. In Iraq, breast cancer is also the most frequent newly diagnosed cancer at 2020 (7515 cases) (22.2%) [2]. The available incidence in Basrah suggests that breast cancer is increasing at a significant pace in recent years [3].

Breast cancer recurrence carries an emotional impact on patients due to its possible negative effect on prognosis and survival. It necessitates additional treatment or even surgery. Recurrence may require patients and their managing doctors to make difficult shared treatment decisions. Fear of tumour recurrence can affect a survivor's quality of life by limiting their ability to fully engage in social, occupational, and recreational activities [4].

Studying factors that increase the recurrence after breast cancer surgery is beneficial for both patients and their managing surgeons and medical oncologists [5].

Axillary lymph node dissection (ALND) was the procedure of choice for management of the axilla in patients with breast cancer for long time. Since the nineties of previous century, sentinel lymph node biopsy (SLNB) has become common surgical management for breast cancer patients with clinically negative axilla, and in the future, it seems that there is a temptation for omission of surgical management of the axilla [4, 5].

This study was conducted to study the effect of the number of excised axillary lymph nodes during modified radical mastectomy on breast cancer recurrence.

Methods

This retrospective study reviewed the medical records of consecutive female patients who had been managed by two medical oncologists in Basrah Oncology Centre from January 1, 2010 to December 31, 2019.The following data were col-

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lected from patients' records:

Age, body mass index, and stage of breast cancer (according to the 8th edition of the American Joint Committee on Cancer Staging System) [6] and results of hormone and HER2neu receptors, total number of excised axillary lymph nodes, number of axillary lymph nodes positive for metastasis, site, and time of recurrence.

Locoregional recurrence after treatment of breast cancer includes recurrence inside the breast after breast conservative surgery, recurrence in the thoracic wall after mastectomy, and recurrence in regional lymph nodes. Tumor dissemination outside of the breast, chest wall, and ipsilateral regional lymph nodes is known as metastatic breast cancer [7].

All patients with breast cancer had been classified according to molecular subtypes [8].

Inclusion criteria

1. Patients with unilateral breast cancer who underwent modified radical mastectomy
2. Patients with histopathologically proven invasive ductal carcinoma
3. Stage I, II and III disease.

Exclusion criteria

1. Patients who did not attend for follow up two or more years
2. Patients who underwent breast conservative surgery
3. Patients with histopathological diagnosis other than invasive ductal carcinoma
4. Stage IV disease
5. Patients without hormone receptors and HER2 neu receptors results

Ethical considerations

Ethical approval was granted from The Ministry of Higher Education University of Basrah College of Medicine, Research Professional Conduct Committee (No. 74/272 dated on 29/6/2021) and The Ministry of Health and Environment, Basrah Health Directorate, Training and human resources center -research unit (No. 291 dated on 28/4/2021).

Statistical analysis

The data were coded and analyzed using the Statistical Package for Social Sciences (SPSS) version 26. Numerical variables were presented as mean ± standard deviation. Categorical data was formulated as numbers and percentages. A p-value of less than 0.05 was considered statistically significant, and the chi-square test was used to estimate the significance of association. A logistic regression was carried out to find an independent association between the recurrence of breast cancer with some variables.

Results

The study included a total of 490 female patients who were diagnosed with stage I-III breast cancer and all of them underwent modified radical mastectomy and axillary lymph node dissection between January 1, 2010 and December 31, 2019. 350 patients had no recurrence during the study period and 140 patients presented with recurrence. The mean age was 49.14 ± 10.96 years.

The majority of patients with recurrence were in the age group between 31-50 years of age (>60%) while most of patients without recurrence were in the age group 41-60 years of age (>60%) as shown in Table 1 (p value was significant = 0.016).

Regarding the body mass index; around 80% of both groups of patients were above normal (overweight and obese).

Evaluation of immunohistochemistry of excised tumours revealed that approximately 70% of both recurrence and non-recurrence cases had Luminal breast cancer.

Concerning the total number of excised axillary lymph nodes; around three quarters of both recurrence and non-recurrence cases had removal of less than ten lymph nodes as shown in Table 1.

There were 140 patients with recurrence 102 (72.9%) of them had distant metastasis and 38 (27.1%) had locoregional recurrence.

Table 2 showed that age, total number of excised axillary lymph nodes and positive lymph nodes had statistically significant association with recurrence of breast cancer.

Discussion

Worldwide, one in eight women has lifelong risk of breast cancer development and till now malignancy of the breast has a big effect on cancer mortality [9].

Recurrence of breast cancer within the local and regional areas is a complex condition that exhibits notable differences in prognosis and optimal treatment approaches [10] and the rate of such recurrence ranges from 7.6 to 15% according to recent studies. The result of current study lies within this range [7, 11, 12].

In a retrospective study by Rudra et al they concluded that breast cancer recurrence was more common in young age group and results of this study are comparable to that study [13].

A multinational study published in 2013 studied more than 9000 patients and concluded that the risk of breast cancer distant recurrence was increased in elderly women [14].

The present study proved no significant association between BMI and recurrence of breast cancer and this is comparable with results of a study that was conducted by Biglia N et al at 2013 [15].

Multiple studies concluded significant association between increased BMI and local recurrence while others showed significant association with distant metastasis [16, 17].

In France, a cohort study published in 2018 included more than 1300 cases with breast cancer recurrence picked by follow-up of more than 4900 women with a median follow-up period of 7.2 years, the authors noticed a higher recurrence rate among cases with negative estrogen and progesterone

Table 1. Clinical profile of female patients with recurrent cancer

Clinical profile		Recurrence (No. = 140)		No recurrence (No. = 350)		Chi-square P-value
		No.	%	No.	%	
Age/year	≤30	4	2.9	10	2.9	$\chi^2 = 15.54$ p = 0.016
	31-40	46	32.9	60	17.1	
	41-50	42	30.0	118	33.7	
	51-60	31	22.1	100	28.6	
	61-70	14	10.0	50	14.3	
	>70	3	2.1	12	3.4	
Body Mass Index	Under weight	1	0.7	3	0.9	$\chi^2 = 1.97$ p = 0.58
	Normal	28	20.0	57	16.2	
	Over weight	49	35.0	112	32.0	
	Obese	62	44.3	178	50.9	
Number of excised axillary lymph nodes.	0-9	111	79.3	266	76.0	$\chi^2 = 2.93$ p = 0.23
	10-20	28	20.0	72	20.6	
	>20	1	0.7	12	3.4	
Positive axillary lymph nodes	0	33	23.6	140	40.0	$\chi^2 = 17.71$ p = 0.001
	1-3	65	46.4	113	32.3	
	4-9	26	18.6	76	21.7	
	≥10	16	11.4	21	6.0	
Breast Cancer Subtyping	HER2	16	11.4	45	12.9	$\chi^2 = 3.33$ p = 0.34
	Luminal	97	69.3	244	69.7	
	TNBC	27	19.3	55	15.7	
	Unknown	0	0.0	6	1.7	

receptors [18].

In a retrospective Iraqi study the researchers evaluated the data of 315 patients with metastatic breast cancer at 2019. More than seventy percent of cases had luminal, 14.6% triple negative and 10.5% HER2-neu positive subtypes, while in another study that included 920 Iraqi female patients with breast cancer; luminal subtype constitutes 69.5% and the researchers concluded that their results were different from western patterns and comparable to middle east patterns [19, 20]. These conclusions agree with the present study.

In a multicenter cohort German researchers evaluated data of more than 9600 patients, they concluded that there was no improvement in recurrence free survival after excision of more than ten axillary lymph nodes. It is worth mentioning that this study included only high-risk breast cancer patients regarding molecular subtypes [21].

To assess the prognostic impact of the number of negative axillary lymph nodes that had been excised during mastectomy, Chinese researchers analyzed data of 2455 breast cancer patients. They found that these patients had better disease-free survival when a higher number of excised axillary lymph nodes were negative [22].

On reviewing data of 300 selected patients, Wangchinda et al from Thailand concluded that possibility of breast cancer recurrence within five years increases in patients with positive axillary lymph nodes [23].

On doing logistic regression analysis we found that young age, total number of excised lymph nodes and number of positive lymph nodes were significant independent variables for breast cancer recurrence.

Limitations

Use of proliferative index Ki67% in a limited number of cases because this test was not available at time before the year of 2012 and it was costly at the beginning.

Table 2. The logistic regression model for certain variables related to recurrence of cancer

Variables	Coefficient (B)	Odds Ratio Exp (B)	P-value
Age	–0.28	0.76	0.003
Total number of LN	–0.75	0.47	0.007
Positive LN	0.31	1.36	0.03
BMI	–0.18	0.84	0.176
Stage	0.07	1.07	0.801

Conclusion

Number of excised axillary lymph nodes, positivity of lymph nodes and age of the patient affect the possibility of breast cancer recurrence in patients who underwent modified radical mastectomy.

Conflict of interest
The authors declare that there is no conflict of interest.
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