

Role of quilting technique of mastectomy flap in prevention and reduction of seroma complication in breast cancer patients.

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Abstract

Objective: The aim of study is to evaluate effectiveness of quilting or tacking mastectomy flap in preventing or reducing seroma formation.

Methods: Study included patients with diagnosed breast cancer. Mastectomy with axillary clearance surgery was done for them. Patients were divided according to the technique of closure of mastectomy flap in to quilting and non-quilting group. Primary outcome were the presence of seroma complication and the amount of fluid collection that require aspiration. Secondary outcome were the mean differences of fluid drained, time to remove drain, stage of disease, level of axillary clearance, distribution of patients according to type of malignancy, oestrogen, progesterone and Her2/Neu receptor status.

Results: Results of the study showed that there was a significant association between type of operation and presence of seroma, more seroma occur among patients treated with non-quilting technique (46.8%) in comparison to quilting technique (20%) (P value 0.012) and more time needed to remove drain among patients treated with Non-quilting technique (with mean 5.74 d) in comparison to quilting technique (with mean 4.74 d). There were significant differences between means of amount of aspiration among patients with seroma (n=29) by study groups, more amount of aspiration among patients treated with non-quilting technique (with mean 144.54 ml) in comparison to quilting technique (with mean 60.71 ml).

Conclusion: Quilting or tacking mastectomy flap to the underlying muscles and fascia to obliterate the surgical dead space is effectiveness in prevention and reduction of seroma formation.

Keywords: Breast cancer, Mastectomy flap, Quilting technique.

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Introduction

Breast cancer is a widespread cancer among women and comprising 23% of female cancers [1]. Since 1990s, breast cancer rates have increased, and at the same time survival rates have improved due to early diagnosis by breast cancer screening program, and effectiveness of variable treatment modality [1-3]. In Iraq, breast cancer is the most common type of female cancer and representing 33% of the all-female cancer patients [4]. One of the commonest early sequels of breast cancer management is seroma formation which is defined as a collection of serous fluid in the dead space of post-mastectomy skin flap, axilla [5].

Seroma remains an unresolved problem post-mastectomy which lead to elevation of the flaps from the chest wall and axilla there by preventing their adherence to the underlying fascia and muscles which in turn lead to delayed wound healing, infected wound due to repeated aspiration, wound dehiscence, prolonged hospitalization, and delay of adjuvant chemotherapy [6]. In practice, several techniques have been reported to prevent or decrease seroma formation such as meticulous techniques of breast surgery using electrocautery, ultrasonic dissection and Argon enhanced electro-

surgery may reduce the incidence of seroma formation on the expense of obvious cost implications for harmonic scalpel and Argon beam coagulation, use of sealants and sclerotherapy such as fibrin glue, external compression dressing to the chest wall and axilla to obliterate the dead space, use of drains and delayed shoulder exercise [7-11]. There are inconsistent and uncertain outcomes on the beneficial role of these techniques in preventing seroma formation. The aim of this study is to evaluate effectiveness of quilting or tacking mastectomy flap to the underlying muscles and fascia to obliterate the surgical dead space by interrupted absorbable suturing in preventing or reducing seroma formation.

Materials and Methods

Study design

This prospective cohort study was carried out in a Hilla General Teaching Hospital and Babylon Private Hospitals, Iraq. During the study period between December 2010 and December 2016, 82 patients with diagnosed breast cancer and agreed to do mastectomy with axillary clearance surgery were included in this study.

Study population and ethical standards applied

Patients with diagnosed breast cancer between December 2010 and December 2016 and agreed to do mastectomy with axillary clearance surgery were included in this study. Socio-demographic characteristics which include age, BMI, smoking history and family history of breast cancer were taken from all patients. Data were collected on the day of surgery and at an outpatient follow up two weeks postoperatively. All procedures followed in this study were in accordance with the ethical standards of the responsible committee on human experimentation (Institutional and National) and with the Helsinki Declaration of 1975, as revised in 2008.

Surgery was done for all patients by the same surgical team in which simple mastectomy with the preservation of pectoralis muscle and fascia. Axillary clearance was done for all patients and level of clearance identified and registered for each. Patients were divided in two groups according to the technique of closure of mastectomy flap. Non-quilting technique was done to the first group of patients between December 2010 till January 2014 and the quilting technique was done for second group of patient's in-between February 2014 till December 2016. In the non-quilting technique, two Redivac drain were left, one in the axilla and the other underneath mastectomy flap. The skin edge after mastectomy was approximated with 2/0 vicryl suture and closed subcutically using 0 nylon suture.

In the quilting technique, after mastectomy and axillary clearance completion, multiple interrupted sutures were taken starting in the lower flap from medial to lateral between the mastectomy flap and underlying pectoralis muscle and fascia tacking between them using 2/0 vicryl suture to obliterate the dead space underneath the mastectomy flap with care to avoid dimpling of the dermis. The second row was done by the same interrupted suture from lateral to medial till the medial angle. The same was done for the upper flap.

Redivac drain was left only in the axilla and no drain left underneath the flap. The skin edge after mastectomy were approximated with 2/0 vicryl suture and closed subcutically using 0 nylon suture. Data were collected on the subsequent 14 d postoperatively. Primary outcome were the presence of Seroma complication and the amount of fluid collection that require aspiration. Secondary outcome were the mean differences of fluid drained by the drainage system, time to remove drain, stage of disease, level of axillary clearance, distribution of patients according to type of malignancy, oestrogen receptor, progesterone receptor and Her2/Neu receptor status.

This study had been acknowledged by College of Medicine University of Babylon and authorized by Babylon health directorate/Babylon General Teaching Hospital. All patients had been consented and agreed to participate in this study.

Data analysis

Statistical analysis was carried out using SPSS version 20. Continuous variables were presented as (Means \pm SD). Student

t-test was used to compare means between two groups. Categorical variables were presented as frequencies and percentages. Pearson's chi square (X^2) and Fisher-Exact test were used to find the association between categorical variables. A p-value of ≤ 0.05 was considered as significant.

Results

Regarding distribution of patients according to socio-demographic characteristics, result show that the mean age of patients were 47.01 ± 10.17 y, 47.6% of breast cancer patients were overweight and 32.9% were in the obese range, 26.8% of breast cancer patients were smoker and there were 13.4% of breast cancer patients had positive family history as shown in Table 1. Regarding distribution of patients according to type of malignancy, result found that the majority (84.1%) of patients presented with Invasive ductal carcinoma, (9.8%) invasive lobular carcinoma and (6.1%) inflammatory type.

Table 1. Distribution of patients according to socio-demographic characteristics.

Socio-demographic characteristics		
Age	47.01 \pm 10.17	28-72
BMI		
Normal (18.5-24.9)	16	0.195
Overweight (25-29.9)	39	0.476
Obese (≥ 30)	27	0.329
Total	82	1
Smoking		
Present	22	0.268
Absent	60	0.732
Total	82	1
Family history		
Present	11	0.134
Absent	71	0.866
Total	82	1

Results of association between type of operation and study variable including (seroma required drainage, Oestrogen receptor, progesterone receptor, Her2/Neu receptor), found that there was significant association between type of operation and presence of seroma. More seroma occur among patients treated with non-quilting technique (46.8%) in comparison to quilting technique (20%) as shown in Table 2.

Table 2. Association between type of operation and study variables.

Study variables	Type of operation			X^2	P-value
	Non technique	quilting	Quilting technique		

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Seroma				
Present	22 (46.8)	7 (20.0)		
Absent	25 (53.2)	28 (80.0)	6.307	0.012*
Total	47 (100.0)	35 (100.0)		
Oestrogen receptor				
Positive	34 (72.3)	26 (74.3)		
Negative	13 (27.7)	9 (25.7)	0.039	0.844
Total	47 (100.0)	35 (100.0)		
Progesterone receptor				
Positive	32 (68.1)	21 (60.0)		
Negative	15 (31.9)	14 (40.0)	0.574	0.449
Total	47 (100.0)	35 (100.0)		
Her2/Neu receptor				
Positive	17 (36.2)	18 (51.4)		
Negative	30 (63.8)	17 (48.6)	1.909	0.167
Total	47 (100.0)	35 (100.0)		

*p value ≤ 0.05 was significant.

Table 3. Mean differences of drainage amount, time to remove drain and aspiration amount according to type of operation.

Study variable	Type of operation	N	Mean	t-test	P value
Amount of drainage (ml)	Non quilting technique	47	522.98 166.19	±	0.677 0.501
	Quilting technique	35	494.86 210.21	±	
Time for drain removal (d)	Non quilting technique	47	5.74 ± 1.25		3.79 <0.001*
	Quilting technique	35	4.74 ± 1.06		
Amount of seroma that require aspiration (ml)	Non quilting technique	22	144.54 ± 86.66		4.37 <0.001*
	Quilting technique	7	60.71 ± 13.36		

*p value ≤ 0.05 was significant.

Regarding the mean differences of amount of drainage by tube drain, time to remove drain and amount of seroma that require aspiration according to type of operation, results found that there were significant differences between means of time need to drain remove by study groups, more time needed to remove drain among patients treated with Non quilting technique (with mean 5.74 d) in comparison to quilting technique (with mean 4.74 d). There were significant differences between means of amount of aspiration among patients with seroma (n=29) by study groups, more amount of aspiration among patients treated with non-quilting technique (with mean 144.54 ml) in comparison to quilting technique (with mean 60.71 ml) as shown in Table 3.

Study also showed significant association between presence of seroma and BMI and level of axillary clearance in which, more seroma occur among obese patients (65.5%) and more seroma with increasing level of clearance. There were insignificant association between presence of seroma with smoking, and family history as shown in Table 4.

Table 4. Association between presence of seroma and study variables.

Study variables	Presence of seroma		χ ²	P-value
	Present	Absent		
BMI				
Normal (18.5-24.9)	2 (6.9)	14 (26.4)	21.89	<0.001*
Pre-obese (25-29.9)	8 (27.6)	31 (58.5)		
Obese (≥ 30)	19 (65.5)	8 (15.1)		
Total	29 (100.0)	53 (100.0)		
Smoking history				
Present	19 (65.5)	41 (77.4)	1.339	0.247
Absent	10 (34.5)	12 (22.6)		
Total	29 (100.0)	53 (100.0)		
Family history of breast cancer				
Present	26 (89.7)	45 (84.9)		0.739f
Absent	3 (10.3)	8 (15.1)		
Total	29 (100.0)	53 (100.0)		
Stage of disease				
Stage 1	3 (10.3)	10 (18.9)		0.371f
Stage 2	20 (69.0)	38 (71.7)		
Stage 3	4 (13.8)	4 (7.5)		
Stage 4	2 (6.9)	1 (1.9)		
Total	29 (100.0)	53 (100.0)		
Level of axillary clearance				
Level 1	2 (6.9)	9 (17.0)		0.021f
Level 2	19 (65.5)	41 (77.4)		
Level 3	8 (27.6)	3 (5.7)		
Total	29 (100.0)	53 (100.0)		

*p value ≤ 0.05 was significant.

Discussion

Results showed that the mean age of patients was 47.01 ± 10.17 y and that comparable with Al-Mu'men in which 60% of breast cancer patients were below 50 y and their mean age was 46.9 y and also comparable with Al-Haris who found 65.4% of cases were not more than 50 y [12,13]. 47.6% of breast cancer patients were overweight and 32.9% were in the obese range. Women who are who are lean have a 30-60 percent lower

breast cancer risk than those who are overweight or obese [14-17]. Most estrogens in the body are produced in the ovaries in pre-menopause period, while in post menopause period; estrogens mostly come from fat tissue. So, overweight women have higher estrogen levels than normal weight women [18].

In the current study, 26.8% of breast cancer patients were smoker. This high percentage of smoking among female breast cancer patients may support a role for cigarette smoking in the etiology of breast cancer and highlighted the importance of timing of this exposure [19].

Regarding the family history of breast cancer, there were 13.4% of breast cancer patients had positive family history. This work is comparable with Setiawan et al. who reported positive family history as 11.1% [20]. Other study showed that 20-30% of breast cancer patients have at least one relative with a positive breast cancer history but only 5-10% of women have a detectable genetic tendency of breast cancer, so we need to do gene study to confirm hereditary breast cancer [21].

The majority of patients (84.1%) presented with Invasive ductal carcinoma. The results were closer to that obtained by Al-Dujaily, who stated 91.1% of breast cancer histopathological diagnosis was IDC and 8.9% were ILC [22]. However, Hassan stated IDC as 96.07% and ILC as 1.96% [23].

There are several methods to prevent or reduce seroma formation, but no single method considered to be constantly effective [24,25]. In the current study, there was a significant reduction in the mean duration of drainage from 5.74 d in the non-quilting group to 4.74 d in the intervention group. This may due to the physical irritation of the tube drain in the control group. Many authors do not insert drain after breast surgery because they belief that the drain didn't prevent seroma and in addition to that, its associated with patients discomfort and prolongs hospitalization [26,27].

Regarding association between type of operation and study variables, there was significant association between type of operation and presence of seroma. More seroma occur among patients treated with non-quilting technique (46.8%) in comparison to (20%) in quilting technique ($p=0.012$). The technique of obliteration of dead space, therefore seem to be advantageous by tacking of mastectomy flaps to the pectoralis muscle and fascia. Several authors also reported that the incidence of seroma was significantly lower in the quilting group compared with the non-quilting group [28-30].

Regarding the amount of seroma required aspiration among patients treated with both arm technique, this study was comparable with several authors who showed significantly less drainage in the quilting group when compared to the non-quilting group [28-30]. There was significant association between presence of seroma and level of clearance this may be due to removal of a larger number of lymph nodes which results in greater injury of the lymph vessels. Although this result was comparable with other authors did not report such association [31,32].

Randomization and Blinding of patients are considered a major issue when studying particular variable. In the absence of randomization and masking, bias can occur and that can predispose to enthusiasm for the new procedure. Patients number in the two arms of the study were unequal which add another limitation to the study although both groups were matched and no confounding variable difference between them were present.

Conclusion

Quilting or tacking mastectomy flap to the underlying muscles and fascia to obliterate the surgical dead space is effectiveness in prevention and reduction of seroma formation.

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