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RESEARCH ARTICLE

EVALUATION OF MASTECTOMY FLAPS FIXATION VERSUS CONVENTIONAL METHOD IN REDUCTION OF SEROMA AFTER MODIFIED RADICAL MASTECTOMY

Hany Mohamed, Sherif Holyl and Hatem Mohammed

General Surgery Departments, Faculty of Medicine, Zagazig University.

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Abstract

Background: Post-operative seroma is a common complication that occurs after modified radical mastectomy, due to accumulation of fluid in the dead space between skin flaps and the underlying chest wall and axilla. **The aim of this study** is to evaluate the effect of fixation of flaps by suturing to the chest wall muscle on the seroma formation.

Patients and Methods: Our prospective study was done in general surgery department, Zagazig University, from Jan 2016 to Nov. 2017. Included 70 female patients with breast cancer operated by modified radical mastectomy, the patients were classified in to two groups (A,B) each group 35 female patients(N=35). Group (A) operated by quilting flap fixation technique while group (B) operated by conventional method. The patients were followed up for one month and both preoperative and postoperative data are recorded, reviewed and statistically analysed for comparison between the two groups.

Results: The preoperative results shows nearly similar results between the two groups regarding the age and body mass index .The breast laterality, the comorbidity (diabetes mellitus (DM), hypertension (HTN), anticoagulant drugs) and stages (T,N) shows small difference between the two groups. the post-operative results shows no significant difference in the operative time, number of Infected seroma, Haematoma and Infected wound ($P>0.05$). Total amount of drained fluid (ml) ,the duration of drainage (day), Seroma post drain removal and number of seroma needed aspiration all shows significant difference between the two groups ($P<0.05$).

Conclusion: Reduction of the dead space during modified mastectomy by suturing and fixation of the skin flaps to the chest wall is a good technique to decrease post-operative seroma.

Introduction:-

Breast cancer is considered the second cause of cancer death in women all over the world in the last three decades.¹ Seroma formation is a prevalent complication of breast surgeries, with incidence 3% to 85 %², while pathophysiology of seroma is vague, many factors produce fluid collection after mastectomy³, as extensive dissection will lead to large dead space under the flaps, chest wall Irregularity as in deep axillary fossa makes difficulty in flap adherence, chest wall movement during breathing and shoulder movement produce a shearing force which retard adherence of the flaps.⁴ Seroma occur secondary to interruption of lymphatic channels which

Corresponding Author:- Hany Mohamed

Address:- General Surgery Departments, Faculty of Medicine, Zagazig University.

unavoidably complicates excessive dissection and interruption of tissue planes producing a dead space. Accumulation of seroma fluid expands the skin leading to discomfort, reduction of ipsilateral shoulder movement and increase incidence of the infection. Traditional wound closure using suction drain post mastectomy to prevent seroma although it commonly occurs after removal of the drain⁵, Excessive Electerocautery use was found to increase formation of seroma after mastectomy.⁶ The hypothesis of suturing efficacy that the dead space is a major factor for seroma formation, and the surgical technique used to obliterate this dead space may decrease the incidence of seroma.⁷ So, ideal wound closure must reduce lymph spillage and serum leak, provide good holding of skin flaps to the chest wall, eliminate dead space, and permit rapid eradication of collected fluid. For this, there are many techniques for flap fixation and wound drainage, decreasing postoperative shoulder movement and using adhesive glue to promote wound healing and prevent seroma formation.⁸ the aim of this study is to evaluate the results of post modified radical mastectomy skin flap fixation regarding operative time, seroma formation, subcutaneous drainage amount and duration and surgical site infection rates.

Patient and Method:-

This study is prospective comparative clinical trial, conducted in general surgery department, Zagazig University, in the period between January 2016 and November 2017, on 70 female patients undergoing modified radical mastectomy for breast cancer treatment.

Patients were randomly allocated using computer generated randomization cards into two groups; group A 35 patients, underwent post mastectomy skin flap fixation, and group B 35 patients underwent wound closure without skin flap fixation.

All patients signed an informed written consent before participation in the study, the study was approved by the research ethical committee of our hospital.

The study had no external funding and the authors had no conflict of interest .In this study we included patients with operable breast cancer stage (I, II) , non-recurrent cases with no previous breast surgery (except for biopsy of the current disease).

All patients of the study were diagnosed by thorough history taking included comorbidity (DM,HTN, Anticoagulants), full clinical examination; they underwent breast ultrasonography and /or mammography, biopsy (fine needle aspiration cytology (FNAC), core needle biopsy or excisional biopsy) with histopathological examination for confirmation of diagnosis. Chest X ray, C.T chest, abdominal ultrasound or C.T abdomen or PET scan for exclusion of metastasis. Routine preoperative workup including laboratory tests, cardiac, medical and anaesthesiologist consultation,

Surgical Procedures:

Preoperative 1 gm. I.V. ceftriaxone was given to all patients prior to skin incision. The patients were operated under general anaesthesia with endo-tracheal tube, supine position, transverse elliptical incision (4-5cm) around the lesion, elevation of the breast flaps to the upper and lower limits of the breast, excision of the breast with the pectoralis fascia and clearance of the axilla with preservation the long thoracic nerve and nerve to latissimus dorsi using diathermy for haemostasis during the operation. During closure; in **the quilting group (A)** we used absorbable suture (vicryl 2/0) to take rows of multiple suture at 3 cm distance between the subcutaneous tissues and the underlying muscle at the site of removed breast and axilla and also at the flap edges then closure of the skin over subcutaneous suction drain size 18 F. **In conventional group (B)** the skin flaps were closed in classic method over subcutaneous suction drain has the same size. Patients were discharged after 1 to 3 days with drains which removed when the amount of drained fluid become <30 milliliter (ml)/day during follow up in outpatient's clinics. Patients were followed up for one month by the attending surgeons. Preoperative data, patient's characteristics, operative and follow up data including amount of drainage, drainage time, seroma incidence, wound infection rate, **were well presented and statistically analysed** using SPSS program package version 22, Z test was used for comparison between percentages of categorical data paired t test, means and standard deviation was used for comparison between continuous data , p value was considered significant at values less than 0.05 at confidence interval 95%.



Figure(1):Suturing of the breast flap
To the pectoralis major muscle.



Figure(2):Suturing of the breast flap
To the serratus anterior in the axilla.

Results:

As presented in table 1; preoperative data show age of group A patients ranged between 31 and 65 with mean \pm SD (49.6 \pm 8.42), while in group B it ranged between 32 and 69 with mean \pm SD (48.9 \pm 10.3), with nearly similar results between the two groups. According to the Body mass index of group A the Mean \pm SD (29.2 \pm 1.29), Range (26-32.7) and in the group B the Mean \pm SD (29.1 \pm 2.39), Range (24-33.3) also with small difference between the two groups. We detected no significant differences regarding laterality and stage of the disease, associated comorbidities or body mass index between both groups.

Table (1):- Shows the preoperative data.

characters	A(N=35)	B(N=35)
Age in each group		
Mean \pm SD	49.6 \pm 8.42	48.9 \pm 10.3
Median (Range)	50(31-65)	49(32-69)
Body mass index (BMI)		
Mean \pm SD	29.2 \pm 1.29	29.1 \pm 2.39
Median (Range)	29.4(26-32.7)	29.1(24-33.3)
Right side cancer	17(48.5%)	16(45.7%)
Left side cancer	18(51.4%)	19(54.3%)
Diabetes mellitus	5(14.3%)	6(17.1%)
Hypertension	6(17.1%)	8(22.9%)
Anticoagulants	1(2.9%)	2(5.7%)
Tumour size(T- stage)		
T1 (<2 cm)	8(22.9%)	9(25.7%)
T2 (2-5 cm)	18(51.4%)	19(54.3%)
T3 (>5 cm)	9(25.7%)	7(20%)
Lymph nodes(N. stage)		
N1	22(62.9%)	24(68.6%)
N2	13(37.1%)	11(31.4%)

The post-operative findings as shown in table 2, we found that , the operative time in the group (A) ranged between 90 and 155 minutes, the Mean \pm SD (126.86 \pm 20.1) while in the group (B) it ranged between 80 and 145 minutes, the Mean \pm SD (120.29 \pm 18.59 with non-significant difference (P= 0.079) . Total amount of drained fluid (ml) in the group A ,The Mean \pm SD 1012.3 \pm 372.21, Range (300-1950) while in group (B), Mean \pm SD(2055.57 \pm 727.32), Range (425-3200) with significant difference (P<0.0001).

Regarding the duration of drainage (day), in the group (A) The Mean \pm SD (10.29 \pm 1.96, range (7-13) with significant difference (P<0.0001). Both seroma post drain removal and number of seroma needed aspiration shows significant difference between the two group (P<0.05). While the number of infected seroma, Haematoma and Infected wound shows non-significant difference between the two groups (P>0.05).

Table (2):- Operative and follow up data.

Characters	A	B	P value
Operative time (min) Mean \pm SD Median (Range)	126.86 \pm 20.1 130(90-155)	120.29 \pm 18.59 125(80-145)	P= 0.079
Total amount of drained fluid (ml) Mean \pm SD Median (Range)	1012.3 \pm 372.21 970(300-1950)	2055.57 \pm 727.32 2200(425-3200)	P<0.0001
Duration of drainage (day) Mean \pm SD Median (Range)	10.29 \pm 1.96 11(7-13)	13 \pm 2.38 13(9-19)	P<0.0001
Seroma post drain removal	2(5.7%)	8(22.9%)	P<0.05
Number of seroma needed aspiration	1(2.9)	6(17.1%)	P<0.05
Infected seroma	0	2(5.7%)	P>0.05
Haematoma	2(5.7%)	8(22.9%)	P>0.05
Infected wound	1(2.9%)	2(5.7%)	P>0.05

Discussion:-

Seroma and its related side effects remain the most postoperative problem following breast surgery, proving that wound drainage is insufficient in prevention of seroma^{9,10}. The amount of dissection is the most effective factor in accumulation of the seroma, So it is vital to obliterate the dead space during breast surgery .Many techniques were used to abolish the dead space to decrease formation of seroma . Halsted initially advised making a short upper flap and fixing it by interrupted silk suture to the fascia below the first rib with skin graft for the remaining defect¹¹. Pressure dressing or compression bandages are not successful in prevention of seroma; Therefore, quilting of the skin flaps or fixation appears to be more effective^{12,13}. The key to decrease collection of seroma seems to include the dead space obliteration. Although, the techniques used to obtain this target have many debate and controversies¹⁴. This study aim to assess the effect of quilting breast flaps in prevention of seroma formation .The operative and postoperative results shows that there is no significant difference in the operative time between the two groups (P= 0.079).This agree with the studies that shows that the dead space obliteration did not increase the operative time or postoperative complications, indicating its safety besides minimizing the rate of seroma formation^{15,16}. In our study the total amount of drained fluid (ml) shows significant difference between the quilting group A and the conventional group B (P<0.0001).this is similar to the result documented by Sakkary with decrease in the mean from 2017.8 mL in the control group to 524.8 ml in the intervention group (P <0.001)¹⁷.also there is significant decrease in the mean duration of drained fluid (day) from 13 day in group B to 10.29 day in group A (P<0.0001) .This agree with the significant results reported by Sakkary (from 13.4 to 5, P < 0.001). according to seroma formation it occur in 2 cases (5.7%) in group A while occur in 8 cases (22.9 %) with significant difference between the two results (P<0.05).This decreases in incidence of seroma is similar in the range with many preceding studies¹⁸.

our study shows that dead space obliteration minimize the seroma formation which proven by multiple variates analysis, this coincide with Anjani et al. study which prove that suturing and fixation of the breast flaps to the underlying muscles significantly and dramatically lead to prevention of seroma formation due to reduction of the dead space below the breast flaps¹⁹. Also, the result of obliteration of the dead space in prevention of seroma was approved by met-analysis of van Bommel et al.²⁰. furthermore Faisal et al., stated a significant decrease in the whole amount of the seroma after axillary exclusion²¹. According to the number of seroma needed aspiration depending on clinical examination, there is significant difference between the two group ($P < 0.05$). Seroma increase the duration of hospital stay, increase the Infection rate and delayed the adjuvant therapy²². So, the cost is higher in the medical care of the group of cases suffering from the seroma and its side effects²³. In our study Although the number of diabetic patients is nearly similar in the two groups, the number of seroma is more in the group B. this agree with past studies that conclude that DM is associated with postoperative seroma and obliteration of the dead space reduce the seroma formation²⁴. In our study there is small number of infected seroma and infected wound in both group with insignificant difference ($P > 0.05$). this may be due preoperative prophylactic antibiotics and good sterilization. This agree with the rates of surgical site infection reported in the literature after modified radical mastectomy²⁵.

Conclusion:-

Reduction of the dead space during modified radical mastectomy by suturing and fixation of the skin flaps to the chest wall is a simple and good technique that significantly reduce the post-operative seroma, duration of drainage. **According to our study we recommended it to be a routin step in the modified radical mastectomy**

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