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ORIGINAL RESEARCH

PREDICTORS OF EARLY COMPLICATIONS OF MODIFIED RADICAL MASTECTOMY

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Abstract:

Background: Breast cancer is the most common site-specific cancer in women and is the leading cause of death from cancer for women aged 20 to 59 years. Breast cancer is the second leading cause of cancer related death, and it is managed by multidisciplinary approach. In operative procedure, modified radical mastectomy is the standard treatment option. Beside oncological complications, some early complications can occur, which increases morbidity, prolong hospital stay, cost and interfere with management of breast cancer. We carried out our study to analyse various risk factors predisposing to early complications after modified radical mastectomy.

Material and Methods: This study was conducted in Department of General Surgery, VIMSAR, Burla, from December 2018 to October 2020. Eighty patients were included in this study that underwent modified radical mastectomy after diagnosis of breast cancer, and these patients were followed in the ward and post-operatively till 4 weeks. Pattern of early complications were noted, each complication were analysed for finding association with predisposing factors: Age, obesity, diabetes mellitus, hypertension, tumour size, tumour stage, duration of surgery, skin flap thickness. The statistical association were deduced using Chi-square.

Result: Seroma formation was the commonest complication seen in 12(15%) of patients, flap necrosis in 10(12.5%), wound infection in 7(8%), marginal necrosis in 4(5%) and

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paraesthesia in 4(5%) cases. Early complications were significantly associated with increasing age, diabetes mellitus, tumour size (>5 cm), duration of operation (>150mins) & skin flap thickness (<5mm).

Summary and conclusion: Most of the complications after modified radical mastectomy were associated with increasing age, co-morbidities (diabetes mellitus), tumour size, duration of operation(>150minutes), less skin flap thickness(<5mm). So, elder patients, diabetic, tumour size >5cm, long duration of operation (>150 minutes), skin flap thickness <5mm should be monitored for early wound complications following modified radical mastectomy.

Keywords: Modified radical mastectomy, complications, carcinoma breast, predisposing factors.

Introduction:

Breast cancer is the most common site-specific cancer in women and is the leading cause of death from cancer for women aged 20 to 59 years[1]. Breast cancer is the second leading cause of cancer related deaths, second to lung cancer[2]; Worldwide approximately one million cases of carcinoma breast diagnosed every year[2]. Breast cancer is also a global health problem, with more than one million cases of breast cancer diagnosed worldwide each year[3] In India 1 in 29 females develops carcinoma breast every year[3]. The modern approach to breast cancer management is multidisciplinary which includes surgery, radiotherapy, hormonal therapy and chemotherapy[4]. However, surgery still has a central role to play in the management of breast cancer[5]. Different surgical treatment options include simple mastectomy, modified radical mastectomy, and breast conservative surgery[6]. Among the surgical procedures modified radical mastectomy (MRM) is the most commonly performed procedure[7]. Ever since the time of Halstead, who first carried out mastectomy in 1882, surgeons have faced several problems such as necrosis of skin flaps, the breakdown of the wound, hematoma, seroma, and infection[8]. Apart from oncological complications like residual disease, local or axillary recurrence after curative resection, other non oncological early complications after Modified radical mastectomy, contributing to morbidity, which prolongs hospital stay and cost and interfere with the management of breast cancer especially delaying the adjuvant chemotherapy or radiotherapy to carry on. Early complications are defined here as complications occurring within 30 days after surgery[9]. Which includes seroma formation, wound infection, skin flap necrosis, marginal necrosis, paraesthesia, hematoma, winging of scapula, phantom breast etc. Based on different conducted surveys, a wide range of 0.8-26% has been reported as the incidence rate of the surgical site complications after the breast surgeries [10,11]. And the various factors have been reported to predispose to these complications, patient factors (Age, Obesity, Diabetes mellitus, hypertension, smoking habits)[12], tumour factors (tumour size, tumour stage), surgical factors (duration of surgery, skin flap thickness)[12]. To prevent early complications after modified radical mastectomy, pre-operative identification of predisposing factors is helpful in designing future trials aimed at reducing the incidence of complications after mastectomy. So, in this study we have tried to know the pattern of early complications after modified radical mastectomy and to determine its pre-disposing factors.

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Aims & objectives:

This study was carried out with objective to identify the pattern of early complications following modified radical mastectomy, and to evaluate the association of certain predisposing factors. With aiming to predict high risk individuals beforehand and to provide measures to reduce the occurrence of complications.

Materials & methods:

This longitudinal study was carried out at Department of General Surgery, VIMSAR, Burla. From December 2018 to October 2020. A total of 80 patients with histological proven breast cancer patients were included in study. Cases were selected randomly among the diagnosed carcinoma breast patients from female surgery ward. The study was approved by the institutional ethics committee and board. The Performa was designed to record complete history and examination findings of all the patients coming with suspicion malignancy of breast. Informed consent was taken from all participating patients in study. All the patients were subjected to detailed history and examination. All the patients underwent fine needle aspiration cytology or open biopsy for confirmation. All patients had ultrasound abdomen, xray chest, bone scan and serum alkaline phosphatise, liver function test, renal function test & complete blood count etc. These patients underwent modified radical mastectomy after diagnosed histologically as breast cancer by Fine needle aspiration cytology or trucut biopsy. The factors observed pre-operatively in these patients were age, BMI, hypertension, diabetes mellitus, tumour size, and tumour stages. Factors observed intra-operatively were duration of operation, and skin flap thickness.

All the patients were followed up daily in the ward for development of any early complications till the patients got discharged, and the patients was followed after discharge up to one month from day of operation, for the development of any early complications. During surgery skin flap were raised mainly by diathermy. Two closed suction drains were given one in axilla and other under the lower skin flap. Haemostasis was secured by diathermy and sutures, Suction drains were removed when amount of drainage was less than 30ml. The patients who developed any complications like seroma formation, skin flap necrosis, wound infection, marginal necrosis, and paraesthesia remain admitted for further treatment. The post-operative day on which patient developed complications were noted.

Diagnosis of seroma formation was confirmed by aspiration of serous fluid.

After tabulating the observations, statistical analysis was done by SPSS Statistics Data Editor Software. Chi-square test was applied to know the significant association between complications and predisposing factors.

Results:

Eighty patients were included in the study with diagnosed breast cancer. Age ranged from 28 year to 78 year and majority of the patients were between 40 year to 60 year with mean age of 51 year.

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Age	Patients with complications	Patients without complications	Total
<50 years	27(81.8%)	6(18.2%)	33
>50 years	26(55.3%)	21(44.7%)	47
Total	53	27	80

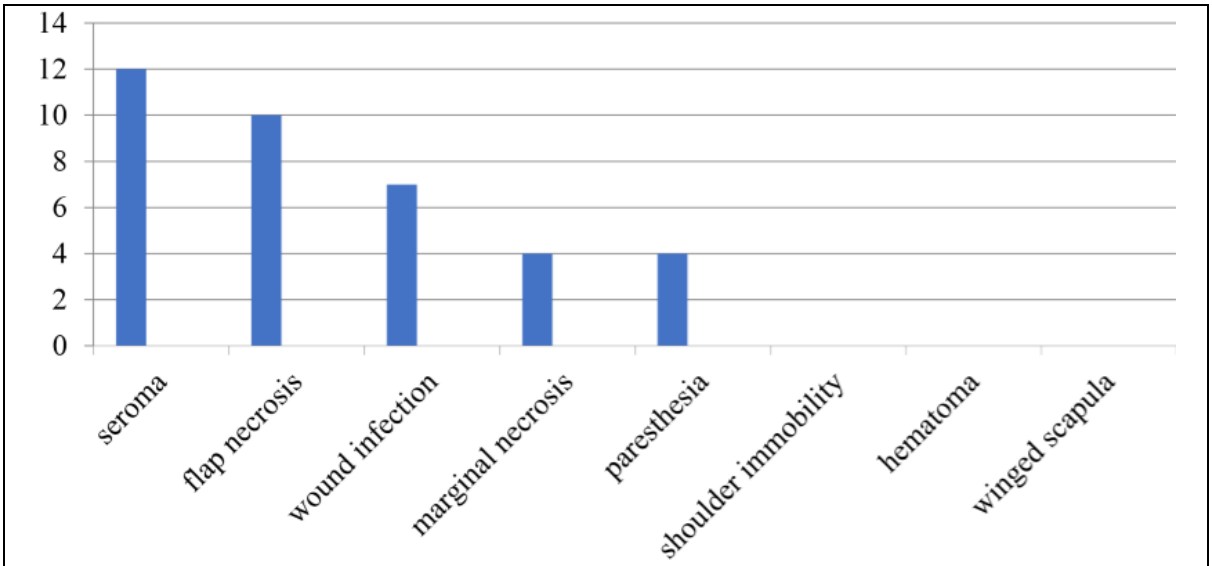
Table 1: Incidence of complications in respect to age group of patients

Out of 80 patients, 33 patients were below 50 years of age, out of which 27 patients developed complications which is around 81.8%. And 47 patients were above 50 years of age, out of which 26 patients developed complications, which is around 55.3%.

In our study most common complication were seroma formation, which was developed in 12 patients i.e., 15%, followed by skin flap necrosis which was developed in 10 patients (12.5%), wound infection was developed in 7 patients (8%), marginal necrosis was developed in 4 patients (5%) & paraesthesia was developed in 4 patients(5%). Evident in Table 2 & Graph 2.

Complications	Number of patients(n=80)	Percentage
Seroma formation	12	15%
Skin flap necrosis	10	12.5%
Wound infection	7	8%
Marginal flap necrosis	04	5%
Pain and numbness in axilla or upper arm	04	5%
Shoulder joint immobility	00	0%
Hematoma	00	0%
Winged scapula	00	0%

Table 2: Incidence of various early complications after modified radical mastectomy



Graph 2: Incidence of various early complications after modified radical Mastectomy

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Variables		Complication				
		Absent	Present	Total	χ^2	P value
Age	<50 yrs.	27(81.8%)	6(18.2%)	33	6.089	0.014
	> 50 yrs.	26(55.3%)	21(44.7%)	47		
BMI	<30 kg/mt2	43(71.7%)	17(28.3%)	60	3.149	0.076
	>30 kg/mt2	10(50.0%)	10(50.0%)	20		
Diabetes Mellitus	No	46(73.0%)	17(27.0%)	63	6.07	0.014
	Yes	7(41.2%)	10(58.8)	17		
Hypertension	no	35(70.0%)	15(30.0%)	50	0.839	0.36
	yes	18(60.0%)	12(40.0%)	30		
Tumour Size	<5cm	23(85.2%)	4(14.8%)	27	6.535	0.011
	>5cm	30(56.6%)	23(43.4%)	53		
Tumour Staging	1	8(80.0%)	2(20.0%)	10	4.894	0.18
	2	11(61.1%)	7(38.9%)	18		
	3	17(81.0%)	4(19.0%)	21		
	4	17(54.8%)	14(45.2%)	31		
DOS	<150 min	29(78.4%)	8(21.6%)	37	4.529	0.033
	>150 min	24(55.8%)	19(44.2%)	43		
Flap Thickness	< 5 mm	11(44.0%)	14(56.0%)	25	8.051	0.005
	> 5 mm	42(76.4%)	13(23.6%)	55		

Table 3: Incidence of complications with respect to different variables

Interpretation of Table 3

Presence of complications among women <50 years of age group was found to be 18.2% &>50 years was 44.7% and it was found significantly different (P=0.014).Complications among the women with BMI <30 kg/mt2 was 28.3% &>30 kg/mt2 was 50.0% and the difference was not significant (p=0.076). Complications among the women without diabetes mellitus were 27.0% & with diabetes were 58.8%, and it was significantly different with p value 0.014. Complications among the women without hypertension was 30.0% & with hypertension was 40.0%, and the difference was not significant (p=0.36). Complications among women with tumour size <5cm was 14.8% and tumour size >5 cm was 43.4% which was significantly different (p=0.011). Complications among women with tumour stage I was 20.0%, stage II was 38.9%, stage III was 19.0% & stage IV was 45.2% which was not significantly different (p=0.18). Complications among women with duration of surgery <150 minutes was 21.6% and duration >150 minutes was 44.2% which was significantly different (p=0.033). Complications among women with skin flap thickness <5mm was 56.0% and skin flap thickness >5mm was 23.6% which was significantly different (p=0.005).

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Sl. No	Variables		Complication		Total	P value	Adjusted Odds Ratio	Confidence Interval
			Absent	Present				
1	Age	<50 yrs.	27	6	33	0.115	0.265	0.051-1.385
		> 50 yrs.	26	21	47			
2	BMI	<30 kg/m^2	43	17	60	0.246	0.356	0.062-2.037
		>30 kg/m^2	10	10	20			
3	Diabetes Mellitus	No	46	17	63	0.075	0.25	0.055-1.148
		Yes	7	10	17			
4	Hypertension	No	35	15	50	0.601	1.566	0.291-8.421
		Yes	18	12	30			
5	Tumour Size	<5cm	23	4	27	0.002	0.059	0.010-0.359
		>5cm	30	23	53			
6	Tumour Staging	1	8	2	10	0.041	0.097	0.010-0.907
		2	11	7	18			
		3	17	4	21			
		4	17	14	31			
7	Duration of Surgery	<150 min	29	8	37	0.076	0.264	0.060-1.152
		>150 min	24	19	43			
8	Flap Thickness	< 5 mm	11	14	25	0.066	5.117	0.897-29.18
		> 5 mm	42	13	55			

Table 4 : Effect of different variables on development of post operative early complications

Interpretation of Table-4

A Binary logistic regression was performed to ascertain the effects of Age, BMI, Diabetes, Hypertension, Size of the tumour, Stage of the tumour, Duration of Surgery, &Flap Thickness, on the likelihood of developing post-operative early complications in women undergone Modified Radical mastectomy.

The odds of developing post-operative complications among female of age group <50 years is 0.265 (CI 0.051-1.385) times as against > 50 yrs. age group (protective). The odds of developing Post op complication among patients having BMI < 30 kg/mt2 is 0.356 (CI 0.062-2.037) times & suffering from diabetes is 0.25 (CI 0.055-1.148) times than patients having BMI > 30Kg/mt2 and not suffering from diabetes respectively. Similarly the odds of having Post operative complications among patients suffering from hypertension has 1.5 (CI 0.291-8.421) times than who doesn't suffer from hypertension. Similarly small tumour size (< 5cm), Duration of surgery (<150 min) has odds of developing post operative complications of 0.059 (CI 0.010-0.359), 0.264(CI 0.060-1.152) times respectively against their counterpart. Flap thickness (<5 mm) are 5.1 (CI 0.897-29.18) times the odds of developing post operative complications than their counterpart.

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Discussion:

Modified radical mastectomy with axillary clearance is the most common surgical procedure performed for breast cancer along with chemotherapy, radiotherapy and hormonal therapy[7]. Like every surgical procedure this procedure also has significant morbidity & mortality.

In our study majority of patients were between 40 to 60 years of age.

Seroma beneath the skin flap represents the most frequent complication of modified radical mastectomy[13,14]. In our study also, after analysis we found seroma formation as the most commonest complication, which was developed in 12 patients out of 80 i.e., 15%. Beside seroma formation, we found other complications like skin flap necrosis in 10 patients (12.5%), wound infection was developed in 7 patients (8%), marginal necrosis was developed in 4 patients (5%), and paraesthesia was developed in 4 patients (5%).

During our study we analysed various risk factors which may predispose to early complications following modified radical mastectomy. Early complications following modified radical mastectomy were found to be significantly associated with increasing age (>50 years) diabetes mellitus, tumour size (>5cm) duration of operation (>150 minutes) & skin flap thickness <5mm.

We found significant association of increasing age with a higher incidence of early complications. According to chi square test p-value for association between age >50 years and early complications is 0.014 which is significant. This observation was consistent with previous studies like Lin et al.[15] which showed significant association between increasing age and early complications following modified radical mastectomy.

Furthermore, higher incidence of early complications was noted in diabetic patients which was statistically significant with p value 0.014. This observation was consistent with previous studies like kumar s et al they also found significant association between early complication and diabetes mellitus [16]. Lumachi F.et al could not find association between tumour size and early complications[6.] But in our study we found higher incidence of early complications among the patients with tumour size >5cm compared to the patients with tumour size <5 cm with p value 0.011.

Complications among the patients were more when duration of surgery was longer (>150 minutes) compared to the patients where duration of surgery were <150 minutes and the association was significant with p-value 0.0033. Patients with skin flap thickness <5 mm had higher incidence of early complications as compared with patients with skin flap thickness >5 mm, with p value 0.005.

Conclusion:

It has been concluded that postoperative complications of modified radical mastectomy were seroma formation, skin flap necrosis, wound infection, marginal necrosis and paraesthesia. It was observed that seroma formation was the most common complication in our study. It was found in 12(15%) patients. Study takes into various patients' parameters which may contribute to early complications following modified radical mastectomy.

And the complications were mostly associated with increasing age, co-morbidities like diabetes mellitus, tumour size (>5cm), duration of operation (>150 minutes) & skin flap thickness (<5mm). So, elder, patients with diabetes mellitus, long operative time & patients

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with less skin flap thickness should be monitored for development of early wound complications after modified radical mastectomy.

In our study we could not analyse each complication with each risk factors as we conducted our study in small sample group, it is recommended to repeat similar studies in larger and variable study sample to analyse each complication with each predictor.

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