

To Evaluate Risk Factors for Seroma Formation in Patients Undergoing Modified Radical Mastectomy

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How to cite this article:

Gurushantappa Y, Veena HR, Abhijit Hiregoudar, To Evaluate Risk Factors for Seroma Formation in Patients Undergoing Modified Radical Mastectomy. New Indian J Surg. 2020;11(3):319–324.

Abstract

To evaluate risk factors for seroma formation in patients undergoing modified radical mastectomy.

Background: Seroma formation is commonest complication incidence following MRM varying from 15% to 85%. Identification of patients prone to develop seroma helps in early detection and adequate management of seroma thus decreasing its morbidity.

Aims: To analyse impact of age, Body mass index, weight of mastectomy specimen, drain volume, serum albumin, no. of lymph node & neoadjuvant chemotherapy on seroma formation.

Design: Prospective observational study.

Materials and methods: All Patients admitted with Carcinoma breast in Department of Surgery in KIMS, and undergoing MRM included in study. relevant clinical details noted. Patients followed up to look for seroma and its association with various factors mentioned above was calculated.

Statistical analysis used

t- test, z test and chi-square test.

p- value < 0.05 was considered significant

Results: Study demonstrated association between seroma formation and age > 45 yrs, BMI more than 22.9, weight of specimen >750gm, post operative day

1 drain output >120ml, total drain output >600 ml.

Conclusion: we concluded that higher incidence of seroma is anticipated in an elderly obese women with mastectomy specimen weighing >750gm especially if her post operative day 1 drain output is >120 ml and total drain output >600ml. these patients require more frequent follow up for early detection of seroma and its aspiration so as to prevent its complications. Serum albumin level, staging of tumour, number lymph nodes dissected, primary mode of treatment does not contribute for seroma formation.

Keywords: Carcinoma breast; MRM; Seroma; Factors

Introduction

Breast cancer is the most frequently diagnosed cancer worldwide and leading cause of cancer death among females, accounting for 25% of cancer cases and 15% of the cancer deaths, although there is a 4 fold variation in mortality rates and over 10 fold variation in incidence rates between high incidence areas such as the United States and Western Europe and low-incidence areas such as Africa and Asia.¹

Incidence of breast cancer in India is much lower than in western countries. Still breast cancer is ranked as number one cancer among Indian females with an age adjusted rate as high as 25.8 per 100,000 women and mortality 12.7 per 100,000 women.²

Surgery is the mainstream treatment in these patients with modified radical mastectomy being most commonly performed surgery for carcinoma breast.

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Seroma formation is the most common complication following modified radical mastectomy incidence varying from 15% to 85%.³ A seroma is a serous fluid collection, which develops following the formation of skin flaps during mastectomy or in the axillary dead space after axillary dissection^{4,5} Seroma causes significant morbidity to the patient, prolonged hospital stay and delay in starting adjuvant treatment thus interfering with treatment of systemic component of the disease and affecting survival.

Identification of patients prone to develop seroma formation and more frequent follow up of these patients helps in early detection and adequate management of seroma thus decreasing its morbidity.

Aim of this study is to analyse the impact of selected factors like blood pressure, diabetes mellitus, age of the patient, BMI (body mass index) of the patient, weight of mastectomy specimen, drain volume, serum albumin, extent of axillary nodal clearance & neoadjuvant chemotherapy on incidence of seroma formation in breast carcinoma patients undergoing modified radical mastectomy.

Methods

The study was conducted on patients admitted in inpatient department of General Surgery in Karnataka Institute of Medical Sciences, Hubli with the diagnosis of carcinoma breast who underwent primary modified radical mastectomy and those who received neoadjuvant chemotherapy followed by modified radical mastectomy during the study period from November 2017 to October 2019. Patient details documented including history and clinical examination and investigations.

A seroma is defined as clinically detectable fluid collection beneath skin flaps and axilla which develops following modified radical mastectomy⁵ it often occurs after removal of drains.

Every patient was advised to follow up after a week of discharge and weekly thereafter or more frequently as needed.

Ethical clearance was obtained by institutional ethical committee.

Inclusion criteria

All patients of Carcinoma Breast undergoing Modified radical Mastectomy as primary treatment and All patients of carcinoma breast who took neoadjuvant chemotherapy followed by modified radical mastectomy were included in the study

Exclusion criteria

1. Patients undergoing Breast reconstruction.
2. Patients who are refusing to be a part of the study.
3. Cases of Carcinoma breast who are treated with Breast Conservation Surgery
4. Cases of Carcinoma breast who underwent immediate reconstruction following mastectomy.

Results

The study was conducted on a total of 81 patients aged between 25-75 years who underwent modified radical mastectomy as a primary treatment or following neoadjuvant treatment at KIMS, Hubli.

Among 81 patients who underwent modified radical mastectomy 23 patients developed seroma (28.39%).

Among the 81 patients 2 were male and none of them developed seroma.

Among 81 patients with age varying from 25 years to 75 years and mean age 50.3 years, 30 (37%) are below 45 years of age, 43 (53%) are 45-65 years of age and 8 (9%) are above 65 years of age, maximum patients with carcinoma breasts were in the age group of 46-65 years.

BMI of patients included in study varied from 14.03 to 39.2 with a mean of 26.2. A total of 46 patients were found to have obesity with BMI >25. Prevalence of seroma was lower (5%) in patient with normal BMI and higher in obese patients (45.6%) which is a statistically significant difference with p value of 0.0001 [table 2]

Stage of the tumour included in the study varied from IA to IV. With 1 patient in stage I, 32 patients in stage II, 43 patients in stage III & 3 patients in stage IV.

None of the patients in stage I developed seroma, and there was no statistically significant difference in seroma formation between stage II & III. [table 3]

Among 81 patients included in the study, 12 received neoadjuvant chemotherapy 3 received palliative chemotherapy and 66 patients underwent primary modified radical mastectomy. [table 4]

Serum albumin level varied from 2g/dl to 4.5g/dl with an average of 3.2g/dl.

13 patients had serum albumin <3, remaining 68 had serum albumin level of >3

Seroma formation was noted in 38.46% of patients with serum albumin <3 and in 26.47 % of patients

with serum albumin >3, eventhough seroma formation was slightly higher in patients with low albumin this difference was not statistically significant. (Table 5)

Weight of mastectomy specimen was measured after surgery using electronic digital weighing scale with resolution of 1gm.

Weight of operated specimen ranged from 216gms to 1400gms with a mean of 607.6gms.

Weight of the specimen more than 750gm correlates positively with seroma prevalence with only 8% of patients with specimen weight <750gm developing seroma. (Table 5)

A Post operative drain output was recorded and drain removed after output is <30ml for 24hrs and patients were monitored for seroma formation.

Total drain output of the patients varied between 70ml to 3150ml with mean of 525ml

Drain output on first post operative day varied from 30 to 410 ml with average of 132ml.

- i) 17.24% of patients where total drain output was <600ml had seroma
- ii) 56.52% of patients where total drain output was >600ml had seroma
- iii) 17% of patients where postop day 1 drain output was <120ml had seroma
- iv) 44% of patients where postop day 1 drain output was >120ml had seroma

Higher drain output both total(>600ml) and

POD 1 output(>120ml) has positive correlation with seroma formation seem to act as predicting factors for seroma formation (Table 5)

Number of lymph node dissected during modified radical mastectomies varied from a minimum of 1 to maximum of 33 nodes with average of 12 nodes. 44 patients had >10 lymph nodes retrieved during surgery.

33% of patients with nodal clearance of less than 10developed seroma while 28.94 % of patients with lymph nodeclearance of 10-20 developed seroma. None of the patients with more than 20 lymph nodes dissected had seroma. However no statistically significant relation found between number of lymph nodes dissected and seroma formation as well as with number of positive lymph nodes and seroma formation. (Table 5). Thus number of lymph nodes dissected does not seem to have any impact on seroma formation.

Association between seroma formation and clinical parameters which were continuous variables in nature was analysed using independent t test which also showed statistically significant association between seroma formation post MRM and age of the patient , BMI of the patient, weight of MRM specimen, drain output (Table 6)

Discussion

Seroma formation is a common problem following mastectomy causing significant morbidity to the patient, however seroma is still an elusive topic

Table 1: Effect of age of patient on seroma formation.

Age	Seroma present	%	OR	95% CI for OR		p-value
<=44yrs	3	14.29		Reference		
>=45yrs	20	33.33	0.50	0.29	0.86	0.0110
Total	23	28.40	81	100.00		

Patients with age >45 yrs have higher incidence of seroma (33%) which is statistically significant with p-value of 0.011

Table 2: effect of bmi on seroma formation.

Body mass index	Seroma absent	%	Seroma present	%	Total	P-value	
<=22.9	Normal	19	95.00	1	5.00	20	0.0001*
23.0-24.9	overweight	14	93.33	1	6.67	15	
25.0-29.9	Obese	19	65.52	10	34.48	29	
>=30		6	35.29	11	64.71	17	
Total		58	71.60	23	28.40	81	

Table 3: Effect of stage of disease with seroma formation.

Stages	Total	Seroma absent	%	Seroma present	%
Stage I	1	1	100.00	0	0.00
Stage II	32	23	71.8	9	28.13
Stage III	43	30	69.76	13	30.23
Stage IV	3	2	66.66	1	33.33

Chi-square=0.4710 P = 0.9230

Table 4: Effect of primary mode of treatment with seroma formation.

Status of seroma	Primary MRM	%	Neoadjuvant	Chemotherapy	%	Total	%
Absent	46	82.14	10	17.85	56	71.60	
Present	20	90.9	2	9.09	22	28.40	
Total	66	84.61	12	15.38	78	100.00	

Chi-square = 0.9320 P = 0.3342

Table 5: Analysis of clinical parameters with seroma formation.

Clinical parameters	Seroma absent	%	Seroma present	%	Total	%	Chi-square	p-value
Levels of albumin								
Hypo	8	61.54	5	38.46	13	16.05	0.7720	0.3800
Normal	50	73.53	18	26.47	68	83.95		
Weight of specimen								
<750	57	91.94	5	8.06	62	76.54	53.7320	0.0001
>=750	1	5.26	18	94.74	19	23.46		
Levels of Lymph node dissection								
1 – 10	24	66.67	12	33.33	36	44.44	0.7770	0.3780
>=11	34	75.56	11	24.44	45	55.56		
Levels of Positive Lymph nodes								
1 – 4	46	74.19	16	25.81	62	76.54	0.8710	0.3510
5 – 11	12	63.16	7	36.84	19	23.46		
Drain output								
<=600	48	82.76	10	17.24	58	71.60	12.4980	0.0001
>600	10	43.48	13	56.52	23	28.40		
Post op day1 drain output								
<=120	39	82.98	8	17.02	47	58.02	7.1240	0.0080
>120	19	55.88	15	44.12	34	41.98		
Total	58	71.60	23	28.40	81	100.00		

Table 6: Comparison of status of seroma with continuous variables by independent t test.

Variable	Status of seroma	Mean	SD	SE	t-value	P-value
Age (years)	Absent	48.86	11.30	1.48	-1.9307	0.0500
	Present	54.09	10.56	2.20		
Body mass index	Absent	24.80	3.62	0.48	-5.6586	0.0001
	Present	29.85	3.62	0.75		
Albumin (g/dl)	Absent	3.45	0.59	0.08	1.3528	0.1800
	Present	3.25	0.57	0.12		
Weight of specimen (gm)	Absent	493.31	138.30	18.16	-9.0513	0.0001
	Present	895.83	259.62	54.13		

Cont.../-

Lymph nodes	Absent	13.14	6.50	0.85	1.8585	0.0668
	Present	10.43	3.98	0.83		
Positive lymph node	Absent	2.48	3.06	0.40	-1.3849	0.1700
	Present	3.61	3.86	0.80		
Total Drain output	Absent	407.05	212.05	27.84	-4.2594	0.0001
	Present	824.39	671.75	140.07		
Post of day1 drain output	Absent	110.43	57.42	7.54	-4.1483	0.0001
	Present	186.74	107.09	22.33		

and its pathophysiology, predisposing factors and preventive methods remains unclear even till day. Several studies have suggested various preventive techniques⁶ and predisposing factors for formation of seroma however a strong evidence supporting each of these factors is lacking and hence our understanding of the formation of seroma. Reported incidence of formation of seroma is varied and is about 15% to 85%.⁷

Association between seroma formation and higher age was found to be statistically significant in our study and similar findings were observed in zeilenski et. al. 2011.⁸ (p value 0.001) and wings loo et. al. 2007⁹. (p value 0.02)

Association between obesity and seroma formation was noted in our study and in zeilenski et. al. 2011.⁸ (p value-0.036). Hence higher vigilance is required for identification of seroma in overweight and obese females undergoing mastectomy as it is more common in them.

Our study did not find any statistically significant correlation between seroma formation and serum albumin similar to findings in Wings Loo et. al. 2007.⁹ (p value-0.073)

No statistically significant association between stage of the tumour and seroma formation was noted in our study though patients with stage II were found to have significantly higher seroma in zeilenski et. al. 2011.⁸ (p value- 0.042)

Neoadjuvant chemotherapy does not seem to influence seroma formation in our study as seen in Ernest Gonzalez et. al. 2003.¹⁰ (p value-0.2)

Weight of the specimen > 750gm is significant predicting factor for seroma formation post operatively as seen in our study and it is comparable with results of zeilenski et. al. 2011. (p value 0.05)

Positive association between total drain output (>600 ml) and first day drain output (>120ml) was noted in our study which is comparable with results of M. Akinci et. al. 2009.¹¹

Mean lymph nodes dissected in our study is 12 and number of lymph nodes dissected does not

seem to be a predicting factor of seroma formation in our study as no significant difference in seroma formation was noted in groups of patients with lymph node dissection <10, 11-20, & >20. Statistically significant increase in seroma formation was noted in patients with >15 lymph nodes dissected in study conducted by zeilenski et. al. in 2011.⁸

Conclusion

Thus we concluded in our study that higher incidence of seroma should be anticipated in an elderly obese women with mastectomy specimen weighing >750gm especially if her post operative day 1 drain output is >120 ml and total drain output >600ml.

These patients may require more frequent follow up for early detection of seroma and its aspiration so as to prevent its complications like increase in pain, wound infection, flap necrosis and delay in starting adjuvant chemotherapy. However serum albumin level, staging of tumour, number lymph nodes dissected, primary mode of treatment does not contribute for seroma formation.

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