

Factors Predicting Seroma Formation after Axillary Lymph Node Clearance

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ABSTRACT

BACKGROUND

We wanted to investigate as to which variable like age, weight, stage, prior chemotherapy, radiation therapy etc. had a significant association with the patient developing collection of serous fluid in the axilla in the post-operative period following axillary lymph node clearance.

METHODS

This is a retrospective study. All patients who underwent axillary clearance were included in the study including elective and therapeutic indications. All relevant clinical data was extracted from these patients. The clinical variables were studied to reveal the most significant variable associated with formation of seroma

RESULTS

Axillary dissection was carried out in 133 patients, 70 patients as a part of modified radical mastectomy for carcinoma breast, 39 patients as a part of breast conserving surgery for carcinoma breast, 12 patient as a part of completion surgery for patients who underwent mastectomy elsewhere for carcinoma breast in which axilla was not addressed, 6 patient with melanoma of the upper limb and 4 for squamous cell carcinoma of upper limb and 2 for sarcoma for the upper limb. Incidence of seroma was 43.47 in >60 yrs. vs 31.04 in <60 yrs., 80% in males vs 33.60% in females, 29.14% for tumour size of 2 cm vs 37.25% for 2-5 cm, vs 41.97% for > 5 cms, 38.46% nodal metastasis vs 28.57 no nodal metastasis, 34.28% in MRM vs 23.07% in BCS vs 41.66% in Completion Mastectomy, neoadjuvant chemotherapy had 54.84% vs 29.41% in no prior chemotherapy, infection/flap necrosis 83.33% vs 30.58 in no infection/ flap necrosis, 85.71% when drainage duration 5 days vs 75% when 5 to 10 days vs 20.40% when more than 10 days. Melanoma and sarcoma histology had higher incidence of seroma formation.

CONCLUSIONS

Male sex, older age, larger tumour size, nodal involvement, completion surgery or re-surgery, histology like melanoma or sarcoma, neoadjuvant chemotherapy, prior irradiation, infection or flap necrosis, and early removal of drain is associated with higher incidence of post-operative seroma formation.

KEYWORDS

Seroma, Axillary Dissection, Carcinoma Breast

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BACKGROUND

Axillary lymph node dissection as part of radical mastectomy for breast cancer has been used to identify nodal metastasis and stage the disease and also for local control in carcinoma breast.¹ This local control translates to overall survival as confirmed by The Early Breast Cancer Trialists' Collaborative Group synthesized findings from 78 randomized controlled trials.² The Axillary dissection has been riddled with multiple complication like wound infections, axillary seromas, paresthesia limb oedema.³ Besides morbidity, wound dehiscence, predisposition to sepsis, prolonged recovery period and multiple physician visits seroma formation delays the initiation of adjuvant therapy.⁴ Axilla dissection is also the part of management for local or regional control of diseases like squamous cell carcinoma,⁵ melanoma,⁶ and sarcoma⁷ of extremities.

METHODS

This is a retrospective study conducted at MNJ institute of oncology and Regional cancer center red hills, Hyderabad, Telangana, India in the Dept. of Surgical Oncology from 2017 to November 2019 on all patients who underwent Axillary dissection as a surgical treatment. The demographic data and other variables were extracted from case records. The definition for axillary seroma was any clinically apparent

fluid collection under the skin flap which required aspirations. Variables studied were age, sex, tumour size, nodal involvement, type of surgical procedure, neoadjuvant therapy received, infection or flap necrosis in the immediate post-operative period and the duration of suction drain.

RESULTS

In our study 133 patients were studied out of which 47 patients developed seroma that is 35.34 percent. 5 Patients were male (1 for sarcoma underwent above elbow amputation developed seroma, 1 underwent WLE for melanoma developed seroma, 1 underwent amputation below elbow for melanoma developed seroma, 1 male breast cancer post NACT underwent MRM developed seroma and 1 male breast cancer patient pre NACT did not develop seroma) with seroma developing in 80% of the patient compared to only 33.60% in their female counterparts. With age as a variable it was observed that patients who were older than 60 years had a seroma percentage of 43.47% compared to 31.04% in their younger counterparts. Patients with tumour Size of less than 2, 2 to 5 cm and more than 5 cm had an incidence of seroma formation of 29.14%, 37.25% and 41.97% respectively. When lymph nodal histopathology was negative for metastasis 28.57% developed seroma compared to 38.46% when histopathology showed metastatic disease in lymph nodes.

Variable	Total	Seroma(n)	Seroma%	No Seroma (n)	No Seroma %
Age					
Less than 60	87	27	31.04	60	68.96
More than 60	46	20	43.47	26	56.53
Sex					
Male	5	4	80	1	20
Female	128	43	33.60	85	66.40
Tumour Size					
< 2cm	51	15	29.14	36	70.59
2 – 5 cm	51	19	37.25	32	62.75
> 5 cm	31	13	41.97	18	58.06
Nodal Involvement					
No	42	12	28.57	30	71.43
Yes	91	35	38.46	56	61.54
Surgical Procedure					
Mastectomy Carcinoma Breast	70	24	34.28	46	65.72
BCS Carcinoma Breast	39	9	23.07	30	76.93
Completion Axillary Dissection Carcinoma breast	12	5	41.66	7	58.34
WLE and Axillary dissection Melanoma	4	3	75	1	25
Amputation below/above elbow Melanoma	2	2	100	0	0
WLE and Axillary dissection SSC	3	1	33.33	2	66.67
Amputation below elbow SSC	1	1	100	0	0
Amputation above elbow Sarcoma	1	1	100	0	0
Fore Quarter Sarcoma	1	1	100	0	0
Neoadjuvant Chemotherapy					
Yes	31	17	54.84	14	45.16
No	102	30	29.41	72	70.59
Prior Radiation					
Yes	1	1	100	0	0
No	132	46	34.85	86	65.15
Infection/Flap Necrosis					
Yes	12	10	83.33	2	16.67
No	121	37	30.58	84	69.42
Drain Duration					
> 10 days	98	20	20.40	78	79.60
5-10 days	28	21	75	7	25
< 5 days	7	6	85.71	1	14.29

Table 1. Patient Data with Incidence of Seroma Formation

Out of the 133 patients, 34.28% of 70 Modified radical mastectomy recipients, 23.07% of 39 Breast Conserving surgery recipients, 41.66% of 12 Completion Axillary Dissection for Carcinoma breast recipients, 75.00% of 4 WLE and Axillary dissection for Melanoma recipients, 100.0% of 2 Amputation for Melanoma recipients, 33.33% of 3 WLE and Axillary dissection for SSC recipients, 100.0% of 1 Amputation below elbow for SSC recipient, 100.0% of 1 Amputation above elbow Sarcoma recipient, and 100.0% of 1 forequarter amputation for sarcoma recipient developed seroma.

31 patients were subjected to Neoadjuvant chemotherapy of which 54.84% developed seroma compared to only 29.41 percent of 102 patients who did not receive any prior chemotherapy. Only one patient had received radiation therapy prior to surgery for bleeding outside our institute and she developed seroma. Flap necrosis or surgical site infection was seen in 12 patients of which 83.33% developed seroma. It was observed that when duration of drain was <5 days, 5 to 10 days and more than 10 days the percentage of patients who developed seroma were 85.71, 75 and 20.40 respectively.

DISCUSSION

Axillary dissection is both a therapeutic and staging procedure^{1,2,8} Axillary dissection is associated with multiple complication like seroma, infection, and lymphedema.^{1,2,3,8,9} Multiple strategies have been reported to prevent seroma formation like use of ultrasound scalpel for dissection,¹⁰ closing dead space,¹¹ thrombin application,¹² fibrin sealant¹³ or fibrin glue application¹⁴ but none have predicted the risk of developing seroma. Other authors have published data throwing light on the impact of seroma on morbidity and treatment. In this study we studied the various variables to describe the incidence of seroma formation with association to various variables. In this study the incidence of seroma formation was 35.34% while others have reported incidence from 3% to 85%.^{15,16} In our study Males patients were few but had a very high incidence compared to their female counter part which is similar to the observation by Oliveira LT et al.¹⁷ Patient's older than 60 years had a higher incidence of seroma formation 43.47% vs 31.04%. Similar observation was reported by another study from Poland.¹⁸ Tumour size had a directly proportional relationship to the incidence of seroma formation in our study. Nodal metastasis was associated with higher incidence of seroma formation 38.46% compared to 28.57% when there was no metastasis. P. Suresh et al in their study indicated similar higher incidence of seroma formation in patients with larger tumours and nodal metastasis.¹⁹ In our study Completion mastectomy following lumpectomy or mastectomy had a higher incidence of seroma than modified radical mastectomy or Breast conserving surgery 41.66% vs 34.22% vs 23.07%. This observation was similar to observation by O'Donnell ME et al demonstrating higher incidence of seroma in completion mastectomy compared to

MRM and Gonzalez et al indicating a lower incidence in Breast conserving surgery vs. MRM.^{20,21} In our study 6 patients were treated with axillary dissection for malignant melanoma, in 4 primary was addressed with wide excision in 2 with amputation 75% and 100% of the patient respectively developed seroma. For Squamous cell carcinoma / Marjolin's ulcer 3 patients underwent wide excision and 1 amputation along with axillary surgery with incidence of 33.33% and 100% seroma formation. 2 patients of sarcoma required axillary lymph nodal clearance 1 with above elbow and 1 with Forequarter amputation with axillary clearance both groups had 100% seroma formation. The Number of patients in the other histological group are small compared to Carcinoma Breast patients but similar incidence of high seroma formation were reported in other studies for these histologies.^{5,6,7} Several studies to investigate post-surgical seroma have indicated association of seroma formation and Neoadjuvant chemotherapy.^{19,22} Neoadjuvant chemotherapy and Prior radiation was associated with incidence of 54.84% and 100% seroma formation in our observation. Infection and flap necrosis have been demonstrated to have association with seroma formation in various studies.^{19,22,23} In our study this variable was associated with 83.33% incidence of seroma formation. Prolonged use of drain has been critiqued because of its association with longer postoperative hospital stay, infection and pain.¹³ Some authors claim no change in incidence with removal of drain²⁴ while other observed early removal to be associated with increased incidence of seroma formation.^{25,26,27} Our study also observed high incidence of 83.33% when drain was removed within 5 days and lower incidence of 20.40% when drain was retained for longer than 10 days.

CONCLUSIONS

Male sex, older age, larger tumour size, nodal involvement, completion surgery or re-surgery, histology like melanoma or sarcoma, neoadjuvant chemotherapy, prior irradiation, infection or flap necrosis, and early removal of drain is associated with higher incidence of post-operative seroma formation and keeping these variables in mind preoperative counselling and planning and postoperative care can be modified to alleviate the morbidity associated with this complication.

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