ASSOCIATION BETWEEN HYPERTENSION AND SEROMA FORMATION IN PATIENTS AFTER MODIFIED RADICAL MASTECTOMY FOR CARCINOMA BREAST

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ABSTRACT

Objective: To determine the association between hypertension and seroma formation in patients after modified radical mastectomy for carcinoma breast.

Results: In this study mean age was 53 years with standard deviation ± 2.63. In seroma formation group the drainage volume was 50-275 ml while in non seroma group the drainage volume was 25-200 ml. In seroma formation group n=31(51%) patients were hypertensive while in non seroma group n=8(13%) patients were hypertensive.

ConIcusion: Although the pathogenesis of seroma remains controversial, such risk factors as age, nutritional status, drainage volume on POD3 and TTV30 should be considered for prediction and prevention of seroma formation in Chinese breast cancer patients.

Key Words: Breast cancer, Modified radical mastectomy,seroma, hypertension.

INTRODUCTION

Despite centuries of theoretical and scientific inquiry, breast cancer remains one of the most dreaded of human diseases. Breast cancer is the most common cancer in the United States and is the second commonest cancer in India in women[1]. Breast cancer is the commonest cause of deaths due to cancer in females throughout the world[2]. Incidence rises with age and risk is increased with positive family history, early menarche, late first pregnancy, nulliparity and late menopause.

The disease may remain localized to breast, spread to regional lymph nodes (most commonly axillary) or metastasize to remote body parts (most commonly bones, lungs, pleura and liver). Treatment of breast cancer is undertaken depending upon status of the draining axillary lymph nodes, tumour size, whether the tumour expresses hormone receptors and/or the protein HER[2], woman's age or menopausal status and presence of metastasis. Treatment modalities may be loco regional e.g. surgery, radiotherapy (RT) or systemic e.g. chemotherapy, hormonal therapy or humanized monoclonal antibodies.

The surgical treatment of choice for these patients is either modified radical mastectomy (MRM) or breast preservation depending upon stage of the disease and various patient factors. Axillary lymph node dissection (ALND) is integral part of modified radical mastectomy and is the preferred treatment of clinically positive or sentinel node biopsy (SNB) positive axillary lymph nodes[3,4,5]. MRM is the more widely used treatment modality in Pakistan because of delayed presentation of patients, surgical practices in vogue and unreliable patient follow up.

The most frequent early complication of breast cancer surgery is seroma formation, with reported rates of 3% to 92%. A seroma is a serous fluid collection which may develop in the space between the chest wall and skin flaps following mastectomy or axillary lymph node dissection for breast cancer. Exact pathophysiology of seroma is still debatable. Reasons that may account for the occurrence of seroma include a large operative field, division of lymphatic channels, the loose axillary skin hollow that follows surgical resection and the highly mobile, dependent nature of the area.6 Seroma is often encountered for no obvious reason and without prodromal warning. Due to its commonality some authors consider seroma a "necessary evil;" which will occur unpredictably in a predictable number of patients[6].

The incidence of seroma has been shown to correlate with patient's age, breast size and hypertension, presence of malignant nodes in the axilla, previous surgical biopsy and use of heparin. Seroma formation is also related to surgical techniques and procedures. It is more frequent if theflaps are raised by electrocautery than by scalpel, as well as occurring moreoften in modified radical mastectomy than in breast-conservingsurgery, in axillary lymph node dissection than in sentinellymph node dissection, and in modified radical mastectomywithout immediate reconstruction than with immediate reconstruction[6,7,8,9].

Although seroma is not life threatening and usually painless, it can lead to significant morbidity including

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flap necrosis, wound dehiscence, predisposes to sepsis, prolonged recovery period, lymphedema, multiple physician visits and may delay adjuvant therapy.[10] Besides the economic loss due to prolonged hospital stay and delay in rehabilitation, seroma formation also adds to psychological trauma. This is, in addition, often to the embarrassment of the operating surgeon, whose experience in surgery does not influence the incidence of seroma after mastectomy.[11,12,13]

Various modalities have been used over the decades to reduce seroma formation. Most of them attempt to reduce dead space under the skin flaps and drain any collections which build up under them. These include application of bovine thrombin, fibrin glue and sealant, buttress suturing of flaps to underlying muscle or fascia and use of drains to evacuate any collections.[14]

MATERIAL AND METHODS

This case controle study was conducted over 61 patients in each group, after approval from hospitals ethical and research committee from 25/04/2012 to 24/10/12. All women meeting the inclusion criteria were included in the study through surgical OPD and were assigned as cases and controls. Cases were those women who had underwent MRM for carcinoma breast minimum 14 days ago and had seroma formation (as per operational definitions) and control were those women who underwent MRM for carcinoma breast minimum 14 days ago and had no seroma formations. Controls and cases were selected from same OPD. The purpose and benefits of the study was explained to all patients and written informed consent was obtained after explaining them the usefulness of study and maintenance of confidentiality.

Among both cases and controls, detailed history was taken along with careful scrutiny of past medical and surgical records. This was done to avoid confounders and possible bias in the study results.

Both cases and controls were carefully scrutinized for uncontrolled hypertension after MRM for Carcinoma Breast. All the observations, diagnosis of seroma and clinical assessments were conducted under supervision of an expert general surgeon fellow of CPSP. All the above mentioned information including name, age address were recorded in a pre designed proforma.

Patients having history of bleeding disorder, fungating carcinoma, intake of antithrombotic or antiplatelet drugs and Body Mass Index of > 25 were excluded because they act as confounders and will make the study results biased.

Extreme care were exercised in the selection of cases and controls to avoid selection bias, similarly extreme care was taken in extraction of information and scrutiny of medical records to avoid responder bias.

RESULTS

This study was conducted at surgical unit Khyber Teaching Hospital, Peshawar in which 122 cases were observed to find association of hypertension with seroma formation in modified radical mastectomy for carcinoma breast. All the patients were divided in two equal groups as 61 patients were taken as cases and 61 patients were taken as control and the results were analyzed as:

Age distribution among 122 patients was analyzed as n=6(5%) patients were in age range 20-30 years, n=16(13%) patients were in age range 31-40 years, n=61(50%) patients were in age range 41-50 years, n=39(32%) patients were in age range 51-60 years. Mean age was 53 years with standard deviation ± 2.63.

Drainage volume among two groups was analyzed as in seroma formation group the drainage volume was 50-275 ml while in non seroma group the drainage volume was 25-200 ml and was statistically significant with p-value=0.034 (as shown in Figure 1).

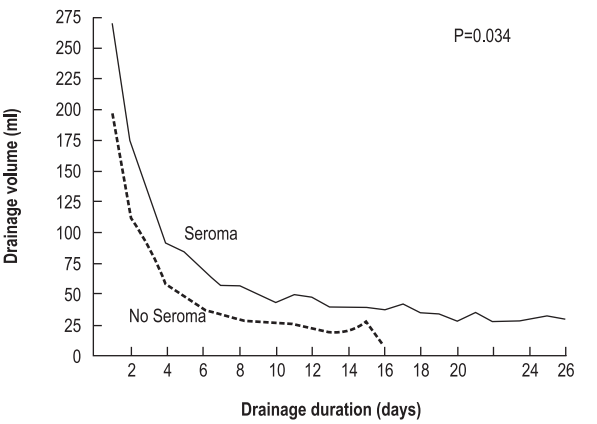

Fig. 1: Drainage Volume in 3 days

Association of hypertension in age group was analyzed as in seroma formation group a total of 31 patients were hypertensive in which 2 patients were in age range 31-40 years, 20 patients were in age range 41-50 years and 9 patients were in age ranged 52-60 years. Where as in non seroma group a total of 8 patients were hypertensive in which 1 patient was in age range 31-40 years, 5 patients were in age range 41-50 years and 2 patients were in age ranged 52-60 years.

DISCUSSION

In this prospective analysis, we certified age as a predictive factor for seroma formation, which was consistent with previous studies. In our study the incidence of hypertension was found more in seroma formation group 31(51%) patients as compare to non seroma group 8(13%) patients with Odd ratio OR 1.488. More over it was also observed that incidence of hypertension is more in age range 41-50 years as out of 31 hypertensive patients in seroma formation group 2 patients were in age range 31-40 years, 20 patients were in age

range 41-50 years and 9 patients were in age ranged 52-60 years. Where out of 8 hypertensive patients in non seroma group 1 patient was in age range 31-40 years, 5 patients were in age range 41-50 years and 2 patients were in age ranged 52-60 years.Similar results were also observed in another study done by Akinci M et al 106 in which hypertension were found to be more likely to develop seroma group 50% while in non seroma group 11%. In another study done by Soomro SA et al 107an incidence of seroma in 61% in hypertensive patients as compare to 5% in normotensive patients with relative risk of 12.72%.

As the increase of age is usually accompanied with elevated risk of hypertension mainly due to vascular sclerosis and renal dysfunction, our observation is not incomprehensible that hypertension was related to seroma formation in the univariate rather than multivariate analysis, which has been partly supported by other analyses.[15-18] Since seromas might be caused by inflammatory exudation or lymphogenous effusion.[19,20] It is postulated that hypertension, in some degree, contributes to seroma formation probably through protracted exudation from the raw surface area.[18,21,22]

However, this assumption is still to be unequivocally proved. Additionally, there are controversies on the effect of neoadjuvant chemotherapy on seroma formation.[21,23] In analysis, we did not find a significant difference in seroma formation between patients receiving neoadjuvant chemotherapy or not ($P > 0.05$).[23,24] Therefore, further studies, based on larger sample size, are required to clarify such issue.[17,25-26]

In the present study, we verified that low values of total protein and albumin in serum were correlated with increased risk of seroma formation, even if both mean levels were within normal ranges. As far as our knowledge is concerned, this finding had not yet been reported, let alone its causation. Seroma is an element in acute phase of wound healing depending on good nutrition. As a reminder of malnutrition, low values of total protein and albumin in serum are connected with protein deficiency, which has been demonstrated to hamper healing rates by way of reduced collagen synthesis. Whether low levels of total protein delay wound healing remains to be further researched. In addition, seroma is in nature an exudate, whose high loss can result in a dearth of as much as 100 grams of protein in one day. Accordingly, total protein or albumin decrease and seroma formation may come to a vicious cycle. On this premise, the assessment of comprehensive nutritional status, especially that of total protein and albumin levels in serum, may be paramount to predict the occurrence of postoperative seroma formation.[27,28]

We observed that daily drainage volume was documented to be highly predictive of subsequent seroma formation. The absorbable gelatin sponge and suction drainage device, which has been clarified to effectively reduce the incidence of seroma, were routinly used in our study.[18,29] According to this procedure, the decrease of drainage intensity occurred during the postoperative 24-48 hours. For this point, drainage volume on POD[3] might somewhat best mirror the effect of interaction between the intrinsic capability of oozing from the raw surface and that of sealing in the leaking vessels. In our study, the drain was removed when drainage volume fell to 30 millilitres or less per day for two consecutive days, since the drainage volume usually fluctuates around 30 ml in some patients from our experience. Thus, it helps to confirm the drainage volume actually decreased by waiting for two days, which is routine in our clinical practice and consistent with other reports. It is noteworthy that there exist some potential limitations related to specific drainage modalities. The logic behind them is still open to approach.[19,27,28]

Despite advances in surgical techniques, seroma formation appears to be a persistent problem after breast cancer surgery. Due to the controversial mechanism of seroma formation, it remains suspended how efficient to screen out patients who will ultimately suffer from seroma, accordingly hindering the progress in measures of prevention and treatment. However, a probe into risk factors for seroma formation is an important means for compensation of the insufficiency, which has been deployed in this study just as others. Our findings indicated the importance we should attach on age, serum total protein, drainage volume on POD 3 and TTV30.[28,30] In order to reduce the risk of seroma, it may be helpful to decrease drainage volume and duration through local compression and the administration of substances for exudate reduction and healing promotion, as well as improve serum total protein levels.[31,32]

CONCLUSION

Although the pathogenesis of seroma remains controversial, hypertension is the most consistent significant risk factor for seroma formation after modified radical mastectomy for carcinoma breast. Good pre, peri and post-operative blood pressure control can reduce the risk of seroma formation and the morbidity associated with it. However small sample size is the limiting factor to this study. Further studies are required to confirm this association.

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