



Type of Wound Drainage and Post Operative Morbidity after Modified Radical Mastectomy

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Suction drains are routinely used after modified radical mastectomy and is an important factor contributing to increased hospital stay as the patients are often discharged only after their removal. Amongst various factors that influence the amount of postoperative drainage, the negative suction pressure applied to the drain has been reported to be of great significance. Against this background a prospective clinical study was conducted to compare the associated postoperative morbidity between suction and non- suction dependent drainage in patients following Modified Radical Mastectomy.

Patients were randomized using randomly ordered sealed envelopes, which were opened immediately before the closure of the wound, to decide on whether suction or dependent drain was to be given. Tight breast bandages were applied within two hours of surgery. Exercises were started within 24 hours of surgery and continued daily. Drains were removed when output was less than 30 ml per day. Patients were followed up from the day of discharge in the wards and up to 2 months after the day of removal of their drains via personal contact numbers.

In this study it was found that there is no significant difference in the incidence of wound infection between post MRM patients with suction and dependent drains.

However the risk of developing seroma is significantly less in dependent drain group.

Thus it can be safely concluded that suction drains do not have any significant advantage over dependent drains after modified radical mastectomy in breast cancer patients. Also the risk of developing seroma is significantly more in patients with suction drains.

Keywords: suction drains, active drains, passive drains, modified radical mastectomy, breast cancer, seroma.

Introduction

Worldwide, breast cancer is the leading type of cancer in women, accounting for 25% of all cases^[1]. It is more common in developed countries and is more than 100 times more common in women than in men. In those who have been diagnosed with cancer, a number of treatments may be used, including surgery, radiation therapy, chemotherapy, hormonal therapy and targeted therapy.^[1] Surgical intervention ranges from wide local excisions to palliative mastectomy. Modified Radical Mastectomy involves removal of the entire breast including the breast tissue, skin, areola, nipple and most of the axillary lymph nodes.

Outcomes for breast cancer vary depending on the cancer type, extent of disease, and person's age. Survival rates in the developed world are high, with between 80% and 90%

of those in England and the United States alive for at least 5 years^[2]. In developing countries survival rates are poorer.^[3]

Drains remove blood, serum, lymph, and other fluids that accumulate in the wound bed after a procedure. If allowed to build, these fluids put pressure on the surgical site as well as adjacent organs, vessels, and nerves. The decreased perfusion delays healing and the increased pressure causes pain. In addition, fluid collection serves as a breeding ground for bacteria. Fluid can be removed from a wound using either a passive or active surgical drain. Passive drains rely on gravity to evacuate fluid, while active drains are attached to a vacuum device. A surgeon chooses a drain that both fits the operative site and can handle the type and amount of drainage expected.

Suction drainage in the management of mastectomy patients was used for the first time in 1947^[4]. The mechanism proposed is that the suction helps skin flaps to adhere to the chest wall and axilla sealing off all the leaking lymphatics^[5,6]. This reduces the incidence of post-operative seromas, hematoma formation and flap necrosis, which are recognized complications of modified radical mastectomy^[5,6].

Prolonged drainage on the other hand, may increase the hospital stay and increase the risk of infection by allowing retrograde migration of bacteria^[7]. If kept for longer periods it has been observed that drain itself might contribute to increased drainage and the risk of infection in addition to the increased hospital stay resulting in to wasteful utilization of the hospital resources.

The amount of postoperative drainage is influenced by various factors like the clinical profile of the patient including the body mass index, extent of axillary lymph node dissection, number of lymph nodes dissected, use of electrocautery, co morbid conditions and also the negative pressure on the suction drain^[7-13].

Against this background a prospective randomized clinical study was conducted to compare the post operative morbidity between patients with suction and non suction dependent drainage following Modified Radical Mastectomy. Incidence of wound infection and seroma formation are the two parameters selected as the indicators of post operative morbidity.

Materials and methods

This was a prospective cohort study which included 100 patients who had undergone Modified Radical Mastectomy in the department of general surgery at the hospital from January 2016 to July 2017.

All female patients who had histopathologically proven carcinoma breast and had undergone Modified Radical Mastectomy were selected and those who had underwent Breast Conservation Surgery were excluded. Patients who underwent spontaneous expulsion of drains and those who were discharged with their drains were withdrawn from the study.

Both axillary and chest drains were kept and connected to a single Romovac suction drain. Patients were randomized using randomly ordered sealed envelopes, which were opened immediately before the closure of the wound, to decide on whether suction or dependent drain was to be given. Tight breast bandages were applied within two hours of surgery. Exercises were started within 24 hours of surgery and continued daily. Daily drain output was monitored by the investigator. Drains were removed when output was less than 30 ml per day. Patients were followed up from the day of discharge from the wards up to two months post operatively via personal contact numbers. Using a printed proforma, patient details, surgical details, details of the treatment and incidence of wound infection and seroma formation were recorded. Statistical analysis was performed with SPSS version 10.

Results

Comparison of Baseline Characters

Table 1: Comparison of baseline characters

Character	Dependent drain	Suction drain	P value
Age	52.64	55.76	0.661
BMI	23.44	23.13	0.683
Presence of Diabetes	16%	20%	0.603
Presence of Hypertension	26%	28%	0.822
Neoadjuvant chemotherapy	20%	14%	0.603
Stage of Disease			0.269
No of Lymph Nodes	11.32	10.92	0.397

The major baseline characters that were studied included age and Body Mass Index of the patient, presence of co morbidities like diabetes and hypertension in the study group, history of neoadjuvant chemotherapy in the patient, stage of the disease at diagnosis and the total number of lymph nodes harvested during surgery. These parameters were selected by the investigator based on review of literature of previous studies which have already found association between the aforementioned characteristics and drain output. On statistical analysis it was found that there is no significant difference in base line characteristics between the two groups and that they are fairly comparable.

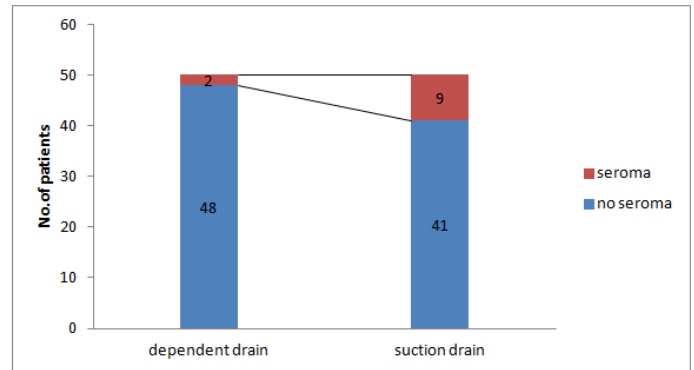
Incidence of Seroma Formation

Table 2: Comparison of incidence of seroma between dependent drain and suction drain group

	Seroma	No seroma
Dependent drain	2	48
Suction drain	9	41

There is a statistically significant decrease in the incidence of seroma in group with dependent drain compared to the group with suction drain with an odds ratio 0.19 (p = 0.025).

Fig 1: Comparison of incidence of seroma between dependent drain and suction drain group



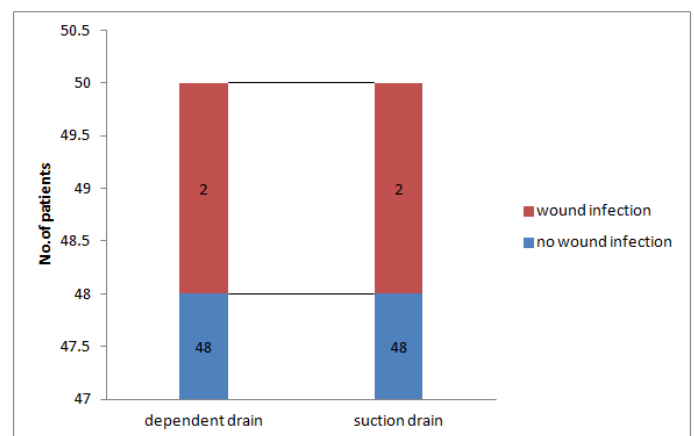
Incidence of Wound Infection

Table 3: Comparison of incidence of wound infection between dependent drain and suction drain group

	Wound infection	No wound infection
Dependent drain	2	48
Suction drain	2	48

There is no statistically significant difference in the incidence of wound infection between the two groups (p= 1).

Fig 2: Comparison of incidence of wound infection between dependent drain and suction drain group



Discussion

Seroma formation is the commonest early sequel to breast cancer surgery especially when axillary dissection is undertaken. It is associated with significant morbidity and financial burden. The main pathophysiology of seroma is still poorly understood and remains controversial. The optimal ways to reduce the incidence of seroma formation are unknown.

A study conducted by Mandar S. Nadkarni et al in 2007 “Influence of surgical technique on axillary seroma formation: a randomized study” a prospective randomized study including 160 patients with breast cancer who underwent surgery .the main outcome measure was postoperative seromaformation defined as a postoperative axillary collection requiring more than one aspiration after removal of the drain. There was no influence on the incidence of seroma formation whether suction drain (84.6%) or corrugated drains (86.1%) were used ($p = 0.822$). The use of different drainage techniques has no bearing on the postoperative seroma formation^[14].

Another study conducted by Chintamani et al in 2005 “Half versus full vacuum suction drainage after modified radical mastectomy for breast cancer- a prospective randomized clinical trial” 85 fine needle aspiration cytology proven cases of locally advanced breast cancer were randomized into 50 patients with full vacuum suction (pressure = 700 g/m²) and 35 cases in to half vacuum suction drainage (pressure = 350 g/m²) groups. The two groups were comparable in respect of age, weight, and technique of operation and extent of axillary dissection. Surgery was performed by the same surgical team comprising of five surgeons (two senior and three resident surgeons) using a standardized technique with electrocautery. The mean volume drained by the full suction group was 525 (s.d = 66.282) and that drained by

the half suction group was 325 (s.d = 39.612) and it was found to be statistically significant^[15].

The study conducted by R G Somers et al conducted a prospective randomized study from 1987 to 1990 of 227 axillary dissections titled “the use of closed suction drainage after lumpectomy and axillary node dissection for breast cancer. A prospective randomized trial” 108 were randomized to a drain group (dg) and 119 to a no drain group (ndg). Drains were removed on the first postoperative day just before patient discharge. Postoperatively, all palpable axillary collections were aspirated on each follow-up visit. The volume aspirated, the number of aspirations, the time to seroma resolution, and all complications were recorded. The mean number of aspirations in the dg was significantly lower than the ndg (2.2 ± 2.2 versus 3.3 ± 2.1 ; p less than or equal to 0.002). Mean volume aspirated in the dg (146.3 ± 181.1 ml) was less than the ndg (266.1 ± 247.6 ml; p less than or equal to 0.003), and the time to seroma resolution was decreased in the dg as compared with the ndg (11.5 ± 10 days versus 18 ± 10.1 days; p less than or equal to 0.0002). Closed suction drainage after lumpectomy and axillary node dissection is advantageous in decreasing the incidence and degree of seroma formation and need not delay early hospital discharge^[16].

The study “Evidence-based risk factors for seroma formation in breast surgery” conducted by Katsumasa Kuroi et al published in April 2006 were based on articles published in English obtained from searches of medline and additional references were found in the bibliographies of these articles. Risk factors were graded according to the quality and strength of evidence and to the direction of association. One meta-analysis, 51 randomized controlled trials, 7 prospective studies and 7 retrospective studies were identified. There was no risk factor supported by strong evidence, but there was moderate evidence to

support a risk for seroma formation in individuals with heavier body weight, extended radical mastectomy as compared with simple mastectomy, and greater drainage volume in the initial 3 days. On the other hand, the following factors did not have a significant influence on seroma formation: duration of drainage; hormone receptor status; immobilization of the shoulder; intensity of negative suction pressure; lymph node status or lymph node positivity; number of drains; number of removed lymph nodes; previous biopsy; removal of drains on the fifth postoperative day versus when daily drainage volume fell to minimal; stage; type of drainage (closed suction versus static drainage); and use of fibrinolysis inhibitor. In contrast, sentinel lymph node biopsy reduced seroma formation. Evidence was weak, or unproven, for other factors that were commonly cited in the literature. They concluded that although a number of factors have been correlated with seroma formation, strong evidence is still scarce. However, there is evidence showing that sentinel lymph node biopsy reduces seroma formation^[17].

In this study it was found that only two out of 50 patients with dependent drain developed post operative seroma whereas nine out of 50 patients developed seroma. There is a statistically significant decrease in the incidence of seroma in group with dependent drain compared to the group with suction drain with an odds ratio 0.19 ($p = 0.025$). Relative risk of seroma formation in dependent drain group was 0.19. However, two out of 50 patients in each group developed post operative wound infection, indicating statistically no significant difference between the groups.

The above mentioned study conducted by Chintamani et al however did not find any statistically significant difference in the incidence of wound infection, seroma or flap necrosis between the groups with half and full suction.

The study conducted by van Heurn & brink in 1995 on 40 patients concluded that low vacuum drains were removed earlier than high vacuum drains. However, seroma production was not significantly different between the two groups^[18].

Conclusion

To conclude, the risk of developing seroma is significantly less in dependent drain group whereas there is no significant difference in the incidence of wound infection between patients with suction and dependent drains. Thus this study proves without doubt that dependent drains are better than the suction drain after Modified Radical Mastectomy.

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