MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218/ makrjms.2.18.2024.528.531

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Key Words
Drainage capacity, revision of radical mastectomy suction, passive drains

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Received: 7 August 2024
Accepted: 8 August 2024
Published: 9 August 2024

Citation: Kaushik Mandal, Mohan Kumar Das and Saurav Sarkar, 2024. Active Versus Passive Drainage after Modified Radical Mastectomy in Breast Cancer. Res. J. Med. Sci., 18: 528-531, doi: 10.59218/ makrjms.2.18.2024.528.531

Active Versus Passive Drainage after Modified Radical Mastectomy in Breast Cancer

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ABSTRACT
Active drains are frequently utilized during Modified Radical Mastectomy (MRM) and their removal is a major reason why hospital stays are longer since patients are frequently not released from the hospital until after their removal. The negative suction pressure that is delivered to the drain is one of the many variables that have been shown to have a significant impact on the volume of post-operative drainage. In light of this, a research comparing the volume and length of drainage in patients undergoing Modified Radical Mastectomy was carried out using suction and dependent drainage methods. To determine whether to use a dependent drain or suction, patients were randomly assigned using sealed envelopes that were unsealed just before the incision was closed. When daily production was less than 30 mL, the drains were removed. From the day of surgery until the drain was removed, patients were monitored. With SPSS, statistical analysis was carried out. In post-MRM patients with an active suction drain, there is a notable daily rise in the drain. However, there is no correlation between the kind of drain and the overall number of drain days or the total drain output. The study also showed that the number of days that patients in the two groups spent in the hospital did not differ significantly. Patients with breast cancer who have a modified radical mastectomy do not significantly benefit from suction drains in comparison to dependent drains.

INTRODUCTION

With 25% of all occurrences, breast cancer is the most common kind of cancer among women worldwide[1]. Following a cancer diagnosis, a variety of therapies may be employed, such as hormone therapy, targeted therapy, radiation therapy, chemotherapy and surgery. Modified Radical mastectomy and breast conservation surgery are two examples of surgical interventions.

The whole breast, including the breast tissue, skin, areola, nipple and the majority of the axillary lymph nodes, is removed during an MRM.

The kind of breast cancer, the severity of the illness and the patient's age all affect the outcome. The industrialized world has very high survival rates, in the United States and England, between 80 and 90% of people survive for at least five years[2]. There are lower survival rates in underdeveloped nations[3].

After an operation, drains remove fluids such as blood, serum, lymph and others that build up in the wound bed. Pain is caused by increased pressure and delayed healing due to reduced perfusion. Furthermore, fluid collecting acts as a haven for bacterial growth. One can use an active surgical drain or a passive surgical drain to remove fluid from a wound. Active drains are connected to a vacuum equipment, whereas passive drains use gravity to remove fluid. A surgeon selects a drain that can manage the kind and volume of drainage anticipated while also fitting the surgical site.

The first application of suction drainage in the treatment of mastectomy patients occurred in 1947[4]. According to the suggested mechanism, the suction aids in the skin flaps' adhesion to the axilla and chest wall, shutting up any leaky lymphatics[5,6]. This lowers the risk of flap necrosis, hematoma development and post-operative seromas-all known side effects of modified radical mastectomy[5,6].

Prolonged drainage may lengthen hospital stays and raise the chance of infection by permitting bacterial retrograde movement[7]. Extended storage times have been found to have the potential to increase drainage and infection risk, as well as lengthen hospital stays and result in inefficient use of hospital resources.

Numerous factors, such as the patient's clinical profile, which includes their body mass index, the degree of axillary lymph node dissection, the number of lymph nodes dissected, the use of electro cautery, coexisting conditions and the suction drain's negative pressure, all affect how much drainage occurs after surgery[7-13].

In light of this, a clinical research comparing the volume and length of drainage in patients undergoing Modified Radical Mastectomy using suction and non-suction dependent drainage was carried out.

MATERIALS AND METHODS

This is a prospective cohort study conducted in the Dept. of general surgery, Burdwan Medical College and Hospital, Burdwan, West Bengal, India. The study included 100 patients who have undergone Modified Radical Mastectomy in the department of general surgery at the hospital from January 2023 to July 2024.

Inclusion criteria: All female patients who have histopathologically proven carcinoma breast and have undergone Modified Radical Mastectomy

Exclusion criteria:

- Patients who have undergone breast conservation surgery
- Patients who underwent spontaneous expulsion of drains and those who were discharged with their drains

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 hrs 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 surgery till day of drain removal. Using a printed proforma, patient details, surgical details, details of the treatment and daily drain output was recorded. Statistical analysis was performed with SPSS version 10.

RESULTS

When comparing the dependent drain group to the suction drain group, there was a statistically significant drop in the mean daily drain ($p = 0.021$) (Table 1).

Between the two groups, there was no statistically significant difference in the overall drain output ($p = 0.765$) (Table 2).

The number of drain days did not differ statistically significantly between the two groups ($p = 0.063$) (Table 3).

The age and BMI of the patient, the existence of concomitant conditions such as diabetes and hypertension in the study group, the patient's history of neoadjuvant chemotherapy, the disease stage at diagnosis and the total number of lymph nodes removed during surgery are the main baseline characteristics that were examined. The investigator chose these factors after reviewing the literature from earlier investigations that had already

Table 1: Comparison of mean drain output per day (mL day^{-1}) between dependent drain and suction drain group

Groups	Mean drain per day (mL)
Dependent drain	74.08
Suction drain	86.41

Table 2: Comparison of mean total drain output between dependent drain and suction drain group

Groups	Mean total drain (mL)
Dependent drain	658.44
Suction drain	683.40

Table 3: Comparison of average number of days of drain between dependent drain and suction drain group

Groups	Minimum	Maximum	Mean
Dependent drain	4	15	8.48
Suction drain	2	14	7.28

Table 4: Comparison of baseline characters

Characteristics	Dependent drain	Suction drain	p-value
Age	52.64	55.76	0.661
Body mass index	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

established a link between the aforementioned traits and drain output. Based on statistical research, it was determined that the two groups baseline characteristics were very equal and did not differ significantly (Table 4).

DISCUSSION

In this study, we have collected data from 50 patients with suction drain and 50 patients with dependent drain and compared the both groups to assess the advantage of suction drain over dependent drain.

The mean total drain output for patients with dependent drains was 658.44 ml in this research, whereas the mean drain output for patients with suction drains was 683.40 mL. Between the two groups, there is no statistically significant difference in the overall drain output (p = 0.765).

On the other hand, the suction group's mean daily drain was 86.41 mL, while the dependent group's was 74.08 mL. When comparing the dependent drain group to the suction drain group, there is a statistically significant drop in the mean daily outflow for the dependent drain group (p = 0.021).

In the dependent group, the average number of days a patient had the drain was 8.48 but in the suction group, it was 7.28. The number of drain days for the two groups does not differ statistically significantly (p = 0.063).

"Influence of surgical technique on axillary seroma formation: A randomized study" by Nadkarni *et al*.[14] was a prospective randomized trial that comprised 160 breast cancer patients who had surgery. Postoperative seromaformation, which is defined as a postoperative axillary collection needing several aspirations following drain removal, was the primary outcome measure. Using corrugated drains (86.1%) or suction drains (84.6%) had no effect on the incidence of seroma development (p = 0.822). The production of seroma following surgery is unaffected by the drainage methods used[14].

Another study by Chintamani *et al*.[15], "Half versus full vacuum suction drainage after modified radical mastectomy for breast cancer-a prospective randomized clinical trial," involved the randomization of 85 cases of locally advanced breast cancer confirmed by fine needle aspiration cytology into two groups: 35 cases were assigned to half vacuum suction drainage (pressure = 350 g/m^2) and 50 patients to full vacuum suction (pressure = 700 g/m^2). Regarding age, weight, surgical method and degree of axillary dissection, the two groups were similar. The same five-surgeon surgical team two senior and three resident surgeons performed the surgery with an electrocautery method that was standardized. It was determined to be statistically significant that the mean volume drained by the half suction group was 325 (s.d = 39.612) and the mean volume drained by the full suction group was 525 (s.d = 66.282)[15]. The mean hospital stays (days) was 10.8 (s.d = 1.603) in the full suction group and 6 (s.d = 1.414) in the half suction group and this was found to be statistically significant. A research undertaken by Kuroi *et al*.[16], titled "Evidence-based risk factors for seroma formation in breast surgery". Strong evidence did not support any risk factor, however there was moderate evidence that those who were heavier at rest, had longer radical mastectures than basic mastectomies and had more drainage volume during the first three days had a higher chance of developing seromas. However, none of the following variables significantly affected the production of seromas: Length of drainage; hormone receptor status, shoulder immobilization, degree of negative suction pressure, lymph node status or positivity, number of drains, number of removed lymph nodes, prior biopsy, removal of drains on the fifth postoperative day as opposed to when daily drainage volume dropped, stage, type of drainage (closed suction versus static drainage) and use of fibrinolysis inhibitor. On the other hand, seroma development was decreased by sentinel lymph node biopsy. For additional factors that were often mentioned in the literature, there was insufficient or no evidence. They came to the conclusion that while a lot of variables have been linked to seroma production, solid data is still hard to come by. But there is proof Sentinel lymph node biopsy has been found to decrease seroma production, nevertheless[16].

According to the findings of van Heurn and Brink[17] on 40 patients, low vacuum drains were removed earlier than high vacuum drains. Nonetheless, there was no discernible difference in seroma production between the two groups.

CONCLUSION

Post-MRM patients with suction drains had a significant daily rise in drain. However, the number of days spent in the hospital does not significantly change. Thus, this study unequivocally demonstrates that suction drains have no advantages over dependent drains but they do result in a greater cost burden.

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