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The Relationship Between Drain Removal Day and Breast Weight in Patients with Breast Cancer After Mastectomy: A Retrospective Study

Mastektomi Sonrası Meme Kanserli Hastalarda Dren Alma Günü ile Meme Ağırlığı Arasındaki İlişki: Retrospektif Bir Çalışma

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ABSTRACT Objective: Surgeries performed for breast cancer often include wide flap practices and breast tissue resections. This condition paves the way for bothersome complications such as seroma, which negatively affect patient comfort and also require hospitalization. Hence, surgeons have adopted postoperative drain application as an indispensable routine. In this study, we aimed to examine the relationship between the weight of resected breast tissue after mastectomy and the postoperative drain removal time. **Material and Methods:** Retrospective medical records of 107 patients who underwent mastectomy procedures due to breast cancer in the surgical oncology clinic were exported from the hospital database. Statistical analyzes were performed within the confidence interval of 95%. A p value less than 0.05 was considered statistically significant. **Results:** The mean age of the patients was 55.13, mean body mass index was 28, mean day of drain removal was 8.45, mean number of lymph nodes removed was 12. Only 47% of the patients had metastatic lymph nodes, with an average of 4.6. We found that the time of drain removal was longer in patients who underwent modified radical mastectomy (MRM) and had axillary lymphatic involvement (p=0.00). In the correlation analysis performed, there was a positive correlation between postoperative drain removal time and breast weight (p=0.00), the total number of lymph nodes removed (p=0.00), number of metastatic lymph nodes (p=0.04), and body mass index (p=0.004). **Conclusion:** Our results are consistent with the current literature, and we recommend being more persistent for drainage practice in patients with axillary involvement, who are overweight and have large breast volumes, and not ignoring individual risks in clinical practice.

Keywords: Body mass index; breast neoplasms; drainage; mastectomy; seroma

ÖZET Amaç: Meme kanseri nedeniyle yapılan ameliyatlar çoğu zaman geniş flep uygulamaları ve meme dokusu rezeksiyonlarını içerir. Bu durum, ameliyat sonrası hem hasta konforunu olumsuz etkileyen hem de hastaneye yeniden yatış gerektiren seroma gibi can sıkıcı komplikasyonlara zemin hazırlar. Bu yüzden cerrahlar, ameliyat sonrası dren uygulamasını vazgeçilmez bir rutinleri olarak benimsemişlerdir. Bu çalışmamızda, mastektomi sonrası rezeke edilen meme dokusunun ağırlığı ile postoperatif dren çekim zamanı arasındaki ilişkiyi incelemeyi amaçladık. **Gereç ve Yöntemler:** Cerrahi onkoloji kliniğinde meme kanseri nedeni ile mastektomi prosedürü uygulanan 107 hastanın retrospektif olarak tıbbi kayıtları hastane veri tabanından çıkarıldı. İstatistiksel analizler %95 güven aralığında yapıldı. p değerinin 0,05'ten küçük olması istatistiksel olarak anlamlı kabul edildi. **Bulgular:** Hastaların yaş ortalaması 55,13, beden kitle indeksi ortalamaları 28, dren alan günü ortalamaları 8,45, çıkarılan lenf nodu sayısı ortalama 12 idi. Hastaların sadece %47'sinde metastatik lenf nodu mevcut olup ortalama 4,6 adet idi. Dren çekim zamanını modifiye radikal mastektomi (MRM) yapılan ve aksiller lenfatik tutulum gösteren hastalarda daha uzun bulduk (p=0,00). Yapılan korelasyon analizlerinde ise postoperatif dren çekim zamanı ile meme ağırlığı (p=0,00), total çıkarılan lenf nodu sayısı (p=0,00), metastatik lenf nodu sayısı (p=0,04) ve beden kitle indeksi (p=0,004) arasında pozitif yönde ilişki mevcuttu. **Sonuç:** Sonuçlarımız güncel literatürle uyumlu olup, klinik uygulamada MRM yapılacak, aksiller tutulum gösteren, kilolu ve büyük meme hacimlerine sahip hastalarda drenaj için daha ısrarlı davranmayı ve bireysel riskleri göz ardı etmemeyi tavsiye ediyoruz.

Anahtar Kelimeler: Beden kitle indeksi; meme neoplazileri; drenaj; mastektomi; seroma

Currently, breast cancer is the most common malignancy seen in women. It is the second most common cause of cancer-related female deaths.[1] The basis of the current treatment is the surgical excision of fibroadipose glandular tissue with tumoral involvement up to intact margins and the application of

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one of the axillary dissection or sentinel lymph node biopsy (SLNB) procedures according to the axillary involvement. Nowadays, after all these surgical procedures, surgeons continue to routinely place drains in the operation region and axilla to prevent seroma formation. Thus, it is expected to reduce the frequency of postoperative aspiration, thus ensuring patient comfort and preventing the possibility of infection.[2,3] To prevent seroma formation after axillary lymph node dissection, surgical procedure, ligation of lymph vessels, filling of the axilla, or closing the dead space with suture flap fixation are recommended.[4-6] It is uncertain whether drainage reduces complication rates. It was reported that adopting a no-drain policy or 24-hour drainage can also contribute to the patient's discharge from the hospital earlier.[7,8] However, it was reported that seroma occurs in 42% of patients treated without drainage, so it would be appropriate to perform drainage, albeit for a short time, and discharge the patient within a day or two following the removal of the drain.[9,10] There is limited quality evidence that postoperative drainage after axillary dissection reduces the incidence of seroma development and the number of postoperative seroma aspirations.[2] Studies have reported that there is a significant relationship between breast volume and the amount of drainage. However, a similar relationship could not be detected between them and body mass index (BMI).

In this study, we aimed to examine the relationship between resected breast tissue weight and drainage time. Surgeons have yet to agree on a specific drainage policy. The result may help determine our drainage policy in the perioperative period.

MATERIAL AND METHODS

In this study, medical records of 107 women who underwent mastectomy procedures for breast cancer in our surgical oncology clinic between January 2016 and December 2020 were obtained retrospectively. The patients' demographic characteristics and clinicopathological characteristics were exported from the hospital's medical database system and recorded.

PATIENTS

The data included in our study were obtained from postoperative follow-up and pathology reports. The patients who underwent mastectomy were included in our study, regardless of the amount of lymph node dissection. Patients with breast cancer who did not undergo mastectomy and those with missing data in the database were excluded from the study. Clinicopathological characteristics such as age, BMI, height, weight, affected breast side, axillary lymph node status, the status of receiving neoadjuvant treatment, surgical procedure, the weight of the removed breast tissue, and drain removal time were collected. The number of patients who were treated with neoadjuvant chemotherapy (NAC) was 8. Therefore, a statistical analysis was not performed. The patients were categorized according to the type of surgery and axillary involvement. In addition, the BMI values of the patients were calculated by dividing the body weight in kilograms by the square of the height in meters (kg/m^2). The lymph node counts extracted from the histopathology reports and the metastatic lymph node counts of the patients who underwent axillary dissection were recorded. The breast weights of the patients were measured by weighing only the breast tissue from the postoperative piece. Drain removal times according to axillary involvement and the type of surgery performed are presented in Table 1.

OUR SURGICAL TECHNIQUE AND DRAINAGE POLICY

Flaps for mastectomy were performed with the help of electro cautery in all patients participating in our study. In cases where adequate hemostasis could not be achieved, ligation with an absorbable suture material such as bipolar electrocautery or vickryl was used. Postoperatively, 2 Jackson-Pratt silicone drains were placed in the axilla and breast tissue in patients who underwent modified radical mastectomy (MRM). In patients who underwent simple mastectomy and SLNB, a single drain was placed to drain the upper and lower flaps. In the presence of drainage amounts below 20 cc, drains were removed postoperatively. In cases of long-term and high drainage, the patients were sent home with their drains and followed up in 3-day periods. If the amount of drainage reached below 20 cc, the drains were removed. Seroma requiring drainage was not observed in any of the patients after drain removal.

TABLE 1: The demographic and clinicopathological characteristics of the patients.

Characteristics	Mean	Minimum-maximum	SD	p value
Age	55.13	31-85	13.2	0.097
BMI	28	18-45	5.2	0.004
Breast weight (g)	1,043	210-3,200	530	0.000
Drain removal time (days)	8.45	2-17	2.7	
Axillary involvement (+)	9.69	3-17	3.5	0.000*
Axillary involvement (-)	7.14	2-15	3.6	
MRM	9	3-17	3.3	0.000*
Mastectomy+SLNB	5	2-15	2.6	
Totalnumber of lymph nodes	16.28	1-35	6.4	0.000
Metastatic lymph nodes	3.54	0-31	5.3	0.004

*The p value belongs to the Mann-Whitney U test; SD: Standard deviation; BMI: Body mass index; MRM: Modified radical mastectomy; SLNB: Sentinel lymph node biopsy.

Informed consent was obtained from each patient included in the study. The study protocol is in accordance with the ethical guidelines of the 1975 Declaration of Helsinki, which was previously approved by the Human Research Committee of the Institution and was approved by the Ethics Committee (decision date: January 14, 2021, decision no: İ10-624-20).

STATISTICAL ANALYSIS

The data were analyzed in SPSS statistics 24.0 (Statistical Product and Service Solitions, Inc.,Chicago, IL USA) and all data were presented as mean±standard deviation, and maximum-minimum values. Parametric test assumptions were reviewed before differential analysis was performed, and the normality was checked by Kolmogorov-Smirnov test, Skewness, and Kurtosis. Since the assumption of normality was not provided, the difference analysis was performed by a Mann-Whitney U test. The relationship between quantitative variables was analyzed using the Spearman correlation test since the data series did not show normal distribution. Statistical analyzes were performed within the confidence interval of 95%. A p value less than 0.05 was considered statistically significant.

The demographic and clinicopathological characteristics of the patients enrolled in the study are presented in Table 1.

RESULTS

The mean age of the patients included in the study was 55.13±13.2 years. All of our patients were women. The affected breast was on the right side in 47% (n=51) of the patients, and the left side in 53% (n=56). MRM was applied to 67% (n=72) of the patients, and mastectomy and SLNB procedures were performed to 33% (n=35). The mean weight of the removed breast tissue was 1043±530 (210-3,200) g. The mean body weight of the patients was 71.6±13.3 (46-131) kg, and the mean height was 160±6 (140-172) cm. The mean BMI of the patients was 28±5.2, and the mean day of drainage was 8.45±2.7 days. Metastatic axillary lymph node (MLN) was found in only 47% (n=51) of the patients. The mean total number of lymph nodes removed was 12±8 (0-32) and the mean number of metastatic lymph nodes was 4.6±2.8 (1-31). In the non-parametric analyses, drain removal time differed significantly depending on the type of surgical procedure and axillary lymph involvement (p=0.00). The time of drain removal was longer in patients who underwent MRM and those with axillary lymphatic involvement.

In the correlation analysis conducted, there was a significant relationship between the time of drain removal and breast weight (p=0.00), BMI (p=0.004), MLN (p=0.04), and total lymph node (TLN) counts (p=0.00).

DISCUSSION

Our study examined the relationship between drain removal time and breast weight and other clinicopathological variables in patients who underwent a mastectomy. Thus, we aimed to have a prediction

about the duration of the postoperative drain removal. In our study, we found that the postoperative drain removal day was associated with breast weight. This relationship also existed between BMI, TLN, and MLN numbers. The MRM group had significantly longer drain removal times than the other group. These periods were longer in women with axillary involvement. The results we obtained were in line with the literature studies.

Uslukaya et al. found that the time of drain removal was associated with the size of the breast tissue removed, the number of lymph nodes removed, and NAC history. They extrapolated that the drainage policy should be personalized to prevent seroma formation.[11] In our study, the analysis was not performed due to the small number of patients who received NAC.

Kuroi et al. examined dozens of factors affecting drain removal times in meta-analysis, including 51 randomized controlled trials, 7 prospective studies, and 7 retrospective studies. Even though several factors associated with seroma formation were mentioned, others except SLNB did not contain strong evidence.[12] In the literature, many studies obtained similar results.[4,13-15]

Despite current knowledge and experience, no consensus has been reached on the type of drain placed and the time of drain removal. The highest seroma incidence and drainage volumes were reported in patients who underwent MRM.[4,14,15] It has been reported that single drain to be placed pressure of suction drain and the type of drain do not affect the amount and duration of drainage, postoperative complications.[16-18] However, it is recommended that the mediolateral (pectoral-axillary) low-pressure suction drain should be removed on the 2nd or 3rd day, or when the amount of fluid drained decreases below 50 milliliters in the last 24 hours.[19] In routine practice, we adopt one drain in the axilla and breast lodge in patients who undergo MRM and a single drain in patients with mastectomy and SLNB. In general, we use drains made of silicone connected to a low-pressure minivac system. We remove the drains when the total daily drainage amount decreases below 20 ccs. The type of drainage tube to be used does not affect the drainage time, and it was reported that the use of closed simple drains could be preferred to suction drains as it will save costs.[10,20]

It was reported that the number of drains used after mastectomy does not affect the rate or amount of seroma, but the use of a single drain is associated with less discomfort and shorter postoperative hospital stay.[21] In our routine practice, we prefer to discharge patients whose drainage amount does not decrease with their drains and manage the process with control visits.

A study conducted on 573 patients reported that not placing drains did not affect the revision rate due to complications, neither in the breast-conserving surgery group nor in the mastectomy group.[22]

Despite all the studies conducted in the literature, surgeons have not reached a consensus on drain policy yet. Surgeons still seem far from this idea, although there are surgeons adopting no-drainage strategies.[7] Routines based on more experience are adopted in current surgical practice.

CONCLUSION

As the literature review contains no arguments for or against the standard placement of drains, we recommend a personalized approach adapted to individual risk. We should determine this approach by considering the procedure to be applied to the patient, the level of the disease, and the individual parameters of the patient.

In conclusion, despite contradictory studies, the need for prospective randomized studies continues to achieve a common consensus.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Şeref Dokcu, Aydan Eroğlu, Mehmet Ali Çaparlar, Özhan Çetindağ;* ***Design:*** *Şeref Dokcu, Aydan Eroğlu, Mehmet Ali Çaparlar, Özhan Çetindağ;* ***Control/Supervision:*** *Aydan Eroğlu;* ***Data Collection and/or Processing:*** *Mehmet Ali Çaparlar, Özhan Çetindağ, Şeref Dokcu;* ***Analysis and/or Interpretation:*** *Şeref Dokcu,Aydan Eroğlu;* ***Literature Review:*** *Mehmet Ali Çaparlar, Özhan Çetindağ;* ***Writing the Article:*** *Şeref Dokcu;* ***Critical Review:*** *Şeref Dokcu, Aydan Eroğlu, Mehmet Ali Çaparlar, Özhan Çetindağ;* ***References and Fundings:*** *Şeref Dokcu, Aydan Eroğlu, Mehmet Ali Çaparlar, Özhan Çetindağ;* ***Materials:*** *Mehmet Ali Çaparlar, Özhan Çetindağ.*

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