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Association of Early Drain Removal with Formation of Seroma in Breast Cancer Patients After Modified Radical Mastectomy

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A B S T R A C T

Background: The installation of drainage after MRM surgery has been aimed at reducing seroma formation. However, when the drain should be removed has not been studied well. This study aims to determine the association of early drain removal with seroma formation. **Methods:** A nested cohort study was conducted on 40 breast cancer patients undergoing MRM surgery. Patients were divided into 2 groups; off-drain day I and day III post-surgery. Seroma formation was assessed 7 days after the patient was discharged. **Results:** Seroma formation seven days after discharge occurs in 25 of the total 40 patients (62.5%). There was no difference in seroma incidence between groups of patients on the off-drain day I and day III seven days after discharge (65% vs. 60%) (p 1,000) or the number of seromas (157.31 +120.00 ml vs. 149.58 + 110.00 ml) (p 0.437). **Conclusion:** Removing the drain faster does not reduce the incidence and number of seromas seven days after discharge.

1. Introduction

Breast cancer is cancer in the highest number of women in the world. Based on the International Agency for Research on Cancer (IARC), in 2012, new cases (incidence) of breast cancer were 43.1 per 100,000 women, with a death rate of 39 per 100,000 population. The estimated number of breast cancer in Indonesia in 2012 was 134 per 100,000 population. Breast cancer is the most common type of cancer, both in women and in the population (men and women) in Indonesia, with an estimated incidence of 40.3 per 100,000 or 48,998 cases per year. This represents 30.5% of all types of cancer in women or 16.4% of all types of cancer in men and women. This means that

there are about 6 cases of breast cancer that occur every hour in Indonesia. At Dr. M. Djamil General Hospital Padang in 2013, there were 253 breast cancer patients who came for treatment, of which 77.2% were in advanced stages (stages III and IV), and 22.8% were in early stages (stages I and II).^{1,2}

Surgery is the main modality for operable breast cancer. The various types of surgery performed include simple mastectomy, classical radical mastectomy, modified radical mastectomy (MRM), quadrantectomy, and lumpectomy. MRM is the most frequently performed surgical procedure among other surgical modalities.³

One of the post-mastectomy complications is the accumulation of a seroma. Seroma is a collection of serous fluid under the flap or in the axillary area that fills the dead space after a mastectomy.⁴ Many surgeons say the formation of a seroma is the most difficult to prevent than other complications. A lot of seroma accumulation will cause discomfort to the patient and pain due to repeated suctioning.⁵

Several methods are used to reduce the formation of seroma. One of them is drainage.⁵ Postoperative drainage is performed to drain the fluid that has formed in the interstitial space. With this, it is expected that fluid accumulation and seroma formation can be reduced. Immediately after, the MRM drain will be installed to reduce seroma, either in the form of a suction drain or a passive drain. On the other hand, the drain device itself is a foreign object that can stimulate the further inflammatory process and produce exudate, so a drain that is installed for too long can increase the production of seroma and cause discomfort and pain to the patient and prolong the treatment period.⁶

Until now when the optimal time to remove the drain is still controversial. However, there is a tendency for surgeons to remove the drain immediately after mastectomy. This is based on several studies that compared early and late draining, where it was proven that the time of draining had no effect on seroma formation.^{7,8} Study by Vos H et al. (2018) found that there was no difference in seroma formation between early draining (4-5 days postoperative) and late draining, but on the other hand, it could improve the patient's quality of life and did not have a negative effect on clinical outcomes.⁹

There are still few studies comparing clinical outcomes within early draining time, in this case, seroma formation. A study by Pihlmann et al., 2018 found that removing the drain even a few hours after mastectomy did not cause an increase in the amount of seroma production and was beneficial in reducing patient discomfort due to drain placement.¹⁰

This study wanted to conduct research on the relationship between early draining on days I and III

with the formation of seroma in breast cancer patients after MRM surgery.

2. Methods

This research is a prospective analytic study, nested cohort, conducted at the ministry's public hospital in Padang. In this study, the sample was divided into 2 groups; the off-drain group on the day I and the off-drain group on day III. The sample of each group consisted of 20 people, so a total sample of 40 people was taken by consecutive sampling, where all subjects who came and met the selection criteria were included in the study until the required number of subjects was met. The study has been approved by the ethical committee of General Hospital M Djamil Padang, Indonesia (No.415/KEPK/2020). Patients who had been diagnosed with histopathologically breast cancer underwent Radical Modified Mastectomy surgery and agreed to be research subjects were included as samples. Patients with comorbidities (diabetes mellitus, hypertension, morbid obesity) were excluded. The presence of seroma accumulation is measured when the patient comes for the first control after being discharged on day 7 after the operation. This is based on a policy of public health insurance that the patient is permitted to control after being discharged on day 7. The presence of seroma was evaluated by physical examination, and the accumulation was measured after aspiration using a disposable syringe.

Data analysis is done with the help of SPSS software version 25. Univariate analysis is performed to obtain the frequency distribution of each test variable. Bivariate analysis is performed to compare test variables, with $p < 0.05$ values.

3. Results

The characteristics of the samples can be seen in table 1. There is no difference in characteristics between both groups statistically. The association of early drain removal with the incidence of seroma formation can be seen in table 2. The association of early drain removal with the volume of seroma

accumulation can be seen in table 3. The formation of seroma was relatively equal either in incidence and also in the volume of seroma accumulation between

the two groups. There is no significant association between the two groups statistically.

Table 1. Characteristics of sample

Variable	Off-drain group		p-value
	The day I (n=20)	Day III (n=20)	
Age (year), mean±SD	47,55±7,36	46,95±7,79	0,804 ^a
Education, f(%)			
Elementary School	2 (10,0)	2 (10,0)	
Junior High School	0	1 (5,0)	0,783 ^b
Senior High School	11 (55,0)	11 (55,0)	
University	7 (35,0)	6 (30,0)	
Job, f(%)			
Public servant	7 (35,0)	6 (30,0)	
Private worker	1 (5,0)	5 (25,0)	0,365 ^b
Housewives	11 (55,0)	9 (45,0)	
Farmer	1 (5,0)	0	
Body mass index	23,61±2,37	24,19±1,28	0,344 ^a
Cancer Stadium			
I	1 (5,0)	1 (5,0)	
IIa	5 (25,0)	1 (5,0)	0,916 ^b
IIb	6 (30,0)	8 (40,0)	
IIIa	8 (40,0)	10 (50,0)	
Histopathology			
Invasive NST	15 (75,0)	16 (80,0)	0,744 ^b
Invasive Ductal	1 (5,0)	1 (5,0)	
Invasive Lobular	4 (20,0)	3 (15,0)	

*p<0,05, significant ^a, Independent Sample T-Test, ^b, chi-square test

Table 2. Association of early drain removal with the incidence of seroma formation 7 days after Modified Radical Mastectomy

Off-drain	Seroma		Total	p-value
	Not occurred (f/%)	occurred (f/%)		
Day I	7 (35,0)	13 (65,0)	20 (100,0)	1,000 ^b
Day III	8 (40,0)	12 (60,0)	20 (100,0)	
Total	15 (37,5)	25 (62,5)	40 (100,0)	

*p<0,05, significant ^b, chi-square test

Table 3. The difference in seroma volume between the off-drain group on day 1 and the off-drain group on day 3, measured 7 days after surgery

Seroma Volume	Mean	Median	Min	Max	P-value
Off-drain day I (n=13)	157,31	120,00	80	400	0,437 ^c
Off-drain day III (n=12)	149,58	110,00	60	400	

p < 0,05, significant. ^c Mann-Whitney test

4. Discussion

In this study, the incidence of seroma in all breast cancer patients after MRM surgery that was removed early was 62.5%. Where the incidence of seroma was higher in the day, I drain group (65%) compared to the postoperative day III drain group (60%). However, there was no significant difference in the incidence of seroma between the two groups.

This result is lower if compared to the study of Porter et al. (1998), who found a seroma incidence rate of 73.75%.¹¹ Okada et al. (2013) found that the incidence of seroma in early drain removal was lower than the results of this study, which was 42.8%.¹² Meanwhile, Yii et al. (1995) also found a lower incidence of seroma in early drains.¹³ The difference in the results of this study may be due to differences in sample characteristics, the use of certain surgical instruments during surgery, and differences in the definition of seroma used.

This study compared the incidence of seroma between off-drain day I and off-drain on day III. Both were early timing of drain removal after MRM surgery. There are still few studies comparing the incidence of seroma in the same period classified with early drain removal. There is one study that compares this, namely the research of Philmann et al. (2018). This study found that the incidence of seroma was the same between the 4-6 hour drain group and the 1-day postoperative drain group, even with the MRM group without drain.¹⁰

Studies comparing early draining with late draining and/or volume-based have shown that early draining is not associated with a seroma. Research by Peeters

et al. (2005), who compared the incidence of seroma in the early (day 1) and late drain (day 5-7) patient groups, obtained similar results where there was no significant difference in the incidence of seroma in the two groups.¹⁴ Research by Yii et al. (1995) also found there was no difference in the incidence of seroma between early and late drain removal.¹³ This suggests that early drain removal is not associated with a higher seroma incidence.

This study showed more seroma fluid aspirated in the off-drain group on the day I than the off-drain group on day III postoperatively but not statistically significant. This is similar to the study of Peeters et al. (2005), who found the mean volume of seroma aspiration in patients with early drain removal (day I) of 213 ± 116 cc compared to late drain removal of 186 ± 100 cc, which was not statistically significant.¹⁴ Parikh et al. (1992) found that the mean volume of seroma aspiration in patients with early drain removal was also not significantly different from that in late drain removal patients. This suggests that early drain removal after MRM surgery is not associated with a higher number of seroma aspirates among patients with seroma.¹⁵

This study has limitations that it did not monitor the number of times aspiration was needed and the total number of seromas formed until the seroma disappeared. However, the assessment of the incidence of seroma obtained is important in assessing the relationship between drain discharge and the incidence of seroma formation.

5. Conclusion

Early drain removal after MRM is not associated with the incidence and accumulation of seroma. Removing the drain early can be considered to reduce the symptoms felt by breast cancer patients related to the installation of drains after MRM surgery.

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