

## **Comparison of the Effectiveness of Full Negative Pressure with Half Negative Pressure on Suction Drain in Reducing Post-Modified Radical Mastectomy Seroma**

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### **Abstract**

**Introduction:** Modified radical mastectomy (MRM) is a breast cancer treatment option that is still operable. One of the postoperative complications that can be found is the formation of seroma. High negative suction drain is done to treat seroma after surgery but it can contribute to increase the length of stay in hospital.

**Methods:** This study was a clinical randomized control trial (cRCT) conducted on 30 breast cancer patients in June - July 2019 at Moehammad Hoesin Hospital in Palembang. This study divided the two sample groups, each group consisting of 15 patients. One group was given half negative pressure on suction drain (experimental group) and the other used full negative pressure on suction drain (control group).

**Results:** There was a significant difference ( $p < 0.005$ ) between the full and half negative pressure groups where there were more seroma events in the full vacuum group in 9 (60%) cases and half vacuum in 2 (30%) but there were no significant differences in long period of stay ( $p > 0.005$ ).

**Conclusion:** Half negative pressure is more effective in treating seroma than full negative pressure.

**Keywords:** suction drain, half negative pressure, full negative pressure, post radical mastectomy seroma

## **Introduction**

In 2018 breast cancer became one of the diseases with the most common malignancy in women recorded by WHO as many as 2.088 million cases (11.6% of all malignancies) with an incidence rate of 46.3 cases per 100,000 women with 13.0 deaths per 100,000 women throughout the world. The number of breast cancer cases in Asia is 911,014 cases with a mortality rate of 310.577 cases.<sup>1</sup>

Surgery is the first choice therapy for breast malignancies, and modified radical mastectomy (MRM) is a breast cancer treatment option that is still operable. One of the post-operative complications that can be found is the formation of seroma.<sup>1-3</sup> After the mastectomy, seroma is the most common problem. Seroma is defined as serous fluid that forms after surgery, which collects under the skin flap to fill dead space causing the skin flap to not stick to the chest wall, which increases the length of stay and increases the cost of treatment. Repeated suctioning will make the patient feel uncomfortable.<sup>2,4-6</sup>

Of the several factors that influence the amount of drainage fluid, the high negative suction pressure drain applied to the drain is reported to give significant results. Drain with high negative pressure is expected to release the accumulated fluid and reduce dead space, but this drain also causes obstruction of the injured lymph vessels to close and causes an increase in the amount of fluid that comes out of the wound.<sup>7</sup>

Van Heurn LW et al. Stated that full negative pressure drain has an advantage in the sense of draining more seromas thus providing an opportunity for the axilla wall to attach to the Thorax wall. However, in the study of Chintamani et al., The fact that the drainage with full negative pressure causes the use of a longer drain, which might explain the hypothesis that a full negative pressure drain can cause the lymph vessels not to close. Therefore the use of drain without negative pressure and those using full negative pressure both contribute to the same result, namely the high incidence of seroma formation and hospitalization in long hospitals. This study aimed to assess the comparison of the effectiveness of full negative pressure with half negative pressure on suction drain against the prevention of post-modified radical mastectomy seroma in surgical ward of Dr. Mohammad Hoesin Hospital Palembang.

## Methods

This research was a clinical randomized control trial (cRCT) conducted on 30 breast cancer patients in June - July 2019 at Moehammad Hoesin Hospital, Palembang. This study divided the two sample groups, each group consisting of 15 patients. One group was given half negative pressure on suction drain (experimental group) and the other used full negative pressure on suction drain (Control group).

## Results

Overall the mean age of patients was 47.8 years  $\pm$  8.6 with details of mean 47.5 years  $\pm$  8.7 in the half vacuum group and mean 48.0 years  $\pm$  8.8 years in the full vacuum group (can be seen in Table 1) and the nutritional status of most patients was normal (53.3%) with average BMI of 23.9. Most (86.7%) sufferers had a history of using hormonal birth control methods, and 86.7% had given birth. There were 7 patients (23.3%) who had a family history of Ca mammae, while 23 (76.7%) patients did not know or did not have a family with a history of breast cancer.

Table 1. Sample Characteristics

Characteristic		Half Pressure (n=15)		Full Pressure (n=15)		*p
		N	%	N	%	
<b>Ca Location</b>	Left	7	43.8	9	56.2	0.464
	Right	8	57.1	6	42.9	
<b>IMT</b>	Underweight	4	100	0	0	0.145
	Normoweight	6	37.5	10	62.5	
	Overweight	3	60.0	2	40.0	
	obesity	2	40.0	3	60.0	
<b>Pathology anatomy assessment</b>	IDCM	10	52.6	9	47.4	0.676
	ILCM	1	33.3	2	66.7	
	NST	3	42.9	4	57.1	
	DCIS	1	100.0	0	0.0	
<b>Grading Histopathology</b>	2	4	44.4	5	56.6	0.881
	3	7	50.0	7	50.0	
	Gx	4	57.1	3	42.9	
<b>Contraception</b>	Yes	14	53.8	12	46.2	0.283
	No	1	25.0	3	75.0	
<b>Birth History</b>	Yes	14	53.8	12	46.2	0.283
	No	1	25.0	3	75.0	
<b>Family History of Cancer</b>	Yes	4	57.1	3	42.9	0.666
	No	11	47.8	12	52.2	
Characteristic	Half Pressure (n=15)		Full Pressure (n=15)		**P	
	X $\pm$ SD	Median (min-max)	X $\pm$ SD	Median (min-max)		
<b>Age</b>	47.53 $\pm$ 8.7	47(35-66)	48.0 $\pm$ 8.8	48 (35-64)	0.835	

<b>IMT</b>	23.2 ± 4.8	23.6(18.0–33.4)	24.6 ± 4.6	23.5(18.6-34.0)	0.319
<b>Tumor weight (gr)</b>	660.6±206.4	695.5(270-1180)	731.2 ± 224.7	740(305-1180)	0.245
<b>Tumor volume (ml)</b>	701.3±208.3	680(290 – 1230)	772.6 ± 224.9	780 (380 - 1250)	0.000
<b>Tumor large</b>	295 ± 98	285 (78 -540)	343 ± 123	314(152-550)	0.351
<b>Length of drain (day)</b>	4.2±1.5	4 (3 – 8)	4.5 ± 1.5	4(3-7)	0.570
<b>***Σ GL</b>	5.4±3	5 (1 – 10)	5.7 ± 1.5	5(3 – 9)	0.660
<b>Drain total</b>	392 ± 157	340 (165 – 650)	610 ± 200	515(165 - 1150)	0.007

\* Categorical data are presented with N (%), chi square analysis, p value is significant if p <0.05

\*\* Normally distributed data is presented with mean ± standard deviation, abnormally distributed data will be presented with a median (min-max), normality data analysis using the Saphiro Wilk test, p values are normally distributed if p> 0.005

\*\*\* GL = gland lymph

Table 1 also shows that 16 patients (53.3%) were located in the left breast. Most stadiums were stadium 3B with 14 patients (46.7%) and stadium 3A with 8 patients (26.7%). Histopathologically the most common case was breast cancer of the intraductal type (IDCM), with 19 patients (63.3%) followed by NST types (23.3%). Tumors operated on average had a mean weight of 695.5 Gram ± 215.0, with an average mean volume of 737 ml ± 216. The mean cross-sectional area of the tumor was 319 cm<sup>2</sup> ± 112.

**Table 2. The relationship between vacuum pressure and Seroma**

Vacuum Pressure	With seroma		No seroma		Total		p*
	n	%	n	%	n	%	
Experimental group	3	20.0	12	80.0	15	100	0.025
Control group	9	60.0	6	40.0	15	100	
Total	12	40.0	18	60.0	30	100	

\* Categorical data are presented with N (%), chi-square test, meaningful if p <0.05

In Table 2 seroma cases were found in 12 cases (40.0%) seromas, while in 18 (60%) cases there were no seromas. In the group with half vacuum pressure found 3 cases of seroma (20.0%), while in the group with full vacuum pressure found 9 cases (60.0%) seroma. There was a significant difference in the occurrence of seroma between the two groups (p = 0.025).

**Table 3. Relationship Between Vacuum Pressure with total fluid drainage volume and length of stay**

Group (N=30)	X	SD	Median	Min	Max	P*
Total volume of drain fluid						
Experimental group	392	157.478	340	165	650	0.007
Control Group	610	200.392	550	360	1150	
Lama Rawat						
Experimental Group	5.73	1.534	5.00	4	9	0.321
Control Group	6.20	1.373	6.00	5	8	

\*Mann-Whitney test, significant if  $p < 0.05$

The length of stay in the half-vacuum group was 5 days (minimum 4 days - maximum 9 days), while for the group with full vacuum pressure the length of stay was 5 days (min.5 days, max. 8 days). In the Mann-Whitney test there were no significant differences in the length of stay between the two groups ( $p = 0.321$ ).

## Discussion

This study is in line with the 2015 Singhal et al. Study found that the proportion of seroma events after surgery between full negative pressure and half pressure was compared to 2:1.<sup>8</sup> A study by Troos et al in 2005 found cases of seroma after surgery by 44 cases (84.6%) in the group without vacuum and 40 cases (90.9%) in the group using vacuum.<sup>9</sup>

Seroma is a collection of fluid in the subcutaneous which occurs after mastectomy which can occur immediately or in the first few weeks after surgery with an incidence varying from 15-81% . To remove this fluid, a drain hose is installed during surgery and is generally removed after a small amount of discharge (less than 30 cc) is usually within 3-5 days after surgery.<sup>7</sup>

Most seromas are detected only if the seroma is large enough to cause discomfort for the patient and the presence of fluid pockets around the surgical wound or under the armpits that are palpated by the patient so that it requires aspiration with a needle. The process by which seroma can form is still uncertain. Some literature explains that seromas are formed by a combination of the inflammatory response from surgery and the occurrence of lymphatic channel transection in the axillary fossa.<sup>8</sup>

The total volume of liquid collected in the half vacuum group has a median of 340 cc (minimum 340 ccl, maximum 650 cc). While in the group with full vacuum pressure the amount of fluid collected was a median of 550 cc (minimum 360, maximum 1150 cc). this is almost the same as the study which found the total liquid collected in full vacuum with a median

of 590 cc (minimum 200 maximum 3170) and half vacuum had a median of 340 cc (minimum 340 - minimum 920).<sup>9</sup> Other studies also found almost similar where total The liquid collects at full vacuum with a mean of  $525 \pm SD 66,282$  and at half vacuum  $325 \pm SD 39,612$ .<sup>10-15</sup>

The length of stay in the half-vacuum group was 5 days (minimum 4 days - maximum 9 days), while for the group with full vacuum pressure the length of stay was 5 days (min.5 days, max. 8 days). There was no significant difference between the length of stay in the half vacuum and full pressure groups in this study. Several other studies found different things, the half vacuum group had a faster and more effective treatment.<sup>16-20</sup>

## **Conclusion**

Negative vacuum pressure of half is more effective in reducing the incidence of seroma with a significant difference ( $p < 0.05$ ).

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