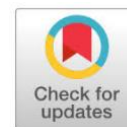


# Massage with methoxy method increasing breast milk production in post-cesarean section mothers



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## ABSTRACT

The mortality of infants can be affected by the nutritional status caused by infection. To avoid the risk of death and illness, breastfeeding is very important. The most important factor for breastfeeding is smooth milk production. Massage with the methoxy method can increase milk production based on baby weight indicators. The study aims to prove the effectiveness of massage using the methoxy method to increase milk production in post-cesarean section mothers. This study used a quasi-experiment with a non-randomized pretest-posttest control group design. The samples were 54 mothers with the post-cesarean section who were divided into 3 groups (the methoxy massage method, the marmet massage technique, and the control group were given breast care). The baby's weight was measured before and after intervention (day 7, day 14, and day 21). The data were analyzed using Repeated ANOVA, Friedman, Kruskal-Wallis dan Mann Whitney. The result showed that there was a difference in increasing breast milk production between the group with methoxy method massage and the marmet technique ( $p=0.001$ ). The conclusion was massage with the methoxy method is more effective as its effect of 1.4 compared to the marmet technique in increasing breast milk production in post-cesarean section mothers.

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## INTRODUCTION

The postpartum period or puerperium period is the time when the baby and the placenta have been born out of the uterus for up to six weeks. In the first month after delivery, there is often a risk of maternal and infant mortality. Infant mortality can be influenced by the nutritional status of infants whose impact on growth, the most common cause is infection. Infectious diseases will cause the baby to have no appetite which will affect growth. To avoid the risk of illness and death, health care during the postpartum period is needed by both mother and baby. Mothers play an important role for babies during the puerperium. One of them is breastfeeding which can be useful for starting the baby's life well. The most important factor that can be met so that the breastfeeding process can run normally is smooth milk production. However, only 48-59 percent of mothers who had just given birth

were given knowledge about danger signs and counseling about the importance of breastfeeding.(1)(2)

The coverage of breastfeeding for infants aged 0-5 months in Indonesia is 37.3%, while the coverage of breastfeeding in Central Java Province is 31%.(3) The government has established a national policy regarding the exclusive breastfeeding program contained in the Indonesian Government Regulation number 33 in the year 2012.(4) The 2015-2019 Strategic Plan target is 50% exclusive breastfeeding coverage in 2019.(2) According to the 2018 Indonesia Health Profile, the national exclusive breastfeeding coverage is 68.74%.(5) According to the 2019 Central Java Health Profile, the percentage of exclusive breastfeeding in Central Java is 66%, there was an increase compared to 2018. However, the percentage of exclusive breastfeeding in Semarang Regency is 55.4%, These data put Semarang Regency in 29th place out of a total of 35 regencies/cities in Central Java. (6) From the results of these data, it is necessary to socialize breastfeeding for mothers to continue to exclusively breastfeed their babies until they are 6 months old without being given other additional foods.

According to the results of research conducted by Kim, in Indonesia showed that 38% of mothers stopped breastfeeding their babies due to a lack of milk production. (7) One of the reasons for the failure to breastfeed is caused by babies born by cesarean section because of the shorter duration of Early Initiation of Breastfeeding and longer early mobilization than normal delivery. (8) Several studies state that section Caesarea will inhibit the formation of milk production. Production of breast milk in normal postpartum mothers is smoother when compared to post-section Caesarea mothers. Based on the World Health Organization (WHO), the incidence of section Caesarea is 5% - 15%. The average incidence of section Caesarea in the world is 6% - 27% where the highest incidence is in Latin America and the Caribbean with a rate of 40.5%, followed by North America at 32.3%, Oceania at 31.1%, Europe at 25%, Asia by 19.2%, and Africa by 7.3%. (9) In Indonesia, the prevalence of section Caesarea is 17.6%, and in Central Java, it is 17.1%. (3)

In a previous study, it was stated that the average time to express breast milk in the normal delivery group was  $1.97 \pm 2.68$  hours, while the average time to express breast milk in the section cesarean delivery group was  $10.85 \pm 7.68$  hours. Therefore, the timing of normal postpartum breast milk expression is faster than section cesarean delivery. (10)(11) Pharmacological therapy that can be given to increase breast milk production is by giving drugs, while safe non-pharmacological therapies are given such as massage, acupressure, therapeutic touch, healing touch, and mind-body healing. (12) The difference is in previous studies, the respondents were mothers with normal postpartum, while in this study the respondents were mothers with post-section Caesarea.

The hormone that affects milk production is prolactin, which increases due to the release of estrogen and progesterone after the placenta is born and the reduced function of the corpus luteum. The prolactin hormone can be released due to stimulation with massage, which is a combination of the marmet technique with oxytocin massage, which is called the methoxy method. Massage with the methoxy method is a method that can increase the hormone prolactin and milk production by using the technique of massaging and expressing the breasts by hand combined with massage of the spine area. (13) Based on the results of exclusive breastfeeding in Central Java, which is still below the national standard, due to a lack of milk production, this study will provide an intervention using massage with the methoxy method for post-section Caesarea mothers for 21 days. Furthermore, it will be assessed the effectiveness of massage intervention with the methoxy method in increasing milk production is measured by the increase in baby weight.

## METHOD

The design of this research used a quasi-experimental research design with a pre and post-test control group approach. This research was conducted at the Ungaran Hospital, Semarang Regency in April-May 2021 after getting ethical clearance. This study was into

three groups, consisting of the first intervention group being given massage treatment with the methoxy method, the second intervention group being given massage treatment using the marmet technique, and the control group being given postpartum breast care.

The sample in this study was 54 respondents for the three groups. Each group consists of 18 respondents. Samples that meet the inclusion and exclusion criteria were selected using a systematic sampling method. The inclusion criteria are postpartum mothers with post-section Caesarea on day 1 to day 21, the mother does not have breast abnormalities (such as flat nipples), has Hb level > 11 g/dL, has an upper arm circumference > 23.5 cm, does not experience complications or other conditions that make it impossible to breastfeed their babies (such as mothers who are receiving treatment for HIV, TB, and cancer), does not consume alcohol, does not smoke, maternal EPDS score < 12, normal birth weight of the baby (>2500 grams), babies born at term (37-42 weeks), and the baby's sucking reflex is good. The exclusion criteria are mothers who take breast milk booster supplements, babies who are not exclusively breastfed, the baby who has a cleft lip, and baby with a short tongue. The first intervention group was given massage using the methoxy method, the second intervention group was given massage using the marmet technique, and the control group was given breast care. Researchers measured baby weight using a baby scale that has been calibrated before the intervention on day 1 and after intervention on day 7, day 14, and day 21.

## RESULTS

**Table 1. Characteristics of respondents post section Caesarea in Ungaran Hospital**

Variable	Methoxy Intervention			Marmet Intervention			Control			P-value <sup>a</sup>
	n	%	Mean±SD	n	%	Mean±SD	N	%	Mean±SD	
<b>Education</b>										
Basic	0	0		2	11.1		0	0		0.090
Middle	12	66.7		14	77.8		14	77.8		
College	6	33.3		2	11.1		4	22.2		
<b>Parity</b>										
Primipara	10	55.6		5	27.8		7	38.9		0.116
Multipara	8	44.4		13	72.2		11	61.1		
<b>Age</b>										
20-35 years old	17	94.4	29.1±4.3	16	88.9	30.8±4.4	15	83.3	31.8±3.9	0.755
> 35 years old	1	5.6		2	11.1		3	16.7		
<b>Breastfeeding Frequency</b>										
			226.3±8.3			226.2±5.1			225.1±5.6	0.257
<b>Food Recall 24 hours</b>										
Calories			1790.7±84.0			1454.8±99.1			1581.8±141.4	0.519
Protein			67.4±5.5			59.2±5.4			60.3±4.7	
Water			1406.6±67.1			1375.0±98.6			1383.3±82.5	

<sup>a</sup> Levene's

Table 1. shows that statistically, the characteristics of respondents which include education, parity, age, frequency of breastfeeding, and intake of calories, protein, and water per 24 hours from the three groups are homogeneous because the p-value shows the number > 0.05.

**Table 2. Normality of data on increasing breast milk production with indicators of baby weight in post-section Caesarea mothers at Ungaran Hospital**

Variable	Intervention	Group	p-value
Increased Breast Milk Production with Baby Weight Indicator	Before intervention (1st day)	Methoxy Intervention	0.094
		Marmet Intervention	0.022
		Control	0.031
After intervention	7th day	Methoxy Intervention	0.138
		Marmet Intervention	0.020
		Control	0.053
	day 14	Methoxy Intervention	0.154
		Marmet Intervention	0.023
		Control	0.026

Variable	Intervention	Group	p-value
	After intervention	Methoxy Intervention	0.095
	day 21	Marmet Intervention	0.044
		Control	0.031

<sup>c</sup> *Shapiro Wilk*

Table 2. explains that the results of statistical tests on the variable of increasing breast milk production with indicators of baby weight have data that are normally distributed in the methoxy intervention group and the control group on the intervention after day 7, while the other groups have data that are not normally distributed with a p-value < 0.05.

The average increase in breast milk production with indicators of baby weight in post-section caesarean mothers in the intervention and control groups can be seen in the following graph:

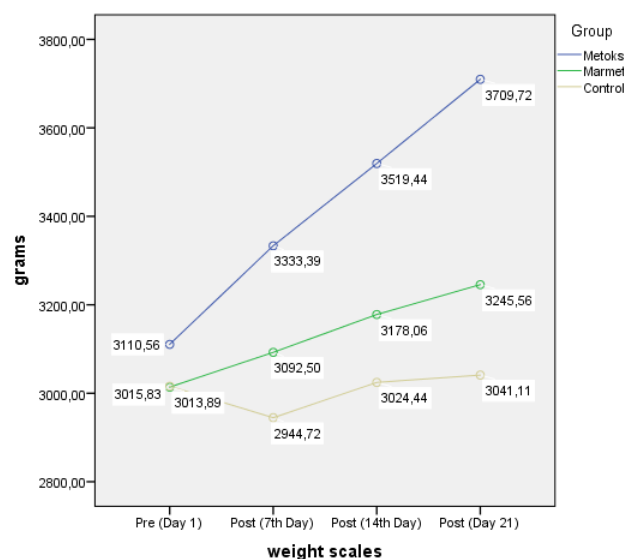


Figure 1. Graph of the average increase in breast milk production with indicators of baby weight in post-section Caesarea mothers at Ungaran Hospital

**Table 3. Differences in the increase of breast milk production between groups based on indicators of baby weight in post-section Caesarea mothers at Ungaran Hospital**

	Group						p <sup>c</sup>
	Methoxy Intervention		Marmet Intervention		Control		
	Mean±SD	Min-Max	Mean±SD	Min-Max	Mean±SD	Min-Max	
Pre (Day 1)	3110.5±512.0	2510-4050	3013.8±406.6	2510-3915	3015.8±311.1	2615-3630	0.866
Post 1 (7th Day)	3333.3±501.5	2710-4250	3092.5±378.3	2615-3930	2944.7±289.6	2595-3615	0.080
Post 2 (14th Day)	3519.4±481.1	2910-4410	3178.0±344.5	2755-3950	3024.4±312.1	2620-3630	0.002
Post 3 (Day 21)	3709.7±489.2	3130-4625	3245.5±327.9	2810-3980	3041.1±311.7	2635-3650	0.001
p	0.001 <sup>e</sup>		0.001 <sup>e</sup>		0.001 <sup>e</sup>		

<sup>c</sup> *Kruskal Wallis*; <sup>d</sup> *Repeated ANOVA*; <sup>e</sup> *Friedman*

Table 3. shows that before the intervention (day 1) there was no difference in breast milk production in the three groups, this is evidenced by the results of the Kruskal Wallis statistical test with a p-value of 0.866 (> 0.05). Likewise, when the intervention was given until day 7, breast milk production also did not experience a significant difference with p-

value = 0.080. Meanwhile, breast milk production on day 14 and day 21 after the intervention had a significant difference with p-values of 0.002 and 0.001.

The results of statistical tests for each group, the methoxy intervention group, the marmet intervention group, and the control group experienced an increase in breast milk production based on the baby weight significantly with p-value = 0.001.

**Table 4. Post Hoc test on increasing breast milk production based on indicators of baby weight on the 1st, 7th, 14th, and 21st days of post-section Caesarea**

Group	Variable	Average Difference	p
Methoxy Intervention	1st day BB vs 7th day BB	222.8	0.001 <sup>f</sup>
	7th day BB vs 14th day BB	186.1	0.001 <sup>f</sup>
	14th day BB vs 21st day BB	190.3	0.001 <sup>f</sup>
Marmet Intervention	1st day BB vs 21st day BB	599.2	0.001 <sup>f</sup>
	1st day BB vs 7th day BB	78.7	0.001 <sup>g</sup>
	7th day BB vs 14th day BB	85.5	0.001 <sup>g</sup>
Control	14th day BB vs 21st day BB	67.5	0.001 <sup>g</sup>
	1st day BB vs 21st day BB	231.7	0.001 <sup>g</sup>
	1st day BB vs 7th day BB	71.1	0.001 <sup>g</sup>
Control	7th day BB vs 14th day BB	79.7	0.001 <sup>g</sup>
	14th day BB vs 21st day BB	16.7	0.001 <sup>g</sup>
	1st day BB vs 21st day BB	25.3	0.001 <sup>g</sup>

<sup>f</sup>Pairwise comparison (Bonferroni); <sup>g</sup>Wilcoxon

Based on the data from statistical analysis as shown in Table 4. shows that in the methoxy group, marmet group, and control group there is a difference in baby weight between before (day 1) and after the intervention on the 7th day, the 14th day, and day 1. - 21 with a ratio of p=0.001.

**Table 5. Post Hoc test on Differences in breast milk production in the intervention group and the control group**

Group	Variable	Mean±SD	Delta (Δ)	p value <sup>h</sup>	Effect Size <sup>i</sup>
Methoxy Intervention	BB Pre (Day 1)	3110.5±512.0	599.2±95.6	0.001	1.4
	BB Post (Day 21)	3709.7±489.2			
Marmet Intervention	BB Pre (Day 1)	3013.8±406.6	231.7±106.6	0.043	
	BB Post (Day 21)	3245.5±327.9			
Control	BB Pre (Day 1)	3015.8±311.1	25.3±0.6		
	BB Post (Day 21)	3041.1±311.7			
Methoxy Intervention	BB Pre (Day 1)	3110.5±512.0	599.2±95.6	0.001	
	BB Post (Day 21)	3709.7±489.2			
Control	BB Pre (Day 1)	3015.8±311.1	25.3±0.6		
	BB Post (Day 21)	3041.1±311.7			

<sup>h</sup>Mann Whitney <sup>i</sup>Cohen's

Based on Table 5. it can be concluded that the difference in the mean increase in breast milk production in the methoxy intervention group had a higher average increase in breast milk production, namely 599.2 compared to the marmet intervention group and the control group, namely 231.7 and 25.3, this was significantly different. The intervention group with the methoxy method was proven to be statistically effective because it exceeded the increase in breast milk production in 21 days.

The effect size of massage with the methoxy method compared to massage with the marmet technique is 1.4, which means that the methoxy massage method has a large effect.

**Table 6. Comparison of breast milk production with indicators of baby weight between the control group and the methoxy intervention group**

Group	Less milk production		Total	RR	RRR	ARR	NNT	NNH
	Yes	Not						
Control	18	0	18	0.2	0.78	0.78	1.28	0
Methoxy	4	14	18					

Based on Table 6. shows the Relative Risk (RR) value of 0.2, meaning that respondents who were given a massage using the methoxy method were 0.2 times less



likely to experience low milk production compared to the control group. Then the value of Relative Risk Reduction (RRR) is 0.78, meaning that if massage using the methoxy method is used as therapy, low milk production can be reduced by 78%. The Absolute Risk Reduction (ARR) value is 0.78, which means that if massage using the methoxy method is used as therapy, the difference in the incidence of less breast milk production between the control group and the methoxy group is 78%.

In this study, the value of the Number Needed to Treat (NTT) is 1.28, which means that it takes 2 people to be given massage therapy with the methoxy method for 21 days, to avoid 1 person experiencing less breast milk production. The Number Needed to Harm (NNH) value is 0 because there are no side effects reported by respondents who received massage using the methoxy method.

**Table 7. Comparison of breast milk production with indicators of baby weight between the control group and the intervention group marmet**

Group	Less milk production		Total	RR	RRR	ARR	NNT	NNH
	Yes	Not						
Control	18	0	18	0.4	0.56	0.56	1.8	0
Marmet	8	10	18					

Based on Table 7. shows the Relative Risk (RR) value of 0.4, meaning that respondents who were given a massage with the marmet technique were 0.4 times less likely to experience low milk production compared to the control group. Then, the value of Relative Risk Reduction (RRR) is 0.56, meaning that if massage with the marmet technique is used as therapy, low milk production can be reduced by 56%. The Absolute Risk Reduction (ARR) value is 0.56, which means that if massage using the marmet technique is used as therapy, the difference in the incidence of less breast milk production between the control group and the methoxy group is 56%.

In this study, the value of the Number Needed to Treat (NTT) is 1.8, which means that it takes 2 people to be given massage therapy with the marmet technique for 21 days, to avoid 1 person experiencing less breast milk production. The Number Needed to Harm (NNH) value is 0 because there are no side effects reported by respondents who received massage with the marmet technique.

## DISCUSSION

### The Effect of Massage with Methoxi Method to Increase Breast Milk Production Based on Baby Weight Indicators

This study was conducted to prove the effect of massage with the methoxy method in increasing breast milk production based on indicators of baby weight. The massage intervention with the methoxy method was carried out for 21 days every morning and evening, then weight gain was observed by weighing on day 1, day 7, day 14, and day 21. Based on the results of statistical analysis, it can be concluded that giving massage using the methoxy method in this study has an influence in increasing breast milk production based on indicators of baby weight in post-section Caesarea mothers.

Massage with the methoxy method is a combination of massage with marmet techniques and oxytocin massage. Oxytocin massage is a spinal massage to the fifth and sixth costal bones to the scapula, which will accelerate neurotransmitters to stimulate the medulla oblongata and send messages to the hypothalamus to stimulate the hormones prolactin and oxytocin. The hormone oxytocin is produced by the posterior pituitary gland. Once produced, the hormone oxytocin will enter the blood and then stimulate the myoepithelial cells that surround the mammary alveoli and lactiferous ducts. The contraction of myoepithelial cells pushes the milk out of the mammary alveoli through the lactiferous ducts into the lactiferous sinus and the milk will be stored.(14)(15)

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Breast massage in the marmet technique to empty breast milk in the lactiferous sinus area under the areola so that emptying breast milk will stimulate the release of the hormone prolactin. Furthermore, this prolactin hormone can stimulate the mammary alveoli to produce breast milk. (16) The more often breast milk is released, the more milk is produced. Sufficient or excessive milk production will affect the baby's weight gain. (17)

Breast milk production refers to the volume of milk secreted by the breasts. The milk that has been produced is stored in the breast milk warehouse then removed from the breast and flowed to the baby. The amount of milk secreted by the breast and taken by the baby is assumed to be the same as milk production. One indicator to assess milk production is the baby's weight.(18)(19)

This research is supported by Darmasari's research that the combination of marmet technique and oxytocin massage can increase milk production in postpartum mothers with average milk production of 1.113 cc. (20) Research conducted by Selistyaningtyas also explained that giving marmet massage and oxytocin for 3 days can increase milk production by an average of 1.167 ml.(21)

Another study conducted by Fahnawal explained that after giving a massage with a combination of marmet techniques and oxytocin massage, maternal prolactin hormone levels increased with an average difference in prolactin hormone p-value of 0.003 and breast milk production in normal postpartum mothers in the intervention group experienced an average weight gain. an average of 402.500 grams with a p-value of 0.000.(13)

#### **The Effect of Massage with Marmet Technique to Increase Breast Milk Production Based on Baby Weight Indicators**

This research was conducted to prove the effect of massage with marmet technique in increasing milk production based on indicators of baby weight. Massage intervention with the marmet technique was carried out for 21 days every morning and evening, then weight gain was observed by weighing on day 1, day 7, day 14, and day 21. Based on the results of statistical analysis, it can be concluded that giving massage with the marmet technique affects increasing breast milk production for post-section Caesarea mothers.

Massage with the marmet technique is a combination of expressing breast milk and massaging the breast which aims to empty the milk from the lactiferous sinuses which are located under the areola so that it will stimulate the release of prolactin. This prolactin release will stimulate the mammary alveoli to produce breast milk. The hormone prolactin will be stimulated so that it triggers an increase in milk production. (21) Sufficient or excessive milk production will affect the baby's weight gain. (17)

The milk produced by the breasts is then passed to the baby. The amount of milk secreted by the breast and taken by the baby is assumed to be the same as milk production. One indicator to assess milk production is the baby's weight. This study is supported by research conducted by Munthe, that post-section Caesarea mother after being given a marmet technique massage experienced smooth milk production. (22) Another study conducted by Ningrum also explained that after giving the marmet technique to postpartum mothers, the mother's milk production increased compared to mothers who were not given a massage with the marmet technique. (23) This is in line with research conducted by Norlita, who explained that giving massage with the marmet technique, was effective for breast milk production. (24)

#### **Differences in Massage with the Methoxy Method compared to the Marmet Technique to Increase Breast Milk Production based on indicators of baby's weight**

The results of this study indicate that giving massage using the methoxy method, massage using the marmet technique, and giving breast care to the control group influences increasing breast milk production as measured by indicators of baby weight in post-section Caesarea mothers. However, based on the mean results, the massage group using the methoxy method was more effective because the average difference was higher and

exceeded the increase in baby weight for 21 days compared to massage using the marmet and breast care techniques in the control group.

Massage with the methoxy method is better to use to increase the mother's milk production because there is a combination of oxytocin massage and the marmet technique. Massage with the marmet technique will empty the contents of the breast by activating the hormone prolactin which produces breast milk and the hormone oxytocin which functions to make the breasts contract so that milk can come out smoothly. Then combined with oxytocin massage, it will stimulate the hormone oxytocin to release breast milk that has been stored in the sinuses of the mother's breast. (25)

Meanwhile, if you only use one method, that is massage with the marmet technique, it will only activate the hormone prolactin to produce breast milk and the hormone oxytocin to facilitate the release of breast milk. This research is supported by research conducted by Kustriyani, that the action of oxytocin massage combined with the marmet technique can optimize the increase in postpartum mothers' milk production. (26)

In this study, the increase in breast milk production based on indicators of baby weight experienced a significant increase on day 14 and day 21 after the intervention. In this study, other factors were not controlled by the researcher, such as the mother's parity status, the way of breastfeeding, and the baby's digestive disorders. A mother's parity status is one of the factors that can affect the increase in breast milk production because primiparous mothers will experience difficulties when breastfeeding because breastfeeding is their first experience. (27)

Other factors such as how to breastfeed the mother can be a factor that affects milk production because if the breastfeeding method is wrong, it can cause breast milk damming which then does not release breast milk smoothly. (28) For Babies who are sick, such digestive disorders can also affect milk production because the baby will have difficulty digesting the milk which will result in the baby's weight not increasing.

A massage with the methoxy method is better to use than a massage with the marmet technique because when two massages are combined it will have more effect than just one massage. This study proved that breast milk production in post-section Caesarea mothers can increase after massage with the methoxy method. The effect of massage with the methoxy method in increasing breast milk production is very significant compared to massage with the marmet technique. The difference in the average increase in breast milk production in the methoxy intervention group had a higher average increase in breast milk production than the marmet intervention group, which was 599.2 versus 231.7 and this difference was significantly different. The effect of massage with the methoxy method compared to massage with the marmet technique is 1.4.

## CONCLUSION

Based on the results of the study, the effectiveness of massage using the methoxy method in increasing breast milk production for post-section Caesarea breastfeeding mothers at Ungaran Hospital, Semarang Regency can be concluded as follows: massage with the methoxy method has been shown to affect increasing mother's milk production based on indicators of baby weight, massage with the marmet technique is proven to affect increasing mother's milk production based on indicators of baby weight, and it is proven that there is a difference in the effect of massage with the methoxy method compared to massage with the marmet technique. Massage with the Methoxi Method affects the average increase in milk production based on indicators of baby weight which is higher than the Marmet technique.

Suggestions based on this study is the need for similar research to be carried out with a higher level of evidence, such as using a true experimental design or Randomized Control Trial (RCT) and controlling all variables that may affect the increase in breast milk production, such as digestive disorders in infants, maternal parity status, and breastfeeding methods.



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