



Hubungan Asupan Natrium, Keseimbangan Cairan dan Status Gizi terhadap Kejadian Sesak Nafas Berdasarkan Laju Respirasi (RR) pada Penderita Gagal Jantung Kongestif (CHF)

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Kata kunci:

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ABSTRAK

Latar Belakang : Data Riskesdas 2018, menunjukkan prevalensi penyakit jantung di Indonesia sebesar 1,5%. Gagal Jantung Kongestif (CHF) adalah ketidakmampuan jantung memompa darah untuk memenuhi kebutuhan oksigen dan zat gizi ke jaringan tubuh. Gejala CHF umumnya sesak napas. Salah satu penatalaksanaan pasien CHF adalah pengaturan pola makan dengan pembatasan asupan natrium dan cairan. **Tujuan :** Mengetahui asupan natrium, keseimbangan cairan dan status gizi terhadap sesak nafas berdasarkan *Respiration Rate* (RR) pada pasien *Congestive Heart Failure* (CHF) di Rawat Inap Poli Jantung RSUD H. Moch. Ansari Saleh Banjarmasin. **Metode :** Penelitian ini menggunakan metode analitik observasional dengan pendekatan prospektif. Sampel 12 orang penderita CHF yang dirawat di RSUD H. Moch. Ansari Saleh Banjarmasin tanggal 16 April s/d 6 Mei 2018 sesuai dengan kriteria inklusi dan eksklusi. Data dikumpulkan menggunakan formulir *food recall* 1x24 jam, asupan cairan dan Laju Respirasi, yang selanjutnya dianalisis dengan uji korelasi *rank spearman* dengan tingkat kepercayaan 95%. **Hasil :** Ada hubungan antara asupan natrium ($p=0,049$) dan keseimbangan cairan ($p=0,01$) terhadap kejadian sesak nafas berdasarkan nilai RR pasien CHF, namun tidak signifikan terhadap status gizi. **Kesimpulan :** Berdasarkan hasil penelitian, perlu adanya penyesuaian asupan natrium dan keseimbangan cairan yang berguna untuk mengurangi gejala sesak nafas pada pasien CHF.

ABSTRACT

Key word:

Congestive Heart
Failure (CHF)
Sodium Intake
Fluid Balance
Shortness of Breath

Background : Riskesdas 2018 data, the prevalence of heart disease in Indonesia is 1.5%. Congestive Heart Failure (CHF) is the inability of the heart to pump blood to meet the needs of oxygen and nutrients to the body's tissues. The most common symptom of recurrence is shortness of breath. One of the dietary managements of CHF patients is the limitation of sodium and fluid. **Objective :** determine sodium intake, fluid balance and nutritional status in the occurrence of shortness of breath based on *Respiration Rate* (RR) in Congestive Heart Failure (CHF) patients in Cardiac Hospitalization at H. Moch. Ansari Saleh Banjarmasin. **Methods :** This study was conducted through the an observational analytic with a prospective approach. The samples were 12 people with CHF who were hospitalized in RSUD H. Moch. Ansari Saleh Banjarmasin from April 16 to May 6, 2018. taken based on inclusion and exclusion criteria. The data was collected using a 1x24 hour food recall form, a liquid form and a *Respiration Rate* form. The collected data was further analyzed by using the Spearman rank correlation test with a 95% confidence level. **Result :** The study has found that there is a correlation between sodium intake ($p = 0.049$) and fluid balance ($p = 0.01$) to the occurrence of shortness of breath based on the RR value of CHF patients and not significant for nutritional status. **Conclusion :** Based on the finding, therefore, adjusting sodium intake and fluid balance is useful to reduce symptoms of shortness of breath in CHF patients.

1. Introduction

Congestive Heart Failure (CHF) is the inability of the heart to pump blood to meet the needs of oxygen and nutrients to body tissues [1]. According to data from the *World Health Statistics* (WHS) in the *World Health Organization* (WHO) in 2012 stated that of 57 million deaths from all types of diseases, 36 million of them were caused by *Non-Communicable Disease* (NCD), which is cardiovascular disease, with the number of deaths from congestive heart failure in the amount of 17 million [2]. *Riskesdas 2018 data, the prevalence of heart disease in Indonesia is 1.5%* [3].

From the report of the medical records at the H. Moch. Ansari Saleh Hospital, data on *Congestive Heart Failure* (CHF) was included in the 10 most common diseases. In January-December 2016 showed amount patients failing heart congestive hospitalization in as many as 267 patients and in mid- 2017 of January-July showed the number of patients with the heart failure many as 114 patients.

The quality and survival of people with congestive heart failure is greatly influenced by proper diagnosis and management. To carry out the proper management, assessment data is needed on patients, one of which is nutritional assessment data. Nutrition assessment is an activity of collecting, integrating and analyzing data to identify nutritional problems related to aspects of nutrient and food intake, clinical aspects and behavioral-environmental aspects and their causes. [4]

CHF patients who often return for hospitalization due to recurrence in CHF episodes are a matter to concern. One symptom of recurrence that is often experienced by CHF patients is shortness of breath or often called *dyspnea*. According to Suratinoyo, et al (2016) [5] in patients with congestive heart failure often have difficulty maintaining oxygenation so they tend to be short of breath. People with heart disease and shortness of breath often experience disorders of the heart rhythm. Sometimes the heart unwittingly races quickly. In shortness of breath breathing frequency increases above 24 times per minute.

The preliminary study conducted in the inpatient ward of Heart patients (Diamond Room and Ruby Room) H. Moch Ansari Saleh Hospital Banjarmasin on September 25, 2017 obtained from 5 CHF patients treated, 2 of them were patients who were previously within the span of 3 last month had received treatment in the same room, where the length of stay of patients is between 5-7 days. Based on the medical record status, it is known that patients coming to the hospital complained of shortness of breath that was shown with objective data of respiratory frequency above 24 times / minute [6].

Besides pharmacological therapy, non-pharmacological therapy can be done with fluid restriction, weight loss, low salt and low cholesterol diet, no smoking, exercise [7]. Sodium restriction is intended to prevent, regulate or reduce edema, and reduce shortness of breath. Many patients with heart failure only limit the salt in their food ranges from 3 grams a day or 1000-2000 milligrams of sodium. According Kasron (2012) [8], excess fluid volume due to the amount of fluid collected in the interstitial results in peripheral edema, ascites, and as a result of heart failure, the supply of oxygen in the lungs fails, causing fluid accumulation in the lungs that can reduce the exchange of O₂ and CO₂ in the lungs, this will cause *dyspnea* with rapid and shallow breathing characteristics, so it is necessary to monitor the fluid *balance*. Due to an increase of fluid in the CHF client, the fluid needs in the CHF client must be reduced from normal requirements. Fluid requirements for CHF clients are: 25 ml x kg¹⁷ BW [9]. This study aims to analyze and determine the effect of sodium intake, fluid balance and nutrition status on the incidence of shortness of breath based on the Respiration Rate (RR) in Congestive Heart Failure (CHF) patients in the Cardiac Inpatient Room of H. Moch Hospital. Ansari Saleh Banjarmasin.

2. Methods

2.1 Ethical Approval No: 175/KEPK-PKB/2018 for this research.

This type of determination is an observational analytic with a prospective approach. The population was all CHF patients who were hospitalized in the Diamond Room and Kumala Room 3rd Floor RSUD H. Moch. Ansari Saleh Hospital Banjarmasin from April 16 to May 6, 2018. Samples were 12 people taken with saturated sampling based on inclusion and exclusion criteria. The method of collecting data uses a 1x24 hour *food recall* form, a liquid form and a *Respiration Rate* form. Data analysis uses the Spearman *rank* correlation test with a 95% confidence level.

3. Result and Discussion

Table 1 shows that most respondents are in the age of 56-65 years were 7 people (58.3%). Based on sexes found men as many as eight people (66.7%). The number of respondents with middle school /equivalent education is the same as a high school/vocational school education that were each 6 people (50%) and the most nutritional status were normal nutritional as many as 9 people (75%) and others 3 people (25%) with overweight.

Table 1. Frequency Distribution of Characteristics of Respondents in Cardiovascular Inpatients Dr. H. Moch Ansari Saleh Hospital Banjarmasin in 2018

Characteristics of Respondents		n	%
Age	36-45 years old	1	8.3
	46-55 years old	3	25.0
	56-65 years old	7	58.3
	> 65 years old	1	8.3
Gender	Male	8	66.7
	Girl	4	33.3
Education	Middle School / equivalent	6	50.0
	High school / vocational school / equivalent	6	50.0
Amount		12	100

Source: Processed Primary Data , 2018

The majority of respondents aged 61 years who experienced Congestive Heart Failure (CHF). The distribution of Congestive Heart Failure (CHF) is known to increase at the age of 40 years and above. As a person ages, most are at risk of developing heart failure due to increasing age and a decline in heart function. The results of this study are in accordance with the theory that increasing age in a person causes natural changes in the body that affect the heart, blood vessels and hormones[10]. The same as Fachrunnisa Research (2015)[11] which examined the factors related to sleep quality in Congestive Heart Failure patients showed that the majority of respondents aged 45-60 years were 14 respondents (43.8%).

Gender is a matter of identity for respondents that can distinguish between respondents with one another. The results of data analysis showed that the majority of respondents were men with a total of 8 people (66.7%). This is in accordance with Hamzah's research (2016) said that there were 36 people (60%) of male CHF patients who were undergoing treatment, while 27 female patients(40%) [9], [12]. Research conducted by Wahyuni (2017) [13] also showed that the majority of male respondents were 57 people (52%) and female respondents were 53 people (48%). Men are more susceptible to heart disease. According to Dr. Basuni Radi, SpJP (K), men are more prone to heart disease because of irregular lifestyles such as smoking, drinking alcoholic beverages, and hormonal factors. Risk factors for congestive heart failure in women tend to be lower than men because women have the estrogen hormone which can produce High Density Lipoprotein (HDL). However, in the condition of a decrease or loss of estrogen levels in women at menopause causes increased levels of triglycerides and a decrease in total fat, so that menopausal women are more at risk of heart disease [7].

Table 2 shows of the 12 respondents who had adequate sodium intake of 9 people (75.0%), negative fluid balance of 8 people (66.7%), normal nutritional status of 9 people (75.0 %) and the frequency of breathing based on *Respiration Rate* (RR) values were normal as many as 6 people (50%) and *tachypnea* as many as 6 people (50%).

Table2. Sodium Intake, Fluid Balance , Nutritional Status and Breath Frequency Based on Respiration Rate (RR) Value of Respondents in Cardiovascular Inpatients Dr. H. Moch. Ansari Saleh Banjarmasin Hospital in 2018

Univariate Analysis		n	%
Sodium intake	Adequate (sodium intake of 200-400 mg)	9	75.0
	More (Sodium intake > 400 mg)	3	25.0
Fluid Balance	Negative	8	66.7
	Positive	4	33.3
Nutritional status	Normal	9	75
	Overweight	3	25
Breath Frequency based on RR Value amount	Normal (≤ 24 x / minute)	6	50.0
	<i>Tachypnea</i> (> 24 x / minute)	6	50.0
		12	100

Source: Processed Primary Data , 2018

A sodium intake respondents in this research was quite as much as 9 people (75%) . Sodium is one of the many minerals found in extracellular electrolyte fluid (outside the cell), has the effect of holding water, serves to maintain fluid in the body, activates enzymes, as conduction of nerve impulses. Decreased cardiac output increases ADH and triggers sodium and water retention to meet cardiac volume and output. The aldosteron hormone also increases thereby increasing sodium and fluid retention with the aim of increasing venous return. The level of total sodium in the body generally increases even though the level of sodium in the serum shows a decrease. That is common in advanced heart failure conditions. Therefore, sodium restriction and fluid retention must be performed in patients with heart failure [6], [12], [14]. Recommendations for sodium administration vary, the most common recommendation being that sodium restriction reaches <2000 mg (2 gr), but recommendations can range from 2000 - 2400 mg / day. Restrictions depend on the severity of fluid retention and response to diuretics [15], [16].

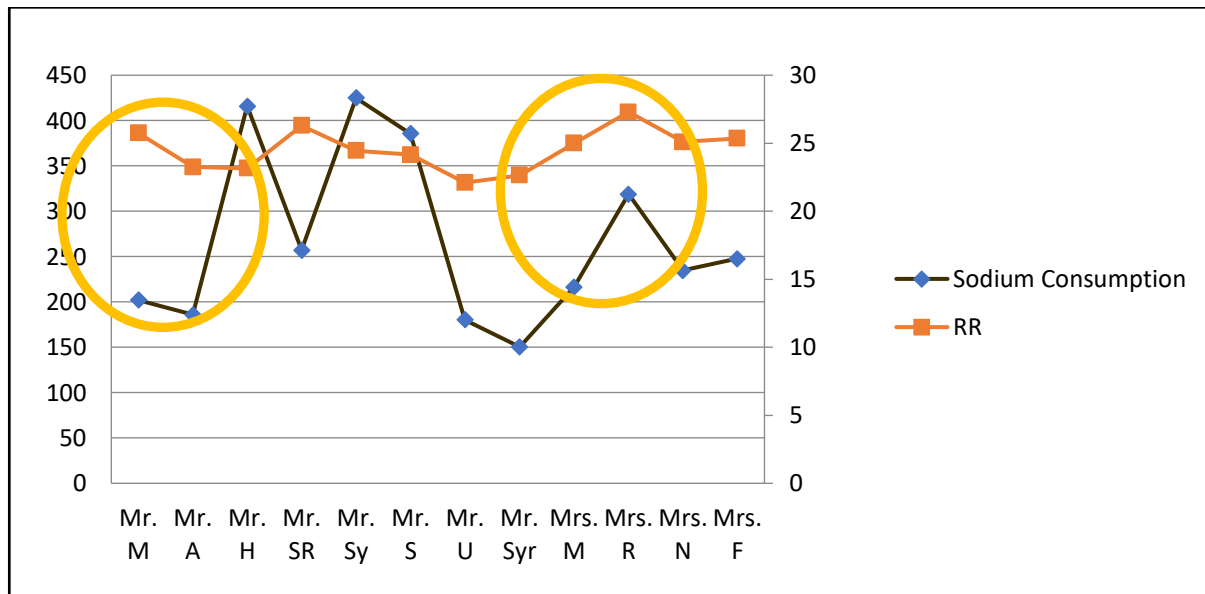
Based on table 3, it is known that the statistical test results obtained a value of 0.049 ($p < 0.05$) which indicates that there is a significant relationship between sodium intake and the incidence of shortness of breath based on the *Respiration Rate* (RR) value in CHF patients in the Cardiac Inpatient Hospital Dr. H. Moch. Ansari Saleh. Correlation value $r = 0.577$ indicates a strong and positive correlation between sodium intake and the incidence of shortness of breath based on the value of the *Respiration Rate* (RR) [15].

Table 3. Distribution of Respondents by Sodium Intake with Shortness of Breath based on Respiration Rate (RR) CHF Patients in Cardiovascular Inpatients

Sodium intake	Shortness of Breath based on Respiration Rate (RR)				amount	
	Normal		<i>Tachypnea</i>		n	%
	n	%	n	%		
Enough	6	66.7	3	33.3	9	100
More	0	0.0	3	100	3	100
Amount	6	50.0	6	50.0	12	100

$\rho = 0.049$ $r = 0.577$ $\alpha = 0.05$

Source: Processed Primary Data , 2018



Graph 1. Average Sodium Consumption Againsts Respiratory Rate

It can be seen in graph 1 that in patient with enough sodium intake the respiratory rate was decrease, meanwhile patient with more sodium intake is found to have increase in respiratory rate.

Statistical test results showed a significant positive relationship between sodium intake and the occurrence of shortness of breath based on the Respiration Rate (RR) value of CHF patients with a value of $p = 0.049$. A positive relationship ($r = 0.577$) can be interpreted that the higher intake of sodium the higher the incidence of shortness of breath in CHF patients [17]. The results of this study are in line with research conducted by He, et al. in Masyitoh (2013) [18], which conducted a study with 679 CHF patients who were overweight and often experienced shortness of breath. Patients consume an average of 113.6 mmol / day of salt. After being given a low salt diet program for 6 months, the results showed that salt consumption decreased to 50.2 mmol / day accompanied by a significant decrease in shortness of breath [19], [20]. According to Hartono (2004) [20] limiting intake of salt (sodium) to 2-3 grams of sodium per day (excessive salt consumption can cause fluid retention so that it adds to the symptoms of edema that is common in congestive heart failure).

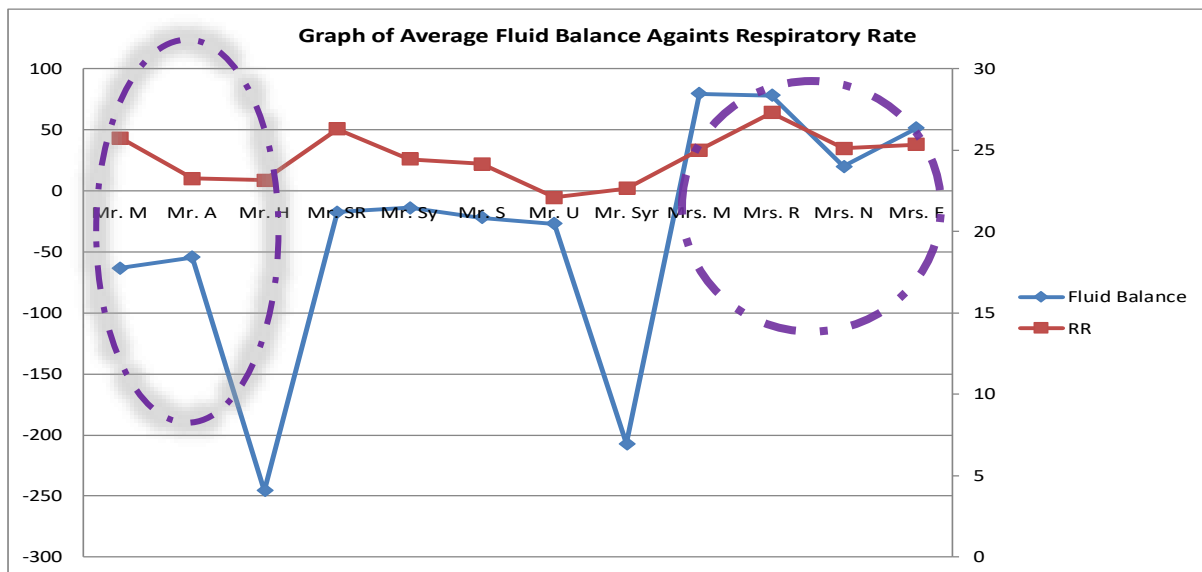
Table 4 shows that the statistical test results obtained a value of 0.01 ($p < 0.05$) indicates a significant relationship between fluid balance and the incidence of shortness of breath based on the *Respiration Rate* (RR) value in CHF patients in the Cardiac Inpatient Dr. H. Moch. Ansari Saleh Hospital. Correlation value $r = 0.707$ shows a strong and positive correlation between fluid balance and the incidence of shortness of breath based on the *Respiration Rate* (RR)

Table 4. Distribution of Respondents According toThe Balance of Liquids with Shortness of Breath by *Respiration Rate* (RR) CHF Patients

Fluid Balance	Shortness of Breath based on <i>Respiration Rate</i> (RR)				amount	
	Normal		<i>Tachypnea</i>		n	%
	N	%	n	%		
Negative	6	75.0	2	25.0	8	100
Positive	0	0.0	4	100	4	100
amount	6	50	6	50	12	100

$p = 0.01$ $r = 0.707$ $\alpha = 0.05$

Source: Processed Primary Data , 2018



Graph 2. Average Fluid Balance Againsts Respiratory Rate

It can be seen in graph 2 patients with positive fluid balance exhibits an increase in respiratory rate, on the other hands patients with negative fluid balance experiences decrease in respiratory rate.

On the first day in observation of 12 respondents, it was known that urine output for 24 hours only ranged from 300 to 900 ml per 24 hours with an average urine output for 24 hours was 562 ml. Heart disorders can cause fluid and electrolyte imbalances and result in kidney disorders [21]. When blood flow to the kidneys decreases due to the decrease in ability of the heart to pump, the body will accumulate fluid and sodium, resulting in fluid retention and fluid overload (hypervolemia). Furthermore, this condition can cause pulmonary edema. Normally, urine will be released in an amount sufficient to balance fluids and electrolytes, acid and base levels in the body. If a lot of fluid intake, the kidneys will filter more fluid and hold ADH so that urine production will increase. Conversely, in a state of lack of fluids, the kidneys will reduce urine production in various ways. Among them are increased tubular reabsorption, sodium retention, and rennin release. If the kidneys are damaged, the ability of the kidneys to carry out regulation will decrease. Therefore, when kidney disorders occur (for example kidney failure) individuals can experience oliguria (urine production of less than 400 ml / 24 hours) to anuria (urine production of less than 200 ml / 24 hour)[22].

The results of this study indicate that the fluid balance of respondents classified as negative as many as 6 people (75%) are in a relatively normal respiratory state. This is a response from the use of diuretic therapy. Generally, loop-blocking diuretics, especially spironolactone, are the treatment of choice used in therapeutic treatments for heart failure patients. The combination of diuretic administration along with fluid and sodium restriction has been shown to reduce the incidence of re-hospitalization in compensated heart failure patients[14] (Table 4 and Graph 2).

Based on the results of statistical tests, it is found that there is a significant positive relationship between fluid balance and the occurrence of shortness of breath in CHF patients with $p = 0.01$. This positive relationship ($r = 0.707$) can be interpreted that the more positive fluid balance will increase the incidence of breathlessness in patients with CHF. This is consistent with case study research conducted by Lestari (2013) [14] of 4 CHF patients given fluid restriction ranging from 100-1500 ml or 80% of total fluid requirements, diuresis within normal limits with fluid balance maintained negative and results during treatment shortness of breath in patients reduced. According to research conducted by Vittoria in Austaryani (2012) [23], for patients with heart failure with severity and limited physical activity according to NYHA Class II to IV classification, diuretic drug therapy can be given as its implementation so as to increase the release of water and

sodium salt in the body client and can cause a significant decrease in fluid volume, which is followed by a decrease in shortness of breath.

Table 5 shows that the statistical test results obtained a value of 0.549 ($p > 0.05$) which shows that there is no significant relationship found between nutritional status and the incidence of shortness of breath based on the *Respiration Rate* (RR) value in CHF patients in the Cardiac Inpatient Dr. H. Moch. Ansari Saleh Hospital.

Table 5. Distribution of respondents according to the Nutritional Status with Shortness of Breath by *Respiration Rate* (RR) CHF Patients at Heart Hospital Inpatient Room Dr. H. Moch Ansari Saleh Banjarmasin in 2018

Nutritional status	Shortness of Breath based on <i>Respiration Rate</i> (RR)				amount	
	Normal		Tachypnea		n	%
	N	%	n	%		
Normal	4	44.4	5	55.6	9	100
Overweight	2	66.7	1	33.3	3	100
amount	6	50	6	50	12	100

$\rho = 0.549$ $r = 0.707$ $\alpha = 0.05$

Based on WHO that obesity based on Body Mass Index is > 30 kg/m². The prevalence of asthma in the presence of shortness of breath and obesity has increased in several countries, and it has been found that obese persons are increased risk of developing shortness of breath [24]. In this study, there was no significant difference between nutritional status and shortness of breath by respiration rate (RR), because the nutritional status of the respondents was not obese and only overweight. The number of respondents with overweight with tachypnea was only 1 person (33.3%) while respondents with normal nutritional status experienced symptoms of tachypnea as many as 5 people (55.6%). This shows that there are other factors that cause shortness of breath, namely sodium consumption and fluid balance.

4. Result

There is a significant positive relationship between sodium intake and fluid balance on the occurrence of shortness of breath based on the *Respiration Rate* (RR) value of Congestive Heart Failure (CHF) patients at RSUD Dr. H. Moch Ansari Saleh Banjarmasin in 2018. The Congestive Heart Failure (CHF) patients are expected to increase knowledge and better control the patient's lifestyle by reducing preserved food, foods processed using salt and flavorings and controlling fluid balance by paying attention to intake (both from drinks, food, and infusion fluids) and discharge of fluids by see 24-hour urine volume.

Efforts to control the occurrence of shortness of breath in patients with Congestive Heart Failure such as education and counseling related to CHF disease, management of a low-salt heart diet and periodic to monitor fluid balance to each patient and family. For other researchers to further develop variables such as potassium intake that affects other signs or symptoms in patients with Congestive Heart Failure (CHF) and as input for efforts to improve nutrition and improve healthy behavior.

5. Unknowledge

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