

# The Effect of Extract of Senggugu to Mucociliary Transport, Nasal Sitogram and Quality of Life Inchronic Rhinosinusitis Patients

Sufriani Syam<sup>1</sup>, Abdul Qadar Punagi<sup>2</sup>, Muhammad Amsyar Akil<sup>3</sup>

<sup>1</sup>Senior resident, Department of Ear, Nose, Throat, Medical Faculty, Hasanuddin University, Makassar, Indonesia

<sup>2</sup>Supervisor, Department of Ear, Nose, Throat, Medical Faculty, Hasanuddin University, Makassar, Indonesia

<sup>3</sup>Supervisor, Department of Ear, Nose, Throat, Medical Faculty, Hasanuddin University, Makassar, Indonesia

**Abstract:** ***Introduction:** Extract of Senggugu's root used during the rinse as one of the traditional medicine, has been widely used by Indonesianto clarifying voice and curing various respiratory disorders by entering the extractof senggugu's root into the nose. The content extract of senggugu's root,saponins and tannins has an effect on the function of cilia, nasal sitogram and quality of life chronic rhinosinusitis patients. **Materials and methods:** A clinical open trial was performed in 20 patients with chronic rhinosinusitis, 10 patients with ekstrak of senggugu's root withthe standard therapy and 10 of standard therapy patients only. Examination of mucociliary transport, nasal sitogram and quality of life conducted four times, before treatment, the second days, the sixth days and the tenth days after treatment. Data were analyzed with t-paired test and Wilcoxon test. **Results:**This study shows the comparison of the value of neutrophils before and after the rothecaserrata extract of root water therapy + standard therapy, obtained significant value changes occurred in the treatment of rothecaserrata extract of root water therapy + standard therapyin all comparisons ( $p < 0.05$ ). On the contrary, in the standard therapy group did not find the value changes significantly ( $p > 0.05$ ). **Conclusion:**It showsthat the provision of extract of sengugu's root therapy tomucociliary transport willimprovethe nasal sitogram and the quality life of patients with chronic rhinosinusitis compared with the standard therapy only.*

**Keywords:** Extract root of senggugu, Standard therapy, Chronic rhinosinusitis, Mucociliarytransport, Nasal sitogram, SNOT-20

## 1. Introduction

Chronic rhinosinusitis is a chronic inflammation of the mucosa of the nose and paranasal sinuses was still a challenge in the field of the department of ear, nose, throat, especially in its diagnosis and management. The number of rhinosinusitis chronic caseswas found drawn from the data incident new cases of rhinosinusitis in adult patients who come to the department of otolaryngology in CiptaMangunsumohospital from January to August 2005. Of the 435 patients, 69% (300 patients) suffer from rhinosinusitis, the educational hospital in Makassar found that the rhinosinusitis cases recorded in 2003-2007 amounted to 41.5% of all cases handled bythem, with a male: female = 46%: 54%.<sup>1</sup>

Changes in nasal and paranasal sinus mucosa due to chronic rhinosinusitis, can be divided into two etiologic factors, namely; non-allergic and allergic.Chronic rhinosinusitis is a result of non-allergic characterized by purulent discharge, with a layer of mucous which is dominated by neutrophil infiltration cells.Chronic rhinosinusitis due to allergic factors, characterized by the influx of eosinophils and basophils in nasal secretions.Study by Lee reported that the ratio of neutrophils eosinophils compared to nasal secretions of more than 0.1 and a critical value to distinguish between allergic and non-allergic rhinitis. The greater the ratio indicates that chronic rhinosinusitis is caused by allergic factors.<sup>2</sup>

Chronic rhinosinusitis disease is a disease that needs to be considered and addressed by carefully considering the

complications, difficult to cure and requires a very large cost. Therefore, treatment should be reviewed from the aspect of modern medicine and traditional keeping in mind the limitations of each. One of the plants that need attention and developed as a new drug is rothecaserrata (Clerodendronserratatum Spreng) verbenaceae. This herbaceous plant has long been known by the people as a traditional medicine mainly by people in the area of Imogiri, Yogyakarta as a rinse.

Rinse or lay terms cleaning and at the beginning is used by the students, mastermind or Javanese singer to obtain a clear sound. Subsequent rinse developments is believed to cure several diseases such as husky, productive cough, asthma (shortness of breath) that a possible link inflammation in the throat area.

Research on rothecaserrata began to flourish. Active substance content in rothecaserrata are saponins and tannins. Inside there is a saponinsapotoksin resulting in inflammation, while the tannins causes increased mucus secretion. Rothecaserrata extract containing potassium, sodium, alkaloids, flavonoids flavones, serratogenat acid, oleonalat acid, sitosterol, glycosides, and 3OH.<sup>3</sup>

Study conducted by SP3T Central Java in 2004 showed rinse with rothecaserrata extract of the root bark of the standardized not causes harmful side effects are characterized by a lack of blood fluid secretions that come out together and the absence of a different description of the cytological secretions. Some side effects can be tolerated the rinse generally include the dizziness throughout the head, red and watery eyes, nose feels hot and snot, thirst and

Volume 5 Issue 9, September 2016

[www.ijsr.net](http://www.ijsr.net)

Licensed Under Creative Commons Attribution CC BY

ringing in the ears that will disappear after the fifth hour of administration.

In Soekardono study, evidenced rinse can reduce the frequency of rhinorrhea and sneezing on the second day after been rinsed, while on the tenth day began to diminish its effect. The study in patients with chronic rhinitis using rinse, showed that after been rinse, the mucociliary transport slowed on the second day than before the rinse is 10.72 minutes and after the tenth day be 7.07 minutes.

Mucociliary system is the body's defense system first in the airway that is very important. For inspection of mucociliary transport can be used a saccharin. Saccharine test is a test that is simple, inexpensive, and non-invasive and is the gold standard for comparative testing.<sup>4</sup>

Based on the study by Iswadi, there is interference with mucociliary transport in patients with chronic rhinosinusitis in Makassar by mucociliary transport time value that is obtained to reach an average 16.87 minutes.<sup>5</sup> While the research by Munir D., obtained an average of mucociliary transport time was 20.86 minutes, whereas in a normal person is around 9.49 minutes.<sup>6</sup>

Since the last decade, the attention not only on symptoms but also on the quality of life of patients (Quality of Life - QoL), or rather the quality of life related to health (Health related Quality of Life - HRQOL). QoL questionnaire assessing the general health and specifically. One of the instruments that can be used to assess the QoL is sinonasal Outcome Test 20 (Snot 20).<sup>7</sup>

Until now, the lack of study reports are consistent about the effectiveness in terms of transport mucociliary, nasal sitogram and quality of life of patients with chronic rhinosinusitis, especially in Makassar and the lack of scientific study of traditional medicine, especially the water extract of the roots rothecaserrata, then the related study on the effect of water extract of the roots rothecaserrata against mucociliary transport, nasal sitogram and quality of life of patients with rhinosinusitis are needed.

## 2. Materials and Methods

This study was conducted at the Dr. Wahidin Sudirohusodo hospital in January until March 2016. This study is a clinical trial, by dividing the subjects into two groups: the rothecaserrata extract of root water therapy + standard therapy and standard therapy group. In both groups of mucociliary transport examination, nasal sitogram and quality of life by snot-20 before treatment, the second day, the sixth day and the tenth day after the treatment. The variables of this study consisted of independent variables

(rothecaserrata extract root therapy + standard therapy, and standard therapy only) and the dependent variable (mucociliary transport, eosinophils, neutrophils and quality of life).

The population is chronic rhinosinusitis patients who met the inclusion criteria who come to the polyclinic of the department of ear, nose, and throat at Dr. Wahidin Sudirohusodo hospital. The study sample is a chronic rhinosinusitis patients who seek treatment at the polyclinic where the study sample met the criteria of inclusion and exclusion, agreed to participate in the study and completed the study to the end. They do the anamnesis, ENT examination, and a CT scan. The protocol was conducted in accordance with principles of Good Clinical Practice, including obtaining written informed consent from each participant's parent or legal guardian before study entry, and was approved by the human studies committees applicable to each study site.

After that, they do the examination of mucociliary transport, nasal sitogram, and quality of life by snot-20. In the rothecaserrata extract of root water therapy + standard therapy do rothecaserrata extract of the roots of the nasal mucosa and the provision of standard therapy, while in the standard therapy group was only given a standard therapy. Examination of mucociliary transport, nasal sitogram and quality of life by snot-20 is again in the second, sixth and tenth day in both groups. All the data obtained are recorded in the form of research data, and then each was analyzed using SPSS.

## 3. Results

The study subjects are grouped into two randomly: the rothecaserrata extract of root water therapy + standard therapy (therapy water extract of root rothecaserrata, oral medications antibiotics, corticosteroids, decongestants and mucolytics) and standard therapy group (drug therapy oral antibiotics, corticosteroids, decongestants and mucolytics) the proportion of 10 subjects (50%) included the rothecaserrata extract of root water therapy, and 10 subjects (50%) entered the standard therapy group.

In this study, most of the study subjects in the age group 18-23 years is 8 (40%) and the lowest in the group of 24-29 years (10%) (Table 1). There is also a sample of the male sex as many as six persons (30%) and female as many as 14 persons (70%) with a ratio of male: female = 1: 2.33. On the characteristics of the study subjects based on the type of education the highest in the group of high school is 13 persons (65%) and the lowest among secondary school and bachelor, respectively 3 persons (15%).

**Table 1:** Characteristics data of study subjects

Characteristic	Group rotheca serrata extract of root water therapy + standard therapy n (%)	Group standard therapy n (%)	Total n (%)
Study subject	10(50.00)	10(50.00)	20(100)
Aged			
18 - 23 years	3(15.0)	5(25.0)	8(40.0)
24 - 29 years	2(10.0)	0(0)	2(10.0)
30 - 35 years	1(5.0)	2(10.0)	3(15.0)
36 - 41 years	3(15.0)	1(5.0)	4(20.0)
42 - 47 years	1(5.0)	2(10.0)	3(15.0)
Sex			
Male	3(15.0)	3(15.0)	6(30.0)
Female	7(35.0)	7(35.0)	14(70)
Education			
Junior High School	1(5.0)	2(10.0)	3(15.0)
Senior High School	7(35.0)	6(30.0)	13(65.0)
Bachelor	1(5.0)	2(10.0)	3(15.0)
Master	1(5.0)	0(0)	1(5.0)

Comparison of mucociliary transport (TMS) before and after the rothecaserrata extract of root water therapy + standard therapy treatment obtained value changes significantly ( $p < 0.05$ ) in the comparison between before treatment with the second day after the treatment and the sixth day to the tenth day after the treatment in group of sengugurothecaserrata

extract of root water therapy + standard therapy, while in the standard therapy group obtained significant change too with ( $p < 0.05$ ) in comparison with the second day of the sixth day after treatment, the sixth day to the tenth day before treatment and with the tenth day after treatment (Table 2).

**Table 2:** Comparison of TMS values before and after treatment in group rothecaserrata extract of root water therapy + standard therapy and standard therapy

	Treatment	TMS average value	Significance (p)
Rotheca serrata extract of root water therapy + standard therapy	Before treatment – second days after treatment	1085.4(SD±254.78)	0.005*
		960.8(SD±209.0)	
	Second days after treatment – sixth days after treatment	960.8(SD±209.0)	0.059
		898.1(SD±211.27)	
	Sixth days after treatment – tenth days after treatment	898.1(SD±211.27)	0.005*
		1077.3(SD±247.24)	
Before treatment - tenth days after treatment	1085.4(SD±254.78)	0.799	
	1077.3(SD±247.24)		
Standard therapy	Before treatment – second days after treatment	1082.6(SD±206.64)	0.114
		1029.3(SD±141.86)	
	Second days after treatment – sixth days after treatment	1029.3(SD±141.86)	0.005*
		871.8(SD±140.92)	
	Sixth days after treatment – tenth days after treatment	871.8(SD±140.92)	0.005*
		792.6(SD±128.96)	
	Before treatment - tenth days after treatment	1082.6(SD±206.64)	0.005*
		792.6(SD±128.96)	

\*significant with the Wilcoxon Sign Range Test ( $p < 0.05$ )

Comparison of eosinophils before and after rothecaserrata extract of root water therapy + standard therapy, found significant changes in value occurred in the standard therapy group on the second day after the treatment with the sixth day after treatment is 0.034 ( $p < 0.05$ ) and the changes prior

to treatment with the tenth after treatment is 0.027 ( $p < 0.05$ ). While the treatment group of rothecaserrata extract of root water therapy are not found significant changes ( $p > 0.05$ ) (Table 3).

**Table 3:** Eosinophils comparison values before and after treatment in group rothecaserrata extract of root water therapy + standard therapy and standard therapy

Treatment		Eosinophils average value	Significance(p)
Rotheca serrata extract of root water therapy + standard therapy	Before treatment–second days after treatment	6.4(SD±11.84)	0.066
		4.3(SD±8.19)	
	Second days after treatment – sixth days after treatment	4.3(SD±8.19)	0.141
		2.3(SD±3.71)	
Sixth days after treatment – tenth days after treatment	2.3(SD±3.71)	0.066	
	0.5(SD±1.27)		
Standard therapy	Before treatment – tenth days after treatment	6.4(SD±11.84)	0.068
		0.5(SD±1.27)	
	Before treatment–second days after treatment	6.7(SD±9.36)	0.228
		5.8(SD±7.58)	
Second days after treatment – sixth days after treatment	5.8(SD±7.58)	0.034*	
	2.9(SD±3.78)		
Sixth days after treatment – tenth days after treatment	2.9(SD±3.78)	0.058	
	1.1(SD±1.85)		
Before treatment –tenth days after treatment	6.7(SD±9.36)	0.027*	
	1.1(SD±1.85)		

\*significance with the Wilcoxon Sign Range Test ( $p < 0.05$ )

This study shows the comparison of the value of neutrophils before and after rothecaserrata extract of root water therapy + standard therapy, obtained significant value changes occurred in the treatment group in all comparisons ( $p < 0.05$ ). On the contrary, in the standard therapy group did not find the value changes significantly ( $p > 0.05$ ) (Table 4).

**Table 4:** Neutrophils comparison values before and after treatment in group rothecaserrata extract of root water therapy + standard therapy and standard therapy

Treatment		Neutrophils average value	Significance(p)
rotheca serrata extract of root water therapy + standard therapy	Before treatment–second days after treatment	47.3(SD±40.03)	0.041*
		30.5(SD±24.88)	
	Second days after treatment – sixth days after treatment	30.5(SD±24.88)	0.013*
		19.2(SD±21.80)	
Sixth days after treatment – tenth days after treatment	19.2(SD±21.80)	0.022*	
	13.6(SD±19.19)		
Before treatment – tenth days after treatment	47.3(SD±40.03)	0.019*	
	13.6(SD±19.19)		
Standard therapy	Before treatment–second days after treatment	50.6(SD±33.65)	0.066
		28.4(SD±22.21)	
	Second days after treatment – sixth days after treatment	28.4(SD±22.21)	0.141
		27.7(SD±30.29)	
Sixth days after treatment – tenth days after treatment	27.7(SD±30.29)	0.066	
	21.8(SD±33.30)		
Before treatment – tenth days after treatment	50.6(SD±33.65)	0.068	
	21.8(SD±33.30)		

\*significance with Wilcoxon Sign Range Test ( $p < 0.05$ )

Comparison of snot-20 before and after rothecaserrata extract of root water therapy + standard therapy, obtained significant value changes in all comparisons ( $p < 0.05$ ) in both treatment (Table 5).

**Table 5:** SNOT-20 comparison values before and after treatment in group rothecaserrata extract of root water therapy + standard therapy and standard therapy

Treatment		SNOT-20 average value	Significance(p)
Rotheca serrata extract of root water therapy + standard therapy	Before treatment–second days after treatment	48(SD±5.54)	0.005*
		38(SD±5.25)	
	Second days after treatment – sixth days after treatment	38(SD±5.25)	0.005*
		31(SD±4.08)	
Sixth days after treatment – tenth days after treatment	31(SD±4.08)	0.005*	
	23(SD±2.47)		
Before treatment – tenth days after treatment	48(SD±5.54)	0.005*	
	23(SD±2.47)		
Standard therapy	Before treatment–second days after treatment	50(SD±8.15)	0.005*
		40(SD±5.50)	
	Second days after treatment – sixth days after treatment	40(SD±5.50)	0.005*
		31(SD±4.83)	
Sixth days after treatment – tenth days after treatment	31(SD±4.83)	0.005*	
	23(SD±3.20)		
Before treatment – tenth days after treatment	50(SD±8.15)	0.005*	
	23(SD±3.20)		

\*significance with Wilcoxon Sign Range Test ( $p < 0.05$ )

#### 4. Discussion

This study shows the characteristics of the study sample according to the age of majority in the age group of 18-23 years (40%) with the youngest aged is 18 and the oldest is 45 years old. This study differs from previous studies showing a mean age of patients was 34.43 years of chronic rhinosinusitis.<sup>5</sup> The sex ratio of male and female is 1: 2.33. According to Munir D, there were no significant difference by sex in the TMS time.<sup>6</sup> The influence of age and sex over time of TMS is still unclear. Some researchers say that the age and sex had no effect on mucociliary transport velocity. Prijanto states that nasal mucociliary transport is related to age, i.e. older age has mucociliary transport speed is slower than a younger age. This is due to the possibility for an older age more exposed to air pollution. The most frequent subjects of the study had a high school education, which is 13 samples (65%). A person who has higher education are usually more concerned about health, thus so impaired/complaint immediately see, especially when it comes to interfere with their daily lives.<sup>8</sup>

In this study, the changes in the average value of TMS significantly in comparison between before treatment with the second day after the treatment and the sixth day to the tenth day after the treatment. The results of this study is different from the previous study related to the changes of TMS after the rothecaserrata extract of the roots administration. The previous study states that the TMS on the second day after the rothecaserrata root extract administration significantly elongated compared to before the administration, but the similar on the tenth day after rothecaserrata extract of the roots administration where the TMS returned to pre-treatment.<sup>9</sup> TMS changes in patients with chronic rhinosinusitis on the second day and the sixth day after the rothecaserrata extract of the roots of water administration caused by the effects of rothecaserrata mucolytic; therefore, the secretions out in large quantities can improve the sinus ventilation and drainage which leads to the improvements of TMS time. However, on the tenth day elongation values happen because of the TMS rothecaserrata extract effects has begun to diminish.

On examination of the nasal sitogram be the number of eosinophils and neutrophils, eosinophils and found a decrease in the number of neurofil, both in the treatment group rothecaserrata extract of the roots as well as in the standard therapy group. However, a significant reduction was found in the comparison value of neutrophils before and after therapy rothecaserrata extract of root water occurred in the treatment group rothecaserrata extract of the roots in all comparisons ( $p < 0.05$ ). This is caused by the presence of saponins and flavonoids in rothecaserrata that has the effect of stimulating an immune response anti-inflammatory effects. Flavonoids has been known to have the effect of antibacterial, antiviral activity, anti-inflammatory, antioxidant, anticancer, analgesic, hepatoprotective, and hypo-allergenic. Flavonoids have anti-inflammatory by inhibiting the cyclooxygenase-2 and are associated with antioxidant activity. Flavonoids have antimicrobial effect against species of *Aspergillus*, *Penicillium*, and *Staphylococcus*.<sup>10</sup>

This study shows the comparison of the value of snot-20 before and after the rothecaserrata extract of root water therapy, obtained significant value changes occurred in the treatment the rothecaserrata extract of root water therapy and the standard therapy group in all comparisons ( $p < 0.05$ ). This is according to a study conducted by Soekardono, where there is a reduction in the number of symptoms such as runny nose, frequency of sneezing and nasal congestion complaints after the rinse administration, so the quality of life of patients with chronic rhinosinusitis is getting better.<sup>3</sup>

#### 5. Conclusion

We concluded that the water extract of the roots sengugu therapy + standard therapy will prolong the mucociliary transport, improve the nasal sitogram and the quality of life of patients with chronic rhinosinusitis compared with only standard therapy only.

#### 6. Future Scope

We suggest the rothecaserrata extract of root water therapy (rinse) can be considered as adjunctive therapy in the management of chronic rhinosinusitis since it can reduce the inflammatory cells and improve the quality of life, although it could extend the mucociliary transport can actually be detrimental. We also suggest the need for further testing to purify the content of nutritious substances in rothecaserrata to follow the rules of Pharmaceutical and Medical Sciences.

#### References

- [1] Punagi. 2008. *Pola Penyakit Subdivisi Rinologi di RS Pendidikan Makassar Periode 2003-2007*. Bagian Ilmu Kesehatan THT-KL FK Unhas. Makassar.
- [2] Lee KJ. 2004. *Essential Otolaryngology Head and Neck Surgery*. 8<sup>th</sup> ed. New York: McGraw-Hill.
- [3] Soekardono S. 2005. *Rinosinusitis Kronik Ditinjau dari Pengobatan Tradisional dan Modern di Indonesia Khususnya di Yogyakarta*. Pidato Pengukuhan Jabatan Guru Besar dalam Ilmu Penyakit Telinga Hidung Tenggorok pada Fakultas Kedokteran UGM. Yogyakarta.
- [4] Jorissen M, Willems T, Boeck KD. 2000. Diagnostic Evaluation of Mucociliary Transport: From Symptoms to Coordinated Ciliary Activity after Ciliogenesis in Culture. *Am J Rhinol*. 14: p.345-52
- [5] Iswadi. 2006. *Perbandingan Waktu Transpor Mukosiliar Penderita Rinitis Kronis Dengan Orang Normal di Makassar*. Tesis Program Pendidikan Dokter Spesial Bagian THT FK Unhas. Makassar.
- [6] Munir, D. 2010. Waktu Bersihan Mukosiliar pada Pasien Rinosinusitis Kronis. *Majalah Kedokteran Indonesia*. Vol. 60, No. 11.
- [7] Enhage. 2008. *Nasal Bronchial Testing as well as Treatment of Patients with Airway Hiperresponsiveness and Inflammation Focusing on the United Airway Concept*. Dept. Clinical Science, Intervention and Technology. Div. of Otorhinolaryngology. Karolinka Institute. Sweden. Stockholm.

- [8] Prijanto S. Roestiniadi. 2002. Nasal Mucocilliary Transpor of Patients Attending Patients. Departement of Otolaryngology Dr. Soetomo Hospital. *Orli*; XXIII.
- [9] KunjanaTri.1997.  
*TransporMukosiliarHidungNormalSebelumdanSesudahGurah*. TesisProgramPendidikan Spesialis-1. FK UGM Yogyakarta..
- [10] Kawai M, Toru H, Shinji H, Junsuke A, Michiru M, Yusuke K. et al. 2007. Flavonoids and Related Compounds as Anti-Allergic Substances. *Allergol Int*. 56: 113-23.

