

# Resistance Test of Some Bacterial Synthetic Calcular Cycinaris Invitro Amoxicillin and Ciprofloxacin Antibiotics in TK II Pelamonia Hospital Makassar, Indonesia

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## ABSTRACT

Sinusitis is defined as mucosal inflammation of the paranasal sinuses. Generally triggered by rhinitis so called rhinosinusitis. The main cause is sales (common cold) which is a viral infection, which is then followed by bacterial infection. The main treatment most often used for chronic maxillary sinusitis is antibiotics, and therefore tested for resistance of antibiotics amoxicillin and ciprofloxacin. The method used in the research is the Kirby Bauer method by using a disk that contains antibiotic concentration. The sample used is a chronic maxillary sinusitis fluid taken from 12 patients who were positive for chronic maxillary sinusitis. From the results of bacterial isolation, all patients infected with *Staphylococcus aureus*, 7 patients infected with the bacteria *Streptococcus pneumoniae* and 2 patients infected with *Haemophilus influenzae* were found. The test results showed that all bacteria were resistant to the antibiotic amoxicillin and sensitive to the antibiotic ciprofloxacin.

**Keywords:** chronic maxillary sinusitis, amoxicillin, ciprofloxacin

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## INTRODUCTION

Rhinosinusitis is an inflammatory mucosal disease that lines the nose and paranasal sinuses. The most common cause is a viral upper respiratory infection that is accompanied by a secondary infection caused by pathogenic bacteria in the upper respiratory tract. Other causes are fungal infections, dental infections and less frequent fractures and tumors<sup>1</sup>. Chronic renal toxicity results from a failure of the nasal protection function against exposure to air containing dangerous particles and foreign matter. Exposure includes allergens, viral or bacterial infections, irritants to air pollution, changes in extreme temperatures, drought or high humidity<sup>2</sup>.

Rhinosinusitis, in addition to otitis media and tonsillitis is a disease that is often encountered by ENT specialists in daily practice. Nevertheless, the management of each ENT doctor is not uniform<sup>1</sup>. Chronic maxillary rhinosinusitis is rarely life threatening, but the symptoms can interfere with the quality of the patient and can lead to serious complications, because it is located close to the eyes and brain. Chronic maxillary rhinosinusitis is one of the increasingly increasing and meaningful health problems that is a big burden on the reconstruction of society, therefore proper diagnosis and management is needed to overcome this<sup>1</sup>.

In Indonesia, where acute respiratory infections are still the main disease in the community so rhinosinusitis is common even though it has not been diagnosed, the incidence is unclear and has not been reported. In Sardjito Hospital Yogyakarta during 2002-2004, the frequency of chronic rhinosinusitis patients was around 3-4.6% and showed an increase over the last 3 years. In Makassar itself, especially in hospitals. Education (Wahidin Sudirohusodo Hospital, Pelamonia Hospital, Labuang Baji Hospital) during 2003-2007 there were 41.5% of rhinosinusitis patients from all cases of hospitalization in the ENT section<sup>3</sup>.

In TK II Pelamonia Hospital, which is located in the center of Makassar, the prevalence of people with sinusitis is

increasing every year. In 2015 there were 691 chronic maxillary sinusitis patients, while in 2016 the number of patients affected by sinusitis in the January-April period was 55. For rhinosinusitis there are several classes of antibiotic drugs used in the treatment, namely penicillin (Amoxicillin, ampicillin) cephalosporin (cefotaxime), macrolide (erythromycin, clarithromycin) and fluoroquinolone ciprofloxacin<sup>4</sup>.

Basically the success of treating bacterial infectious diseases with antibiotics is the end result of 3 components, namely sufferers, bacteria and antibiotics. This is because bacterial infectious diseases are clinical manifestations of interactions between sufferers and bacteria. As for the treatment of infection, the right antibiotics and the body's resistance are needed. Choosing the right antibiotic can be done based on at least knowing the types of bacteria that cause disease and it will be even better if accompanied by the results of microbiological examination sensitivity<sup>5</sup>.

## MATERIALS AND METHODS

### Types of research

This type of research is experimental (experimental is a research method that can correctly test hypotheses involving causal links).

### Research sites

The study was conducted at Makassar Pelamonia Hospital

## RESULTS

Based on the results of the study found positive bacteria that infect chronic maxillary sinusitis patients can be seen in the table 1.

**Table 1: Bacteria that infect chronic maxillary cynicitis patients**

Patient	Bacteria identified based on observations		
	<i>Staphylococcus Aureus</i>	<i>Streptococcus pneumonia</i>	<i>influenza</i>
Patient 1	+ (positive)	+ (positive)	- (negative)
Patient 2	+ (positive)	- (negative)	-(negative)
Patient 3	+ (positive)	- (negative)	- (negative)
Patient 4	+ (positive)	+ (positive)	- (negative)
Patient 5	+ (positive)	- (negative)	- (negative)
Patient 6	+ (positive)	+ (positive)	- (negative)
Patient 7	+ (positive)	+ (positive)	- (negative)
Patient 8	+ (positive)	+ (positive)	+ (positive)
Patient 9	+ (positive)	+ (positive)	- (negative)
Patient 10	+ (positive)	+ (positive)	- (negative)
Patient 11	+ (positive)	- (negative)	- (negative)
Patient 12	+ (positive)	- (negative)	+ (positive)

Analysis of the results of observing the inhibitory power of the resistance test in each patient is shown in the table

**Table 2: Results Data Average Inhibitory Power of Amoxicillin Antibiotics Against *Staphylococcus Aureus* Bacteria**

Bakteria Coloni	Disk potency	Inhibitory Power			Average	Information
		I	II	III		
P1	0 µg	0	0	0	0	R
P2	0 µg	0	0	0	0	R
P3	0 µg	0	0	0	0	R
P4	0 µg	0	0	0	0	R
P5	0 µg	0	0	0	0	R
P6	0 µg	0	0	0	0	R
P7	0 µg	0	0	0	0	R
P8	0 µg	0	0	0	0	R
P9	0 µg	0	0	0	0	R
P10	0 µg	0	0	0	0	R
P11	0 µg	0	0	0	0	R
P12	0 µg	0	0	0	0	R
Total	-	0	0	0	0	R

P = Patient; S = Sensitive; I = Intermediat; R = Resistance

**Table 3: Results Data on Average Inhibitory Power of Amoxicillin Antibiotics Against Bacteria *Streptococcus pneumoniae***

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Bakteria Coloni	Disk potency	Inhibitory Power			Average	Information
		I	II	III		
P1	10 µg	0	0	0	0	R
P4	10 µg	0	0	0	0	R
P6	10 µg	0	0	0	0	R
P7	10 µg	0	0	0	0	R
P8	10 µg	0	0	0	0	R
P9	10 µg	0	0	0	0	R
P10	10 µg	0	0	0	0	R
Total	-	0	0	0	0	-

P = Patient; S = Sensitive; I = Intermediat; R = Resistance

**Table 4: Results Data on Average Inhibitory Power of Amoxicillin Antibiotics Against *Haemophylus influenzae* Bacteria**

Bakteria Coloni	Disk potency	Inhibitory Power			Average	formation
		I	II	III		
P8	10 µg	0	0	0	0	R
P12	10 µg	0	0	0	0	R
Total	-	0	0	0	0	-

P = Patient; S = Sensitive; I = Intermediat; R = Resistance

**5: Average Results Data of Inhibition of Ciprofloxacin Antibiotics Against *Staphylococcus Aureus* Bacteria**

Bakteria Coloni	Disk potency	Inhibitory Power			Average	Information
		I	II	III		
P1	0 µg	32.7	3.46	2.70	32.95	S
P2	0 µg	3.64	35	5.70	35.11	S
P3	0 µg	4.80	5.42	5.76	35.32	S
P4	0 µg	3.64	1.81	4.80	33.41	S
P5	0 µg	3.45	4.76	4.50	34.23	S
P6	0 µg	4.33	35	5.67	35.33	S

P7	0 µg	3.78	2.84	4.76	33.79	S
P8	0 µg	0.78	3.49	1.70	30.32	S
P9	0 µg	2.41	2.88	2.00	32.43	S
P10	0 µg	4.86	5.41	4.50	34.92	S
P11	0 µg	4.83	2.21	4.22	33.75	S
P12	0 µg	2.87	4.33	2.89	33.36	S
Total	-					

P = Patient; S = Sensitive; I = Intermediat; R = Resistance

Table 6: Average Results Data of Inhibition of Ciprofloxacin Antibiotics Against Bacteria *Streptococcus pneumoniae*

Bakteria Coloni	Disk potency	Inhibitory Power			verage	formation
		I	II	III		
P1	0 µg	0.92	0.69	6.24	38.95	S
P4	0 µg	4.16	3.75	6.24	34.71	S
P6	0 µg	1.06	0.66	8.97	39.89	S
P7	0 µg	4.88	4.76	8.98	36.20	S
P8	0 µg	5.71	7.65	5.00	36.45	S
P9	0 µg	5.76	4.97	2.88	34.53	S
P10	0 µg	7.46	7.48	1.66	38.86	S
Total	-					

P = Patient; S = Sensitive; I = Intermediat; R = Resistance

Tabel 7: Data Hasil Rata-rata Daya Hambat Antibiotik Ciprofloxacin Terhadap Bakteri *Haemophylus influenzae*

Bakteria Coloni	Disk potency	Inhibitory Power			Avera ge	Informati on
		I	II	III		
P8	10 µg	38.40	40.61	39.03	39.34	S
P12	10 µg	36.05	36.99	38.49	37.17	S
Total	-					

## DISCUSSION

Sensitivity testing aims to determine the level of sensitivity and resistance of an antibiotic to an illness. This test is a very important scientific step, because the results of his research can be used to improve the accuracy of antibiotic use in the treatment of certain diseases. One method used in testing antibiotic sensitivity and resistance is Kirby-Bauer's diffusion method. This method uses a disc (Disk) containing antimicrobial agents and then placed on agar media which has been planted with test microorganisms<sup>10</sup>.

Antibiotics are only needed if the flu and runny nose have secondary infections by bacteria. Most flu and colds do not require antibiotics, antibiotics that are inadequate in doses and frequency<sup>2</sup>. Temperature and other physical environmental, immune system condition may affect the antibiotics<sup>12-19</sup>.

Based on the testing of samples for ciprofloxacin antibiotics for *Streptococcus pneumoniae* bacteria, *Staphylococcus aureus*

and *Haemophilus influenzae*, the results showed that all patients were identified as sensitive to ciprofloxacin antibiotics. The mechanism of action of ciprofloxacin is to inhibit bacterial bactericidal activity with a broad spectrum of bacteria against gram positive and negative bacteria. The sensitivity of bacteria to antibiotics depends on the ability of the antibiotic to penetrate the bacterial cell wall. More antibiotics that are effective work against Gram positive bacteria because the cell wall permeability is higher than Gram negative bacteria. So an antibiotic is said to have a narrow spectrum if it is able to inhibit the growth of Gram positive bacteria, while broad spectrum antibiotics if the growth of Gram positive bacteria and Gram negative bacteria can be inhibited by these antibiotics<sup>6</sup>.

## CONCLUSION

The results showed that the most infecting bacteria with chronic maxillary sinusitis were *Staphylococcus aureus* which infected 12 patients from 12 patients, infecting 7 of 12 patients and then *Haemophylus influenzae* positively infected 2 of 12 patients. From the results of the antibiotic resistance test using the Kirby Bauer method (agar diffusion) the results showed that 12 patients who were given antibiotic amoxicillin were positively resistant, whereas the ciprofloxacin antibiotic showed that ciprofloxacin still had a sensitive effect on the 12 patients.

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