Jurnal Laboratorium Medis E-ISSN 2685-8495
Vol. 06 No. 01 Bulan Mei Tahun 2024
Submit Artikel : Diterima 2024-01-03; Disetujui 2024-05-29

Profil SGOT, SGPT, dan Kreatinin Pada Pasien MDR TB di RS KRMT Wongsonegoro Semarang

Profile of SGOT SGPT Kreatinine MDR TB on KRMT Wongsonegoro Hospital Semarang

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Abstrak

Tuberkulosis (TB) adalah penyakit menular yang disebabkan oleh infeksi bakteri Mycobacterium tuberculosis. Tuberkulosis apabila tidak segera ditangani atau pengobatan yang tidak lengkap dapat mengakibatkan komplikasi yang berujung pada kematian. Multidrugs resistant tuberculosis (MDR-TB) merupakan salah satu komplikasi dimana kuman Mycobacterium tuberculosis tidak dapat lagi dibunuh dengan beberapa Obat Anti Tuberkulosis (OAT). Prevalensi kasus TB-MDR di Kota Semarang mengalami peningkatan dari 35 kasus pada tahun 2017 menjadi 79 kasus pada tahun 2018. Terapi MDR-TB membutuhkan waktu yang lebih lama, yaitu sekitar 18-24 bulan. Paparan obat yang terlalu lama dapat memengaruhi fungsi tubuh, terutama ginjal dan organ hati yang berperan dalam proses pembuangan racun dan sisa metabolisme. Penelitian ini bertujuan untuk mengetahui profil kesehatan ginjal dan organ hati penderita TB MDR melalui parameter SGPT dan Kreatinin SGOT serta mendeskripsikannya berdasarkan usia dan rentang usia. Penelitian ini merupakan penelitian kuantitatif adeskriptif dengan pendekatan cross sectional. Pengambilan sampel menggunakan total sampel sebanyak 18 pasien. Hasil penelitian menunjukkan bahwa 33% (n = 6) pasien mengalami peningkatan kadar SGOT dan SGPT, sedangkan pemeriksaan kadar kreatinin menunjukkan bahwa 33% pasien mengalami masalah ginjal. Pria memiliki kadar SGOT dan SGPT upnormal sebesar 40% (n = 4) dibandingkan dengan wanita, yaitu 25% (n = 2), sedangkan kadar kreatinin upnormal pada pria adalah 40% (n = 4) sedangkan pada wanita adalah 50% (n = 8). Pasien di atas usia 46 tahun memiliki kadar SGOT SGPT dan kreatinin upnormal terbanyak, yaitu 61% (n = 4). Hasil penelitian menunjukkan bahwa usia dan jenis kelamin berpengaruh terhadap peningkatan kadar SGT dan Kreatinin pada pasien TB-MDR.

Kata Kunci: MDR-TB ; Ginjal ; Hepar ; Kreatinin ; SGOT ; SGPT

Abstract

Tuberculosis (TB) is an infectious disease caused by infection with the bacterium Mycobacterium tuberculosis. Tuberculosis apabila is not treated immediately or the treatment is not complete can result in complications leading to death. Multidrugs resistant tuberculosis (MDR-TB) is one of the complications where the germ Mycobacterium tuberculosis can no longer bekilled with several Anti-Tuberculosis Drugs (OAT). The prevalence of MDR-TB cases in Semarang City has increased from 35 cases in 2017 to 79 cases in 2018. MDR-TB therapy takes a longer time, which is about 18-24 months. Prolonged exposure to drugs can affect body functions, especially the kidneys and liver organs which play a role in the process of removing toxins and metabolic waste. This study aims to determine the health profile of the kidney and liver organs of MDR TB sufferers through the SGOT SGPT and Creatinine parameters and describe them based on age and age range. This research is adescriptive quantitative research with a cross-sectional approach. Sampling using total samples of 18 patients. The results

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showed that 33% (n= 6) of patients had increased levels of SGOT and SGPT, while examination of creatinine levels showed that 33% of patients had kidney problems. Men have upnormal SGOT and SGPT levels of 40% (n=4) compared to women, which is 25% (n=2), while upnormal creatinine levels in men are 40% (n=4) while in women it is 50% (n = 8). Patients over the age of 46 years have the most levels of SGOT SGPT and upnormal creatinine, which is 61% (n=4). The results showed that age and gender had an effect on increasing SGOT SGPT and Creatinine levels in MDR-TB patients.

Keyword: *MDR-TB ; Kidney ; Liver ; Creatinine ; SGOT ; SGPT*

1. Introdution

Indonesia is the country with the third highest Tuberculosis (TB) in the world. Tuberculosis is an infectious disease caused by mycobacterium tuberculosis bacterial infection which is still a world health problem, including in Indonesia (Kemenkes RI, 2020).

According to the World Health Organization (WHO) 2017, the number of deaths from Tuberculosis decreased by 22% between 2000 and 2015, but Tuberculosis still ranks as the 9th highest cause of death in the world. Indonesia's TB prevalence rate in 2016 was 358 per 100,000 population. (WHO, 2019 ; 2020)

Tuberculosis when left untreated or the treatment is not complete can result indangerous complications until death. Multidrugs resistant tuberculosis (MDR-TB) is one of these complications, where mycobacterium tuberculosis bacteria can no longer be killed with one or more Anti-Tuberculosis Drugs (OAT) (Kemenkes RI, 2020).

MDR-TB cases in Indonesia are estimated to be around 2.4% of new cases of TB with Tuberculosis Multi Drug Resistant (MDR-TB) every year (WHO, 2019). The MDR-TB rate is estimated at 11% of new TB cases and 67% of re-treatment TB cases. Tuberculosis patients with Multi Drug Resistant (MDR-TB) as much as 22% have not been diagnosed or received treatment properly and correctly (WHO, 2019).

Semarang City is a city with 189 cases of MDR-TB discovery in Central Java from 2011-2018 with an increase in case prevalence from 35 cases in 2017 to 79 cases in 2018 (Wahyuni, 2020).

MDR-TB treatment management using second-line OAT which is more toxic than first-line OAT can cause side effects in patients during treatment (Aini, Yovi, and Hamidy, 2015). The second line OAT group for the initial treatment of MDR-TB according to standardized guidelines is Kanamycin (Km), Etionamid (Eto), Levofloxacin (Lfx), Cycloserine (Cs), Pyrazinamide (Z), Etambutol (E) (Permenkes RI, 2013).

The treatment time required for the therapy of MDR-TB patients is 18-24 months and requires a lot of drugs for their therapy. The duration of treatment can have a negative impact on body organs, for example, damage to the kidneys (Nanda, 2015). All drugs taken can become toxic and will cause side effects on the body. Some types of drugs affect kidney secretion through the tubules that can cause damage to kidney function (Denrison & Erdiana, 2019).

In addition to affecting kidney function, OAT consumption with various types of drugs and is prone to a fairly long time causes hepatotoxicity. Hepatotoxicity due to OAT causes extensive and permanent liver injury and can lead to death if not detected in the early stages (Azizah, 2019).

The mechanism of liver damage by OAT is not yetknown as clear, but some studies have mentioned the occurrence of hepatotoxicity due to direct effects or through the production of complex ction of enzymes that result in cell dysfunction and membrane dysfunction, the type of reaction that occurs is a hepatocellular reaction (El Bouazzi et al., 2016).

Based on the background above, researchers are interested in conducting research related to liver and kidney organ function in MDR-TB patients with SGPT and SGOT examinations for liver function because these two methods are considered quite sensitive in the process of detecting hepatocellular damage. Meanwhile, the kidney function examination uses a

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creatinine examination which is considered specific in the process of examining kidney function.

2. Method

This type of research is descriptive quantitative withcros s sectional approach. Pthere this study describes subjects by age group, sex in MDR-TB patients. This study also aims to describe the hepar and kidney function of patients with SGOT, SGPT and Creatinine parameters in MDR-TB patients at one time saja.

This study used a single variable, meaning that the variable used to describe the elements or factors in each symptom that are included in the variable (Aulia Devi Prahmadita, 2014) which in this study used variables were SGOT, SGPT, and Creatinine levels.

The population in this study was all MDR-TB patients who carried out OAT therapy at KRMT Wongsonegoro Hospital, Semarang City, while the population was determined based on inclusion and exclusive criteria. The inclusion criteria are patients diagnosed with MDR-TB who perform SGOT, SGPT, and Creatinine examinations while the exclusion criteria are extra-pulmonary TB patients or extra pulmonary MDR-TB so that the sample obtained is 18 patients.

The data used in this study is secondary data with a *cross-sectional* approach obtained from data from the Laboratory Medical Record of KRMT Wongsonegoro Hospital, Semarang City. The data taken is from the medical record data of Multi Drug Resistant Tuberculosis (MDR-TB) patients and the archive of clinical chemistry examination results, namely SGOT, SGPT and creatinine. Before taking data, researchers pay attention to research ethics principles related to data confidentiality and conduct *informed consent*. The data were then processed, tabulated, and presented descriptively in the form of nominal tables and frequency distribution tables and pie charts to describe the state of kidney and liver function in MDR-TB patients.

3. Results and Discussion

The study utilized secondary data using a cross-sectional approach that was obtained from the Laboratory Medical Record of KRMT Wongsonegoro Hospital, Semarang City. The data was taken from the archive of clinical chemistry examination results and the medical record data of patients with multidrug-resistant tuberculosis (MDR-TB). This study used male and female patients who were divided into 6 age categories, including Late Adolescence (17-25), Early Adult (26-35 years), Late Adult (36-45 years), Early Elderly (46-55 years), Late Elderly (56 - 65 years), and Seniors (>65 years). The subjects of the study were 10 men and 8 female sexes. The specimen used in the examination is a venous blood serum specimen that has been carried out a centrifuge process, namely the separation of blood cells from blood serum. The reference value for SGPT levels is < 41 µ/l for men and < 31 µ/l for women (Diasys, 2019). Meanwhile, the reference value of SGOT in adults is <40 µ / l. The reference value of creatinine in adult males is 0.6-1.1 mg / dl, while in adult women it is 0.5-0.9 mg / dl. The following is the data obtained from the medical records of the Laboratory of KRMT Wongsonegoro Hospital obtained the results of the examination of liver function of MDR TB patients presented in the following table:

Table 1. SGOT SGPT Examination Results

SGPT levels	Frequency (F)	Percentage (%)	SGOT	Frequency (F)	Percentage (%)
Usual	12	67%	Usual	12	67%
Upnormal	6	33%	Upnormal	6	33%
Total	18	100%	Total	18	100%

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Based on the results of table 1 above, it can be seen that bahwa patients with SGOT and SGPT values above normal amounted to 33% of the total study subjects. The results of SGOT and SGPT classifiedby sex can be seen in table 2.

Table 2. SGPT results by gender

No.	Gender	SGPT Result				TOTAL	
		Usual		Upnormal			
		F	%	F	%	F	%
1	Male	6	60%	4	40%	10	100%
2	Female	6	75%	2	25%	8	100%

Based on the results of table 2 above, the results of SGOT and SGPT above normal in men were much higher than women, namely by 40%, sothat the female income was only 25%. SGOT SGPT results based on age classification are presented in the table as follows:

Table 3. SGPT results based on ageg susceptibility

No.	Age (Years Old)	SGPT Result				Total	
		Usual		Upnormal			
		F	%	F	%	F	%
1	Late Teen (17-25)	3	75%	1	25%	4	100%
2	Early Adult (26-35)	3	100%	0	0%	3	100%
3	Late Adult (36-45)	0	0%	0	0%	0	0%
4	Early Seniors (46-55)	4	67%	2	33%	6	100%
5	Late Senior (56-65)	2	50%	2	50%	4	100%
6	Seniors (>65)	0	0%	1	100%	1	100%
Total						18	100%

Based on the results obtained in the table above, it can be seen that the percentage of SGPT above normal is dominated by elderly patients aged 46-55 years with a percentage each for Early Seniors of 33%, Late Seniors of 50% and Seniors of 100%. While in patients aged 17-25 (Late Teen) only 25%.

Table 4. SGOT results based on age susceptibility

No.	Age (Years Old)	SGOT Result				Total	
		Usual		Upnormal			
		F	%	F	%	F	%
1	Late Teen (17-25)	3	75%	1	25%	4	100%
2	Early Adult (26-35)	3	100%	0	0%	3	100%
3	Late Adult (36-45)	0	0%	0	0%	0	0%
4	Early Seniors (46-55)	3	50%	3	50%	6	100%
5	Late Senior (56-65)	2	50%	2	50%	4	100%
6	Seniors (>65)	0	0%	1	100%	1	100%
Total						18	100%

Based on the results obtained in the table above, it can be seen that the percentage of SGPT above normal is dominated by elderly patients aged 46-55 years with a percentage each for Early Seniors of 50%, Late Seniors of 50% and Seniors of 100%. While in patients aged 17-25 (Late Teen) only 25%.

The results of testing creatinine levels are also carried out to determine the function of the kidney organs in MDR-TB patients. Result of creatinine levels are presented in the following

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table :

Table 5. Results of Creatinine Examination of MDR-TB patients

Creatinine levels	**Frequency (F)**	**Percentage (%)**
Usual	12	67%
Upnormal	6	33%
Total	18	100%

In table 5, results were obtained from 18 study subjects of 67% or as many as 14 MDR-TB patients had normal creatinine levels, namely in susceptibility of 0.6-1.1 mg / dl for adult men and in adult women, namely 0.5-0.9 mg / dl. Meanwhile, 33% of the total study subjects had creatinine levels above normal.

Table 6. Creatinine Results by Sex

No.	**Gender**	**SGPT Results**				**TOTAL**	
		Usual		**Above Normal**			
		F	**%**	**F**	**%**	**F**	**%**
1	Man	6	60 %	4	40 %	10	100%
2	Woman	4	50 %	4	50%	8	100%

Based on Table 7 it has been shown that out of a total of 10 men who belonged to the study subject group, two of them had creatinine levels above normal values with a percentage of subjects of 40% and 60% of them had normal creatinine. Meanwhile, in 8 female subjects, the results of each percentage were as much as 50% in creatinine above normal and normal.

The ratio of the percentage of creatinine levels above normal between men and women is greater than that of women. This is not in line with previous studies which stated that kidney damage due to OAT therapy is dominated by men (Chia-Hao Chang et al., 2014). This is due to the process of creatinine synthesis carried out inside the cells of muscle cells. Men generally have higher muscle mass than women which is directly proportional to creatinine production.

However, the condition of high creatinine can also be affected by other comorbidities such as kidney disorders or nephritis suffered previously and is further aggravated by the presence of OAT liver. In addition to the length of treatment, the individual can also affect the longer the treatment, the higher the risk of kidney disorders which results in high levels of creatinine in the blood.

In addition to being influenced by gender, creatinine levels are also influenced by age because kidney function is directly proportional to age increase. Old age results in a decrease in the function of body organs including the kidneys.

Table 7. Creatinine Results Based on Age Susceptibility

No.	Age	Creatinine Results				Total	
		Usual		**Above Normal**			
		F	**%**	**F**	**%**	**F**	**%**
1	Late Teens (17-25)	4	100%	0	0%	4	100%
2	Early Adult (26 – 35 years old)	3	100%	0	0%	3	100%
3	Late Adult (36- 45 years old)	0	0%	0	0%	0	0%
4	Early Seniors (46 – 55 years old)	1	17%	5	83%	6	100%
5	Late Seniors (56 – 65 years old)	3	75%	1	25%	4	100%
6	Senior (>65 years old)	1	100%	0	0%	1	100%
TOTAL						18	100%

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Based on table 7 creatinine results in the early adolescence, early adulthood, and seniors categories all had normal creatinine results, while creatinine above normal was dominated by the early elderly category as many as 5 out of 6 subjects in the early elderly category had creatinine above normal with a percentage of 83% and the remaining 17% had normal creatinine levels. Meanwhile, in the final elderly age category of 4 subjects, 1 or 25% of them had creatinine levels above normal and 75% had normal creatinine.

Subject with more male sex than women, It can be caused by several factors such as smoking habits, comorbidities disease and social factors where the average man has more activities outside the home than women (Azwar et al., 2017). This is in line with research conducted by Saida and Syamsiar (2020) with the results of the study showing a relationship between smoking and environmental conditions with the risk of being infected with tuberculosis due to smoking activities can damage the defense mechanisms of the lungs. (Saida & Syamsiar, 2020).

The results of the SGOT and SGPT examinations showed that there were disorders in the hepatocellular due to exposure to OAT in patients. This is in line with research conducted by Govindan (2011) that 39 TB patients have normal SGOT values, 9 of which have low hepatotoxicity of 17.6% and 40 of them are normal and 7 patients atau 13.4%have SGPT values above normal. Based on the sex of the study subjects, the results of the examination of liver function differences in muscle activity between lbattery -men and women which can affect SGPT and SGOT levels so that in men the enzymes SGPT and SGOT were found to be higher levels than in women.

SGPT above normal is dominated by elderly patients with the age of 46-55 years halcaused by a decrease in hepar function, resulting in a high probability of hepatotoxicity in the hepar organ because the increase in age is directly proportional to the decrease in the function of the body organs.

Decreased renal function in MDR-TB patients is characterized by an examination ofreatinine k that exceeds normal limits. This indicates an indication of kidney fascial or renal impairment due to frequent and large amounts of OAT exposure. The ratio of the percentage of creatinine levels above normal between men and women is greater than that of women. This is not in line with previous studies which stated that kidney damage due to OAT therapy is dominated by men (Chia-Hao Chang et al., 2014). This is due to the process of creatinine synthesis carried out inside the cells of muscle cells. Men generally have higher muscle mass than women which is directly proportional to creatinine production.

However, the condition of high creatinine can also be affected by other comorbidities such as kidney disorders or nephritis suffered previously and is further aggravated by the presence of OAT liver. In addition to the length of treatment, the individual can also affect the longer the treatment, the higher the risk of kidney disorders which results in high levels of creatinine in the blood. Age also has an effect on creatinine levels in the blood. This study is in line with Indriani's research (2020) which states that of the 3 tuberculosis patients with the late elderly age group who experienced an increase in creatinine levels as many as 2 patients (66.7%). Kidney function is inversely proportional to age gain. As you get older, the kidney function will decrease because the body begins to lose several nephrons that function as filters in the kidneys (Kustiana, 2018). If kidney function decreases, the level of creatinine in the blood will be high. In this study, it also showed the same thing that creatinine levels above normal were dominated by the early and late elderly age categories due to a decrease in kidney function, other comorbidities such as nephritis coupled with exposure to OAT for a long time.

4. Conclusions and Suggestions

The results of the liver function examination in MDR TB patients showed that 33% of patients had hepatotoxicity and the remaining 67% were normal, while the kidney function examination showed that 33% had impaired kidneys while 67% had good kidney function. Gender has an effect on increasing enzymes in liver due to differences in physical activity between men and women. Males have higher SGOT and SGPT enzymes. Meanwhile, the

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creatinine examination in this study showed that women had higher creatinine levels which could be caused by other comorbidities and the duration of treatment. Age also has an effect on liver and kidney function. The increasing age results in the functioningof the liver and kidney organs which was shown in this study that the decline in liver and kidney function is dominated by the elderly. Examination of liver and kidney function needs to be carried out periodically for monitoring of pasien MDR-TB.

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