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DIFFERENCES IN THE RESULTS OF ABO BLOOD TYPE EXAMINATION USING ANTISERA REAGENTS AND SERUM SLIDE METHOD

PERBEDAAN HASIL PEMERIKSAAN GOLONGAN DARAH ABO MENGGUNAKAN REAGEN ANTISERA DAN METODE SLIDE SERUM

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Abstract

Blood group examination is a blood grouping system based on the type of antigen. Examination of blood groups with antisera reagents, namely examination of blood groups with antisera reagents obtained from in vitro supernatant cultures derived from mouse cell immunoglobulin hybridization. Examination of blood type with serum is an examination that uses blood type A as anti-B, blood type B as anti-A, and blood type O as anti-AB. The purpose of this study was to determine the profile of the ABO system blood group examination using antisera reagents and serum slide method. The research method used was descriptive with samples of the ABO system blood group using antisera and serum reagents for 30 respondents using probability sampling technique. The materials used are human blood groups A, B, AB and O and anti-A, anti-B, anti-AB reagents. Data analysis was descriptive in the form of a profile table of the results of the ABO system blood group examination using antisera and serum reagents. The results of the study revealed that the results of blood group A were 7 (23%), blood group B were 7 (23%), blood group AB were 8 (27%), and blood group O were 8 (27%). The results obtained showed that the antisera and serum reagents had differences in the blood group examination results, namely the grade of agglutination produced by the serum was different from that of the antisera. It can be concluded that the results of blood grouping with antisera and serum reagents can be used for blood group examination. However, compared to antisera reagents, the results are better using antisera reagents compared to serum.

Keywords : Blood Group, ABO System, Serum, Antisera Reagent.

Abstrak

Pemeriksaan golongan darah adalah sistem penggolongan darah berdasarkan jenis antigen. Pemeriksaan golongan darah dengan reagen antisera, yaitu pemeriksaan golongan darah dengan reagen antisera yang diperoleh dari kultur supernatan in vitro yang berasal dari hibridisasi imunoglobulin sel tikus. Pemeriksaan golongan darah dengan serum adalah pemeriksaan yang menggunakan golongan darah A sebagai anti-B, golongan darah B sebagai anti-A, dan golongan darah

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O sebagai anti-AB. Tujuan penelitian ini adalah untuk mengetahui profil pemeriksaan golongan darah sistem ABO menggunakan reagen antisera dan serum. Metode penelitian yang digunakan adalah deskriptif dengan sampel golongan darah sistem ABO menggunakan reagen antisera dan serum sebanyak 30 responden menggunakan teknik pengambilan sampel probabilitas. Bahan yang digunakan adalah golongan darah manusia A, B, AB dan O serta reagen anti-A, anti-B, anti-AB. Analisis data bersifat deskriptif dalam bentuk tabel profil hasil pemeriksaan golongan darah sistem ABO menggunakan reagen antisera dan serum. Hasil penelitian menunjukkan bahwa hasil golongan darah A adalah 7 (23%), golongan darah B adalah 7 (23%), golongan darah AB adalah 8 (27%), dan golongan darah O adalah 8 (27%). Hasil yang diperoleh menunjukkan bahwa reagen antisera dan serum memiliki perbedaan dalam hasil pemeriksaan golongan darah, yaitu tingkat aglutinasi yang dihasilkan oleh serum berbeda dengan tingkat aglutinasi yang dihasilkan oleh antisera. Dapat disimpulkan bahwa hasil penggolongan darah dengan reagen antisera dan serum dapat digunakan untuk pemeriksaan golongan darah. Namun, dibandingkan dengan reagen antisera, hasilnya lebih baik menggunakan reagen antisera dibandingkan dengan serum.

Kata Kunci : Golongan Darah, Sistem ABO, Serum, Reagen Antiserum.

1. INTRODUCTION

Hospital laboratories require blood samples for blood typing. Blood type is essential for every individual, as it can be used to identify specific blood types when needed for specific or urgent purposes (Nadia et al., 2015). Blood type can be used for early blood transfusions. It's also important to know each individual's blood type so that if a blood donor is needed, a suitable match can be found (Desmawati, 2013).

The ABO blood group system is implemented by dividing blood based on the agglutinogens and agglutinins present on the outer layer of red blood cells. According to Desmawati (2013), blood type determination relies heavily on two substances: antibodies and antigens. Karl Landsteiner, an Austrian-born expert, proposed that human blood is characterized by A, B, AB, and O blood types (Guyton and Lobby, 2019).

The most well-known method for determining ABO blood types is the slide technique (Oktari and Silvia, 2016). Antisera reagents are used in the slide method of blood typing. Antisera reagents are obtained from in vitro culture supernatants obtained from immunoglobulin hybridization of mouse cells, which can cause agglutination (Kiswari, 2014). Serum is the fluid portion of blood that does not contain platelets and blood clotting factors (Oktari and Silvia, 2016).

1.The purpose of this study was to determine the differences between the serum slide method and the antisera-based ABO blood typing method.

2. RESEARCH METHOD

This research was conducted descriptively. The researchers conducted the study from April to May 2023 at Indriati Hospital, Boyolali. The population and sample were 30 patients from April to May 2023 at Indriati Hospital, Boyolali, using a probability sampling technique. The independent variable in this study was the results of the blood typing test, and the dependent variable was the blood typing test using the slide method.

The tools and materials used included a 25 µl micropipette, yellow type, stick, blood typing card, needle or lancet, whole blood samples, anti-A reagent, anti-B reagent, anti-AB reagent, anti-D reagent, and serum from blood types A, B, AB, and O.

The primary data collection technique consisted of the results of the ABO blood typing system using antisera and serum. The data analysis technique used was descriptive data, which included a table of differences in blood typing test results.

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3. RESULT AND DISCCUSSION

Tabel 3.1 Frekuensi golongan darah

Blood type	Frequency	Percentage (%)
A B AB	7	23
O	7	23
	8	27
	8	27
Total	30	100

Table 1 shows the results of blood type examinations conducted on 30 patients from April to May 2023. Based on the results of the blood type examination, it can be seen that the results for blood type A were 7 (23%), blood type B 7 (23%), blood type AB 8 (27%), and blood type O 8 (27%).

a. Blood Type A Examination



Figure 3.1 Results of examination of group A

Table 3.1 Blood group A examination uses serum and antisera

Treatment		Serum				Reagen		
Blood type	**Code patient**	Gol. B Anti A	Gol. A Anti B	Gol. O Anti AB	Anti A	Anti B	Anti AB	Anti D
A	1	0	+3	0	+4	0	+4	+4
A	9	0	+3	0	+4	0	+4	+4

Judging from Figure 3.1 and Table 3.2, blood type assessment using antiserum and serum reagents shows a contrast in agglutination. This occurs because blood cells A contain agglutinogen A and serum contains beta agglutinin, so the anti-serum A result is negative (-) because there is no agglutination. Meanwhile, agglutination causes a positive result of 4 (+4) for the anti-A reagent. The anti-B reagent gets a negative result (-) because there is no agglutination, while the anti-B serum gets a positive result of 3 (+3) due to agglutination.

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b. Blood Type B Examination



Figure 3.1 Results of examination of group B

Table 3.2 Blood group B examination uses serum and antisera

Treatment		Serum				Reagen		
Blood type	**Code patient**	Gol. B Anti A	Gol. A Anti B	Gol. O Anti AB	Anti A	Anti B	Anti AB	Anti D
B	4	+3	0	0	0	+4	+4	+4
B	7	+3	0	0	0	+4	+4	+4
B	10	+3	0	0	0	+4	+4	+4
B	14	+3	0	0	0	+4	+4	+4
B	20	+3	0	0	0	+4	+4	+4
B	21	+3	0	0	0	+4	+4	+4
B	27	+3	0	0	0	+4	+4	+4

Seen from Figure 3.2 and Table 3.3, the blood type assessment using antisera and serum reagents shows a contrast in agglutination, especially anti-A serum gets a positive consequence of 3 (+3), while antiserum A reagent gets a positive consequence of 4 (+4), indicating that the enemy serum A produces agglutination similar to antisera A reagent. The results of the anti-serum B blood type test and abdominal muscle serum are negative (-) because there is no agglutination, while for the anti-B test and against the abdominal muscle reagent the positive result is 4 (+4) mildly indicating that there is agglutination. If the serum contains alpha agglutinin, the blood type can be identified as B.

c. AB Blood Type Examination



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Figure 3.2 Results of AB group examination

Table 3.3 Examination of AB blood group using serum and antisera

Perlakuan / Blood type	Patient code	Serum			Reagen			
		Gol. A Anti A	B Gol. Anti B	A Gol. Anti AB	O Anti A	Anti B	Anti AB	Anti D
AB	2	0	0	0	+4	+4	+4	+4
AB	6	0	0	0	+4	+4	+4	+4
AB	13	0	0	0	+4	+4	+4	+4
AB	17	0	0	0	+4	+4	+4	+4
AB	22	0	0	0	+4	+4	+4	+4
AB	24	0	0	0	+4	+4	+4	+4
AB	26	0	0	0	+4	+4	+4	+4

Based on Figure 3.3 and Table 3.3, blood type examination using antisera and serum reagents shows a difference in agglutination, for specific enemies A, anti B, and anti serum serum shows an adverse result (-) based on the fact that no agglutination occurs, while against A, against B, and against the reagent Agglutination Gastric muscles get a positive consequence of 4 (+4) on the grounds that agglutination occurs. If there is no agglutinin in the serum, it is called blood type AB.

d. Blood Type O Examination



Figure 3.3 Results of examination of group O

Table 3.4 Examination of blood type O using serum and antisera

Perlakuan / Blood type	patient code	Serum			Reagen			
		Gol. A Anti A	B Gol. Anti B	A Gol. Anti AB	O Anti A	Anti B	Anti AB	Anti D
O	3	+3	+3	0	0	0	0	+4
O	5	+3	+3	0	0	0	0	+4
O	8	+3	+3	0	0	0	0	+4
O	11	+3	+3	0	0	0	0	+4
O	16	+3	+3	0	0	0	0	+4
O	18	+3	+3	0	0	0	0	+4
O	23	+3	+3	0	0	0	0	+4

Based on Figure 3.4 and Table 3.5, blood type assessment using antisera and serum reagents shows a contrast in agglutination, specifically anti-serum A and anti-serum B. A positive result is 3 (+3) due to agglutination, while anti-serum A and anti-serum B produce a negative result (-) due to

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the absence of agglutination. Anti-serum AB and anti-serum AB are used in blood type testing, and the result is negative (-), indicating that the anti-serum produces the same agglutination as the anti-serum AB. Blood type is considered O, assuming the serum contains alpha and beta agglutinins.

Blood grouping is a system for collecting blood based on the type of antigen present, with elements such as antigens on the outer surface of red blood cells and antibodies in the serum (Nadia et al., 2015). According to Harmoning (2019), antisera reagents are reagents for blood type analysis derived from the hybridization of mouse cell immunoglobulins in in vitro culture supernatants. According to Sacher and McPherson (2012), serum is the portion of blood that contains all electrolytes, antibodies, antigens, chemicals, exogenous substances, and proteins not used in blood clotting.

During serum blood typing testing, blood types A, B, and O are used as anti-B, while blood types O and O are used as anti-AB. The body's natural immunity is facilitated by blood type antibodies, which are globulin proteins found in serum. Agglutination occurs because erythrocytes contain α and β antigens. These antigens respond to antibodies in serum (Abegaz, 2021).

There are differences between blood type testing using serum and antisera reagents. According to Oktari & Silvia (2016), serum can be used to determine blood type, but antisera reagents provide clearer results. Rahman et al. conducted a study (2019) that found significant differences between the use of serum and antisera reagents. These differences arise from blood type assessment using serum and antisera reagents. This difference is because the antibodies present in the opposing serum reagent are not pure and explicit, whereas in the serum separated from the antibodies there are also other protein parts so that the level of agglutination is unique.

4. CONCLUSION

The interpretation of the research findings is that blood typing results using serum can be used for blood typing. However, serum results are superior to those obtained with antisera reagents. Serum is the liquid phase without platelets and clotting factors, so it does not clot. Antisera is an immune-rich serum obtained from vaccinated animals or humans, so it contains more antisera than serum.

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