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EDITORIAL

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A NEW HOPE: A NEW TREATMENT PATTERN OF VARIOUS DISEASES BASED ON ABO BLOOD TYPES

Arend L. Mapanawang

[1)] Internal Medicine, Nurses Department of STIKES Halmahera,
[2)]Pharmacy Department of STIKES Halmahera,
[3)]Midwife Department of Akbid Makariwo Tobelo, North Halmahera, North Moluccas, Indonesia.

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Correspondence to Author:
Arend L. Mapanawang
Internal Medicine, Nurses Department of STIKES Halmahera, Pharmacy Department of STIKES Halmahera, Midwife Department of Akbid Makariwo Tobelo, North Halmahera, North Moluccas, Indonesia.

E-mail:
arend_mapanawang@yahoo.com

The treatment pattern of various diseases is still oriented toward approach to body weight and dosage in milligrams, or mg/ kgw. Various problems arise, such as side effects, toxicity, and drug resistance. It is recognized that the entry of the drug into the body can be affected by several factors such as genes, race, gender, age, and weight. These factors are closely linked to the pharmacokinetics of drugs that include absorption, distribution, metabolism, and elimination stages (ADME).[1]

Research on genes and the ABO blood group shows that there are differences in the pharmacokinetics of each type of medication with each blood type.[2]

The treatment approach based on ABO blood type can increase the effectiveness of therapy and reduce side effects, toxic effects, and resistance on each individual. Currently, the treatment pattern generally provides the same dose to all blood types. In that regards, various diets based on blood types have also been developed.

In the future, research should be developed towards the field of biomolecular, genes, and ABO blood group so that the pattern of disease treatment can target appropriate organ, with appropriate dosage, and with minimum side effects, toxicity and resistance, so that each individual receiving treatment is actually healing and safe from the adverse effects of the drug.

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The treatment approach based on the ABO blood group is a certainty. This is a new breakthrough in the treatment management of various diseases that can be exercised by paramedics and doctors for the global community in the future.[2]

ABO Blood Group System was discovered by Karl Landsteiner in 1900 by experimenting on a few donors. These experiments were conducted by reacting red blood cells, also called erythrocytes, with a serum. In these experiments, it was found that there are two kinds of reactions that became the foundation of the antigens A and B, which are known as the blood group A and B, and one kind of reaction without antigen, known as blood group O. Then, Decastello and Sturli found blood group AB in 1901. In the blood group AB, both antigens A and B were found altogether in the red blood cells, while antibodies were not found in the serum.[3]

In general, blood type O is the most common in the world, although in some countries such as Sweden and Norway, blood group A is more dominant. Antigen A is also more common than the antigen B. Blood type AB requires the presence of two antigens, A and B. This type is the most rare in the world.

Blood groups in humans can be passed down to children. The inheritance follows certain rules. Mendel's Law states the following: Agglutinogen (antigen) is not possible in children if the antigen is not present on one or both parents. Parents who are homozygous must continue the gene for such antigen to their children. Children who are homozygous have to receive the gene for such antigen from each parent. Mendel's Law application in the A-B-O system is as follows: Agglutinogen A and B are not possible in children when the agglutinogen are not present on one or both parents. Parents with blood group AB cannot have a child with blood type O.

Every cell in the human body has 23 pairs of chromosomes that consist of 22 pairs of autosomes XY, while the female is marked with XY chromosomes (Butler, 2008). During conception, the father's sperm cell will unite with mother's ovum so that the chromosomes of the father will be in pairs with the chromosomes of the mother and form a zygote. At this point, the DNA sequences are inherited from the father and mother to the child with each parent contributes 50 percent of the child's DNA.[4]

Inside the cell nucleus, DNA together with proteins called *histone*, is intertwined to form chromosomes, which are crucial components of all living cells. DNA separation process is done by a chemical process called DNA isolation, which begins with the expenditure of chromosomes from the cell nucleus, and then the proteins are separated with *proteinase* enzymes.[3'4]

Every cell in the body has a DNA identical sequence. The DNA sequences are called chromosomes. Each chromosome is divided into loci, which marks the position of a gene in a chromosome. Genes contained in these loci are called alleles. Gene in one locus is similar to the locus in its paired chromosome, thus called homozygous alleles. If different, it is known as heterozigot.[4]

Protein function in almost every aspect of cellular life, and there may be thousands and even tens of thousands of different proteins in a single cell. Enzymes that catalyze most chemical reactions in the cell are made of protein chains. Some hormones, such as insulin, are also made of protein. Other functions that involve protein is cell signaling, immune responses such as antibodies, blood clotting factors, chromatin structure such as histone, movements such as molecular motors, cytoskeletal elements such as tubulin, contractile proteins such as collagen, and others. [3,4]

Each protein contains amino acids in a certain amount perfectly arranged into a sequence. The blueprint that specifies the amino acid sequence is encoded in the nucleotide sequence of one DNA region called genes. Genes are composed of codons, each of which specifies a specific amino acid through mRNA molecules. A codon consists of a group of three nucleotides, both in DNA and in the mRNA transcript.

Food that is rich in nutrients would be very beneficial for consumption so that nutritional needs are met and a healthy body is maintained. However, not every food necessarily provides positive effects when the type of your blood (A, B, AB or O) is taken into account.[5]

Viewed from the nutrition science and pharmacology standpoints, in general, medicinal plants contain various bioactive substances or chemical compounds that are antioxidants, antibacterial, anti-inflammatory, anticholesterol, immunostimulants, and others. Vegetables and spices become natural sources of antioxidants, which could protect the body from free radical threat. Fruits rich in fiber, vitamins, and minerals have a positive role for health. Nuts and seeds contain essential compounds, such as vitamins, minerals, isoflavones, lecithin, and others, which can help prevent degenerative diseases, such as coronary heart and cancer. Although these groups of plants have health benefits for

our bodies, not all the plants are necessarily suitable or appropriate for consumption by people with different blood types A, B, AB, or O. This was revealed in four books on healthy diet based on blood groups (A , B, AB, and O)-Diet without hunger written by Dr. Peter J. D'Adamo and Catherine Whitney. Dr. Peter J. D'Adamo categorized each group of plants (herbs, fruits, vegetables, nuts and seeds) into three: HIGHLY BENEFICIAL (acting like a "drug"), NEUTRAL (acting like "food "), and AVOIDED (acting like "poison").[5]

Entering the third millennium, malaria infection remains a clinical problem for the tropical/sub-tropical countries, both developing and developed countries. Malaria is the leading cause of death in tropical diseases. Approximately one million people worldwide die, and 200-300 new malaria cases are recorded each year.[6] One of the pathogenesis of severe malaria is due to the formation of a rosette. Rosette is most common in severe malaria patients with blood group A and B, compared to blood type O.

In light of the many mysteries about malaria, the study was conducted. The purpose of this study was to investigate the relationship of severe malaria with blood type that can explain the correlation between blood type with plasmodium falsiparum infection.[6] Blood type is not associated with the incidence of malaria infection, but is related to the manufacture of a rosette. Blood type and severe malaria induced by plasmodium falciparum have not been sufficiently studied. The latest research on the pathogenesis of malaria showed that rosette formation of red blood cells is triggered by cerebral. In some strains studied, it is easier for Plasmodium falciparum to trigger the formation of a rosette, depending on the blood type where the blood groups A and B form a rosette more quickly than blood type O. [2,6]

In Zimbabwe, malaria is relatively more common in individuals with blood types A and B. Coma cases are found in the blood group. One of the pathogenesis of severe malaria is the formation of a rosette. Rosette formation plays an important role in addition to other factors that trigger severe malaria.[6] In this study, patients with blood group B encounter cerebral malaria and acute renal failure higher than any other blood type. ABO blood group antigens have an important role, particularly for type A, B and AB. These antigens are key receptors for red blood cells that form a rosette. Meanwhile, blood group O antigens do not appear as an intermediary for the rosette formation increase.[6]

Malaria remains one of deadly diseases in Indonesia, which mainly occurred in Tobelo, North Halmahera. Genetic factor is one of the significant factors where the gene acting in protein and enzyme coding influences the drug pharmacokinetics. An ABO blood group is correlated with severe malaria but not with the incidence. However, no studies have been carried out on the pharmacokinetics of anti-malaria of dihydroartemisinin (DHA). Blood samples were taken sequentially starting from day 0 to day 28, and then thick blood drop, liver function, kidney function, leucocyte, erythrocyte and hemoglobin were tested. The samples were then tested to measure the kinetic concentration of ACT combination using LC-MS and to analyze its pharmacokinetics parameters. The results showed that the kinetic profile of DHA, piperaquine, and primaquine synergized well and the patients were cured without any side effects.

Treatment pattern of diseases generally only considers the weight and drug dose in milligrams. Meanwhile, in pharmacokinetics, the absorption, distribution, metabolism, and elimination (ADME) are taken into account. In addition to the factors that influence the drug in the body such as genes, race, gender, age, body weight, and certain diseases that frequently change in the treatment of a disease. Research on the pharmacokinetics and blood group ABO on uncomplicated malaria in Halmahera is currently in progress. Thus, it is the time to study the proper drug dosage in the treatment of various diseases because absorption of each drug in each blood group is different. It is the time that treatment is done in accordance with the ABO blood group system.[2.6]

Based on the above discussion, it is the time that treatment is done in accordance with the ABO blood group system, as it can minimize toxicity and side effects, so that the treatment becomes more precise. During this time, treatments generally produce seemingly random results; some patients recover quickly, while some others slowly; some experience toxicity and side effects, while some others do not. In the end, everyone can receive treatments that produce good results with minimum side effects.

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