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RESEARCH ARTICLE

Description of Patients Recipient of Blood Transfusions in Pediatrics at Cut Meutia General Hospital (RSCM), North Aceh 2019 - 2020

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Abstract: Giving blood or blood components from a healthy person (donor) to another person is known as blood transfusion. A blood transfusion is intended to save a person's life. The number of blood donors has increased in the last decade, but it is still insufficient to meet the demand for blood. According to WHO guidelines, at least 2% of the total population requires blood, but the use of blood in hospitals is currently very limited. Adults receive blood transfusions more frequently than children and neonates. In adults, it is most commonly used in internal medicine, and in children, it is most commonly used in cases of thalassemia. The purpose of this study is to identify the characteristics of patients receiving transfusions in the pediatric ward at Cut Meutia General Hospital in North Aceh in 2019-2020. The descriptive method was used in the research. Total sampling was used in this study, the data taken from the patient's medical records at the North Aceh Hospital in 2019-2020 obtaining 89 samples. The study's results for transfusion recipients were frequently found in male sex (55.1%), at 5 years - 11 years (38.2%), blood type O (51.7%) frequently with rhesus positive (98.9%). Thalassemia patients received the majority of blood transfusions (50.0%), and blood components were almost always PRC (98.9%). The conclusions in this study were male blood transfusion recipients, aged 5-11 years, blood type O rhesus positive, diagnosis of thalassemia and blood components used by PRC.

Keywords: Blood transfusion in pediatric, Blood components, Bloog group, Disease

INTRODUCTION

A blood transfusion is the transfer of blood or blood components from a healthy person (donor) to another person / patient (resipien). The administration of blood transfusions aims to save a person's life; therefore, it is crucial to see the appropriate and clear indications when

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administering blood transfusions in order to avoid complications.[1] The presence of complications can be avoided by determining the patient's blood type. The ABO and Rh blood type tests are the most frequently observed blood type examinations. This blood type examination is crucial because it frequently results in a fatal reaction during blood transfusions.

This blood type examination is crucial because it frequently results in a fatal reaction during blood transfusions. Adults receive blood transfusions more frequently than children and neonates.[1] Blood transfusions are most common in adults in the internal medicine section, as well as in cases of cancer, gastrointestinal tract bleeding, and chronic renal failure. The emergency room, intensive care unit, obstetrics in cases of antepartum bleeding, surgical department, cases of injuries, fractures, and operations are the regions of the hospital that frequently require blood.[3]

Blood transfusions are given to children in the children's section who are undergoing routine chemotherapy for blood cancer or cancer of specific organs and thalassemia being the most common case requiring blood transfusions.[4,5,6] The children who experienced thalassemia were around 420,392 children. Aceh Province (13.4%) has the highest prevalence among Indonesia's 33 provinces, followed by DKI Jakarta Province (12.3%), South Sumatra (5.4%), Gorontalo (3.1%), Riau Islands (3.0%), West Nusa Tenggara (2.6%), Maluku (1.9%), West Papua (2.2%), and East Kalimantan (0.2%).[5]

According to data released by the Ministry of Health (MOH), the supply of blood to hospitals in 2018 has remained deficient for the past ten years. According to WHO, reaching blood needs necessitates at least 2% of the current population. If the population of Indonesia in 2016 was 258,704,986, the blood required was 5,174,100 bags, and the current shortage was 972,522 bags, or 18.8%.[3]

METHOD

The descriptive study method was used in this study, along with total sampling techniques. In March 2022, the Cut Meutia General Hospital in North Aceh conducted this study. Patients receiving blood transfusions in the pediatric inpatient room at Cut Meutia General Hospital in North Aceh from 2019 to 2020 who met the inclusion and exclusion criteria were included in this study. In this study, the sample size was 100 people, with 89 people who fulfilled the criteria. This study's data source was secondary data, specifically data obtained from patient medical records. The Ethics Committee of this research with No.763 / KEPK / FKUMSU / 2022 has approved it to pass the ethics review.

RESULT

This study was conducted over two days at the Cut Meutia General Hospital in North Aceh, on March 11, 2022 and March 15, 2022. The patients in this study received blood transfusions while being treated in the pediatric room at Cut Meutia General Hospital from 2019 to 2020. This study's sample was about 100 patients, with 89 patients meeting the inclusion and exclusion criteria. This study's data source

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was secondary data obtained from pediatric patients's medical records.

Table 1: Characteristics of Blood Transfusion Recipient Patients in Cut Meutia Hospital's Pediatric Inpatient Room in 2019-2020.

Characteristic	N	%
Age		
toddler (0 – 4 tahun)	30	33.7
children (5 – 11 tahun)	34	38.2
Teenager(12 – 17 tahun)	25	28.1
Gender		
Man	49	55.1
Woman	40	44.9
blood type		
O	46	51.7
A	20	22.5
B	22	24.7
AB	1	1.1
Rhesus		
Rh +	88	98.9
Rh -	1	1.1
Total	89	100

Table 1 shows information about the patients who received blood transfusions in the pediatric inpatient room at Cut Meutia Hospital in 2019-2020. It was discovered that 89 respondents were mostly children, 38.2% (34 respondents), male, 55.1% (49 respondents), blood type O, 51.7% (46 respondents), and Rh positive, 98.9%. (88 respondents). In table 2, it was discovered that among 89 respondents, the majority of diagnoses that frequently require blood transfusions are thalassemia disease with a percentage of 50% (45 respondents) and febrile seizures, tendon ruptures, chronic hepatitis, and others with a percentage of 1.1%. (1 respondent).

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Table 2: Overview of Blood Transfusion Recipient Patients' Diagnosis in the Pediatric Inpatient Room at Cut Meutia Hospital in 2019-2020.

Diagnosis	n	%
Thalassemia	45	50.0
Tumor jejenum	1	1.1
Anemia	14	15.7
Leukemia	4	4.5
ACPD (Acquired prothrombin complex deficiency)	2	2.2
Fraktur femur	6	6.7
Kejang demam	1	1.1
ITP (Idiopatik trombositopenik purpura)	2	2.2
Ruptur tendon	1	1.1
BBLR (Bayi berat lahir rendah)	3	3.4
Hepatitis kronis	1	1.1
DHF (Dengue haemoragic fever)	1	1.1
Broncopneumonia	1	1.1
CHD (congenital heart disease) Cyanotic	1	1.1
Hepatitis viral akut	1	1.1
Massa di mesenfalon	1	1.1
Pendarahan intracranial	1	1.1
Spondilitis tuberculosis	1	1.1
Meningitis	1	1.1
Peritonitis	1	1.1
Total	89	100.0

The majority of patients were obtained by 89 respondents using the PRC blood component, with a percentage of 98.9% (88 respondents) and a TC percentage of 1.1%. (1 respondent).

Table 3: Blood Components of Blood Transfusion Recipient Patients in the Pediatric Inpatient Room at Cut Meutia Hospital in 2019 to 2020.

Komponen	Jumlah	Presentase %
PRC	88	98.9
TC	1	1.1
WB	0	0
FFP	0	0

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Cryo	0	0
Total	89	100.0

DISCUSSION

Table 1 depicts the characteristics of patients receiving blood transfusions in the pediatric care room at RSCM, with the first characteristic indicating that the majority of patients are between the ages of 5 and 11 years.

According to Yasmen and Hasnain 2019 research, people with thalassemia received the most blood transfusions at the ages of 5-10 years and 10-15 years, compared to other age groups, due to iron complications and frequent blood transfusions due to elevated ferritin levels.[6] As we get older, blood transfusions will increase every month. Because of the senescence, the body's ability to resist diseases is deteriorating. The age range of patients who will receive a blood transfusion is 0-5 years and receives one bag of blood each month, whereas the age range of patients who will receive a blood transfusion is 11-20 years and receives two blood sacs each month. However, when administering blood transfusions, other factors must be considered.

Thalassemia patients aged 3-4 years require one unit of blood bag, while those aged 10 years require two units of blood bag. The availability of this transfusion is critical in order to maintain Hb levels.[7] The administration of blood transfusions in children differs from that in adults; in pediatric patients, the amount of blood volume is calculated and adjusted to the patient's body weight and age. The increase of the age of children has a direct impact on the frequency of child transfusions, particularly in cases of thalassemia. The demand for blood rises by about 0.816 mL per year. The cause is that the disease's condition worsens and complications occur, causing patients under the age of 18 to require transfusions more frequently. Furthermore, activity increases with age, and as activity increases with age, more energy is required in metabolic processes, and an increase in metabolism will increase the body's oxygen demand for hemoglobin. As Hb levels fall, the child appears weak, pale, and short of breath because the body is no longer full of energy and is attempting to supplement it. 8 According to a study conducted by Muhammad Khaliqal Ramadhany in 2021, 71% of children who required blood transfusions were aged 1 to 10 years. 9 According to Izabel et alresearch, .'s the majority of children who required blood transfusions were aged three to six years and 47.62% were aged seven to eleven years.[10]

The second characteristic demonstrates that men outnumber women, though the differences between men and women are not significant. Sex differences are not significant because thalassemia is also influenced by genetics inherited from the parents, where abnormalities can occur in autosomal or non-sex chromosomes.[11] According to Mendel's law, genetic inheritance is autosomal recessive, which means that the inheritance of traits is not determined by a specific sex. The inheritance of this trait shows that the child of the carrier of the trait has a 25% chance of having a normal child, the carrier of the trait has a 50% chance, and the sufferer has a 25% chance.[12] According to previous research conducted by Utoma in 2020, transfusions are more common in men than in women.[13] Another study conducted in

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2021 by Al-Saqladi and Albanna found that men (63.4%) received more blood transfusions than women (36.6%).[14]

The third characteristic is blood type; the majority of patients are of blood type O. According to data from the Directorate of Primary Health Services of the Republic of Indonesia in 2018, the majority of blood types in Indonesia are O (39%), blood type B (28%), blood type A (24%), and blood type AB (8%).[3]

The fourth characteristic is Rh, according to data from the Ministry of Health of the Republic of Indonesia in 2018, the majority of which are positive (99.9%) and the rhesus minority is negative (0.01% of the total population of approximately 1.4 million). According to Utoma 2020 research, blood type O rhesus positive people receive transfusions more frequently than other blood types.[13]

Table 2 depicts the diagnosis of blood transfusion recipient patients in the pediatric treatment room at RSCM North Aceh, with the majority of patients requiring blood transfusions having thalassemia. According to data from the Indonesian Ministry of Health, Indonesia has a high number of thalassemia patients, accounting for 3.8% of thalassemia careers. According to data from the Indonesian Thalassaemia Foundation in 2012, thalassemia cases in Indonesia continue to rise, reaching 4896 cases in 2012 and 8761 cases in 2018. According to the 2018 Basic Health Research Data (RISKESDAS), Aceh province has the highest prevalence of thalassemia.[3] Until now, there is no preventive therapy has been discovered that can completely cure thalassemia. Although blood transfusions provide supportive therapy, supportive therapy remains an impediment in countries with limited financial resources. [11] After thalassemia, anemia is the second most common disease. The 2013 Indonesian National Health Survey found that anemia was prevalent in children aged 1-4 years (28.1%), 5-14 years (26.4%), and 15-24 years (18.4%). There was an increase in prevalence compared to previous surveys conducted in 2007, specifically children aged 1 - 4 years (27.7%), children aged 1 - 14 years (9.4%), and children aged 15 - 24 years (6.9%).

The research results revealed that the number of anemias in school age and adolescence was three times higher.15 According to the World Health Organization (WHO), the global prevalence of anemia reached 1.62 billion cases, with 25.4% occurring during primary school and 305 million schoolchildren experiencing anemia. The global anemia rate shows that the risk of anemia in school-age children is quite high, reaching 37%; in Asia, this figure has increased to 58.4%, which is higher than Africa's figure of 49.8%. Anemia affected 19.7% of women in Indonesia, 13.1% of men, and 9.8% of children. Iron deficiency is the most common cause of anemia, accounting for 60.2% of all cases.[16] The third disease that is frequently encountered in children is femoral fractures. Faraktur is frequently found because the femur contains large blood vessels, so if a fracture occurs, it often necessitates a blood transfusion in order for the patient not to die.[17] According to Riskesdas 2018 data, there are 1.4% to 5.3% of fracture cases in children in Indonesia, and the incidence of fractures is increasing over time. Lower extremity fractures are the most common, accounting for up to 20% of all fractures. In children,

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the most common fracture is a tibial (40.2%) fracture, followed by a femoral (40.1%) fracture. Femoral fractures in children occur at a rate of about 20 per 100,000 cases, or 2% of all pediatric fractures. Fractures in children can account for 10% to 25% of all types of injuries in children.[18]

Apart from thalassemia, anemia, and femoral fractures, it was discovered in this study that other diseases that require transfusions such as leukemia, ACPD, ITP, BBLR, febrile seizures, tendon rupture, chronic hepatitis, DHF, bronchopneumonia, CHD cyanotif, acute viral hepatitis, masses in the mesenflon, intracranial bleeding, BBLR, TB spondylitis, meningitis, peritonitis, jenum tumors but the number of cases in can be small.

Table 3 in this study depicts the use of blood components in pediatric patients receiving blood transfusions in the Cut Meutia Hospital in 2019-2020. The PRC blood component was used by 98.9% of patients (88 respondents) and the TC blood component was used by 1.1% of patients (1 respondent). Thalassemia patients were found to be the most common recipients of blood transfusions in this study. Patients with thalassemia are treated in a supportive manner, with blood transfusions aimed at promoting proper growth and development. Given that diseases caused by genetic disorders have not been treated to date, even when alternating with normal genetic cells, the current administration of the therapy is only intended as a companion therapy, not the primary one given in response to the patient's complaints.[11]

Anemia was also among the most transfused conditions in this study. Anemia is defined by the World Health Organization as a lack of red blood cells. Transfusion administration is given to anemia patients in acute post-bleeding anemia with signs of hemodynamic disturbance and to help hemoglobin levels return to normal. PRC transfusions with slow droplets can be given with the risk of heart failure.[1] According to Isti R research from 2018, PRC is an important blood product that can be stored in a blood bank for 35-42 days and is the most widely used therapy in the world.[19] Another study published in 2017 by Apriastini revealed that the most commonly used blood components for transfusion are PRC 2114 units, followed by TC 503 units, frozen plasma 240 units, and cryopresspitate 203 units.[20] Nency's research in 2016 found that the most commonly used blood components were TC, with 3228 units used, PRC 1682 units, FFP 295 units, PRP 224 units, and Cryo 133 units. According to this study, the most common prc usage rate in heart disease cases was 2.23 units, followed by kidney disease 2.25 units and thalassemia 1.7 units. The most TC use occurs in ITP cases (14.70 units), aplastic anemia (9.8 units), and leukemia (6 units). Patients with leukemia, sepsis, and ITP were found to be the most frequent users of TC components in Nency's study.[21] Meanwhile, PRC components were discovered in leukemia and ITP patients in this study. According to the findings of the study, PRC blood was used in patients with thalassemia, anemia, phharctoral, and other conditions, whereas TC components were used in DHF patients.

CONCLUSION

The use of blood components in the pediatric room at RSCM North Aceh was PRC, according to this study. Whereas the

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majority of patients who use blood are males between the ages of 5 and 11, and have a positive O rhesus blood type. This study also found that thalassemia was the most common medical diagnosis among pediatric blood transfusion recipients.

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