

BLOOD TRANSFUSION IN COVID-19 PATIENTS: ONE YEAR SURVEY

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ABSTRACT

Introduction: Due to the COVID-19 outbreak, many chronic patients and elective surgical procedures have been postponed to create spaces for the hospitalization of COVID-19 patients, raising issues related to this change. The objective of this study is to assess the effect of the COVID-19 pandemic on the demand for blood products transfusion.

Materials and methods: The study presents the results of a retrospective study of blood transfusions in COVID-19 patients admitted to the Constanta County Emergency Clinical Hospital. The period of study was January-December 2021. We compared the transfusion requirement for each type of blood component in COVID 19 patients versus patients with non-COVID pathology.

Results and discussions: During 2021, we transfused 282 COVID-19 patients; 150 patients had only Covid pneumonia (of which 19 patients with severe forms needed intensive care in ICU-Covid), and 132 patients had various co-morbidities. The maximum blood requests was registered in the period February - April 2021, with a peak of 63 patients in April 2021. The main co-morbidities in patients with Covid 19 were: severe anemia in patients with malignant hemopathies. Anemia at admission in patients with Covid pneumonia is reported in more than 40% of patients. Moderate anemia (Hb <11 g/dL) is considered as an independent risk factor for the severe course of COVID-19 infection and mortality in these patients. The transfusion requirement in these patients was greater than 1.43 RBC (units/patient), 0.81 Plasma units/patient, 0.40 Platelets concentrate units + single donor platelet concentrate units/patient, in accordance with the associated pathology.

Conclusions: The most requested product was packed red blood cells, the correction of anaemia being an important factor in preventing the severe course of the disease. The platelet requirement was 0.15 units/patient, thrombocytopenia being present in patients with severe evolution of the infection (hospitalized in ICU-COVID). The most requested blood groups were O+ and A+. COVID-19 transfusion data will help plan and prepare for the use of blood resources during the pandemic.

Keywords: COVID 19, co-morbidities, transfusion, blood products

Introduction

Due to the COVID-19 outbreak, many chronic patients and elective surgical procedures have been postponed to create spaces for the hospitalization of COVID-19 patients. The need for transfusion support in COVID-19 patients was not known (1-4).

The most requested product was packed red blood cells, the correction of anaemia being an important factor in preventing the severe course of the disease (5).

The objective of this study is to assess the

effect of the COVID-19 pandemic on the demand for blood products transfusion.

Materials and methods

The study presents the results of a retrospective study of blood transfusions in COVID-19 patients admitted to the Constanta County Emergency Clinical Hospital. The period of study was January-December 2021.

Covid 19 infection was confirmed by positive PCR test for SARS CoV 2, performed in the molecular biology laboratory of County

Emergency Hospital Constanța.

The complete blood count was performed on the Sysmex XN 1000 analyzer (flow cytometry with hydrodynamic focus). Pre-transfusion tests are done by the gel column agglutination method. Alloimmunization is tested by detecting irregular antibodies (IAT), using LISS/Coombs and Enzyme tests cards, which can detect anti-Rh, Kell, Kidd IgG class antibodies. The tests were done using gel column agglutination technique, by immuno-haematology DiaMed – ID MicroTyping System (DiaMed-Division of BioRad).

Selection of compatible blood by compatibility sample performed by Salin Test at 22°C Enzymatic Test, Indirect Coombs Test at 37°C. LISS/Coombs ID Cards for Indirect Coombs Test contain polyspecific human anti-IgG serum and anti-C3d (monoclonal), in gel suspension. NaCl ID / Enzymatic test cards contain a neutral suspension of gel.

Alloimmunization was tested by detecting irregular antibodies by Indirect Coombs Test (IAT), and Enzymatic Test using LISS/Coombs and Enzyme (BIO-RAD) cards, and test erythrocytes ID-DiaCell I-II-III and ID-DiaCell I-II-III P. (6).

Results and discussions

During 2021, were transfused 282 COVID-19 patients admitted to the Constanta County Emergency Clinical Hospital (CCECH).

Out of these, a number of 132 patients were admitted having associated comorbidities with SARS-COV 2 infection. A group of 150 patients had only COVID 19 pneumonia.

The evolution of the total number of transfused patients, and the number of transfused Covid 19 patients in 2021 was: (Figure 1)

The maximum blood requests was registered in the period February - April 2021, with a peak of 63 patients in April 2021.

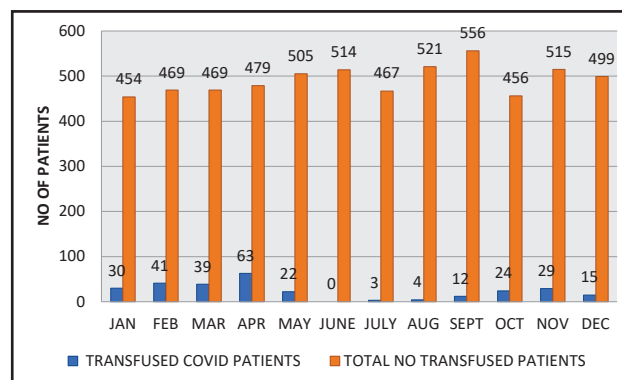


Figure 1 : Evolution of the number of transfused patients in 2021

Out of the total of 282 Covid 19 patients admitted to CCECH and transfused in 2021, 150 patients had only Covid pneumonia (of which 19 patients with severe forms needed intensive care in ICU-Covid), and 132 patients had various co-morbidities, and were admitted in the Covid extensions of other wards of the hospital. (Figure 2)

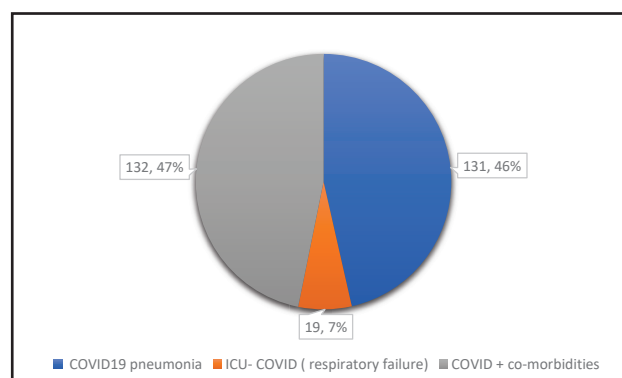


Figure 2: Covid 19 patients transfused in 2021

The main co-morbidities were: severe anemia in patients with malignant hemopathies: acute and chronic leukemias, but also non-malignant: Autoimmune hemolytic anemia, idiopathic thrombocytopenic purpura (49 -38%), upper digestive hemorrhage (21 – 16%), chronic kidney disease (18 – 14%), Acute myocardial infarction and heart failure (17 - 13%), malignant tumors (11 - 9%), post-operative status (7-5%), diabetes mellitus (6 - 5%).

The transfusion requirement in these patients was greater than 1.43 RBC (units/patient), 0.81 Plasma units/patient, 0.40 Platelets concentrate units + single donor platelet concentrate units/patient, in accordance with the associated pathology

The distribution of patients according to the hospital ward is:

Table 1: Distribution by hospital ward of COVID transfused patients

Ward	Number of patients	Diagnosis
Covid	131	Sars-cov2 infection (covid pneumonia)
Internal Medicine I+II (+49 Haematology)	49	Severe anemia, Haemophilia, Leukemia (ALL, AL, AIHA)
Gastro-Enterology	21	Upper digestive hemorrhage, melena Severe anemia, Liver cirrhosis
Intensive Care Unit Covid	19	Acute respiratory failure, Massive epistaxis, Severe thrombocytopenia
Nephrology + Hemodialysis	18	Chronic kidney disease stage IV and V(anemia, hypoproteinemia), Acute renal failure, Acute renal failure+ decompensated liver cirrhosis
Cardiology	17	Acute myocardial infarction, Cardiac failure, Anticoagulants overdose
Cardio-Vascular Surgery	7	Post-thigh amputation status, Post-dissection of ascending aorta status
Diabetes	6	Diabetes mellitus
General Surgery I And II	4	Tumor rectum, Sigmoid diverticulitis
Oncology	3	Neoplasms
Obstetrics + Gynecology	3	Severe anemia
Urology	3	Urinary bladder tumor, Adenocarcinoma prostate
Orl	1	Laryngeal tumor
Total	282	

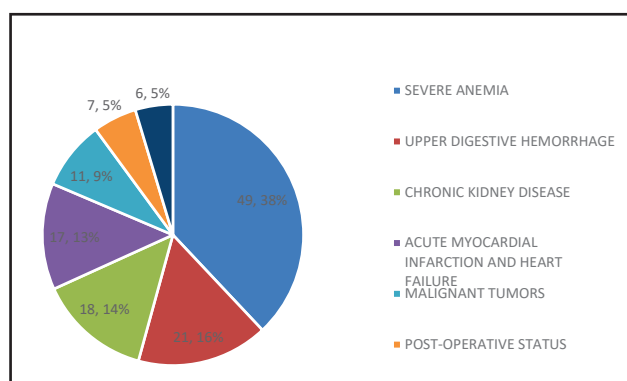


Figure 3: The main co-morbidities in Covid 19 patients transfused in 2021

The need of blood products by blood group was as seen in Figure 4.

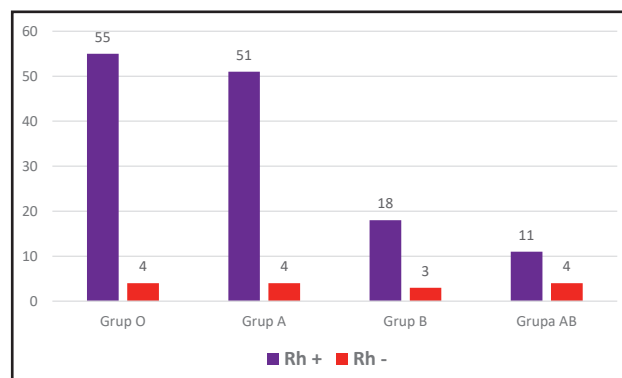


Figure 4 Distribution of patients by blood ABO and RH

As for strictly patients with Covid pneumonia, they required the following blood components; Packed RBC (RBC, leukocyte depleted RBC) 94 units, representing (0.62 units/patient), Plasma (fresh frozen plasma and decryoprecipitated plasma) 65 units, representing (0.43 units/patient), Cryoprecipitate 56 units representing (0.37 units/patient), Platelets concentrate units + single donor platelet concentrate 21 units, representing (0.14 units/patient).

Table 3: The need for blood components per patient in transfused COVID 19 patients

Diagnosis	Pneumonia	Covid +others
Number Of Patients	150	132
RBC	94 (0.62 units/patient)	189 (1.43 units/patient)
Plasma	65 (0.43 units/patient)	107 (0.81 units/patient)
Cryoprecipitate	56 (0.37 units/patient)	20 (0.15 units/patient)
Platelets concentrate units, single donor platelet concentrate	21 (0.14 units/patient)	54 (0.40 units/patient)

Anemia at admission in patients with COVID-19 pneumonia is reported as being present in more than 40% of patients. Moderate anemia (Hb <11 g/dL) is considered as an independent risk factor for the severe course of COVID-19 infection and mortality in these patients. (7)

In this study, COVID-19 pneumonia patients had a CER requirement of 0.62 units per patient. Another parameter taken into account

was the number of platelets, but the platelet requirement was small, of 0.15 units/patient), thrombocytopenia being much less common in patients with Covid 19 pneumonia than anemia, and was present in patients with severe evolution of infection (hospitalized in ICU-COVID).

In terms of cryoprecipitate, the need for patients with COVID 19 pneumonia was 0.37 units/patient. Variables with the p value <0.1 or established clinical significance include: age, sex, diabetes mellitus, hypertension, hyperlipidemia, heart disease, chronic kidney disease, TGP value, creatinine and platelet count. Patients with severe symptoms may develop anemia and thrombocytopenia. (8-9).

In the present study, the main co-morbidities were malignant and non-malignant hemopathies, upper digestive hemorrhage, chronic kidney disease, acute myocardial infarction and heart failure, post-operative status and in a smaller percentage diabetes mellitus.

The transfusion requirement in these patients was greater than 1.43 RBC units/patient), 0.81 plasma units/patient, 0.40 Platelets units/patient, in accordance with the associated pathology.

These results are in line with other studies published in the literature:

“COVID-19 wards had significantly lower transfusion rates compared to non-COVID wards for packed red blood cells (0.03 vs 0.08 units/day-patient), platelets (0.003 vs. 0.033) and plasma (0.002 vs 0.018; all $p < 0.0001$). Cryoprecipitates rates were similar (0.008 vs. 0.009, $p = 0.6$).” (7,8)

In COVID patients it is also very important to differentiate between antibodies induced by COVID-19 and possible alloantibodies associated with transfusions. (9,10).

Conclusions

Out of the total of 282 Covid 19 patients admitted to CCECH and transfused in 2021, a number of 150 had only Covid pneumonia (of which 19 were in the ICU-Covid, with severe forms), and 132 patients with co-morbidities, admitted in the Covid extensions of other wards of the hospital.

The transfusion requirement in these

patients was greater than 1.43 RBC (units/patient), 0.81 Plasma units/patient, 0.40 Platelets concentrate units + single donor platelet concentrate units/patient, in accordance with the associated pathology.

Patients with Covid pneumonia required the following blood components; RBC 94 units, representing (0.62 units/patient) Plasma 65 units (0.43 units/patient) Cryoprecipitate 56 units (0.37 units/patient) Platelets concentrate units, single donor platelet concentrate 21 units (0.14 units/patient)

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