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## **Adverse reaction after transfusion of Red Blood Cells in a patient aged 97 years - case report**

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### **Summary**

During hospitalization 97 years old patient had blood transfusion. This procedure lead to overload of cardiovascular system. Pharmacotherapy gradually improved the general condition of the patient. The patient was discharged in a stable state. Doubts arise; when blood should be transfused, in which cases should a blood transfusion be discontinued, what should be the recommendation for a blood transfusion for older people over the age of 90. There is a need for further research in geriatrics regarding the transfusion of blood and its components.

**Key words: geriatry; case report; transfusion**

### **Introduction**

Anemia is defined as a decrease in the concentration of hemoglobin, hematocrit and the number of erythrocytes in the blood [1]. It is one of the most common diseases of the hematopoietic system in the elderly, its incidence in the geriatric population is estimated at 17.2-17.4%, and after 85 years of age. at 26.9-35.6% [2]. In the elderly, we most often deal with mild anemia of iron, vitamin B12 or folic acid deficiency, anemia of chronic diseases and anemia of unexplained etiology, anemia caused by neoplastic disease [1,2]. Age-related physiological involution changes are important factors contributing to the reduction of erythrocytes [3,4]. Disturbances in cytokine homeostasis and an increase in interleukin 6

concentration may be a key pathogenetic factor of anemia in the elderly. Treatment of anemia in the elderly has a positive effect on: functional capacity, cognitive functions, quality of life, reduction of depression symptoms, prevention of falls, and reduction of mortality. Red blood cell transfusion aim is to improve oxygen carrying capacity, therefore it is symptomatic treatment, and if the patient does not report any symptoms and no symptoms of anemia are observed, do not transfuse Red Blood Cells [4,5,6]. In case of chronic anemia and concomitant cardiovascular disease, or in the presence of symptoms of low red blood cell count such as orthostatic hypotension, syncope, dyspnoea, chest pain, tachycardia unresponsive to fluid infusion or congestive circulatory failure, erythrocyte transfusion should be considered at concentration hemoglobin (Hb)  $\leq 8$  g / dL [5,6,7]. Treatment with blood components is associated with the risk of post-transfusion adverse reactions, which can be classified as early (up to 24 hours) and late (24 hours after the end of transfusion), and due to the mechanism of immunological and non-immunological. The early post-transfusion non-immune complications include: TACO (Transfusion Associated Circulatory Overload), which is manifested by orthopnoea, cough, cyanosis, tachycardia, increased blood pressure, headache, jugular vein overload, pulmonary edema and increased BNP (Brain concentration. Natriuretic Peptide) in the serum. TACO is more common in elderly patients with heart or kidney disease, and is the third most common cause of death after transfusion. The treatment consists in discontinuing the transfusion, oxygen therapy and administering diuretics and placing the patient in a sitting position, and if there is no improvement, mechanical ventilation or blood discharge are used [5,6].

### **Case report**

A 97-year-old patient admitted to the Geriatrics Clinic due to weakness and anemia (Hemoglobin 6.4 g%) caused by deficiency of serum iron (Fe 13.4 g / dl). Other elements of blood count: WBC 12.41 [ $10^3 / \mu\text{l}$ ], RBC 2.58 [ $10^6 / \mu\text{l}$ ], HGB 6.5 [g / dl], HCT 21.2 [%]. MCV 82.2 [fl], MCH 25.2 [pg], MCHC 30.7 [g / dl], PLT 317 [ $10^3 / \mu\text{l}$ ], erythroblasts 0.02 [ $10^3 / \mu\text{l}$ ]. Woman walked with the help of another person. Verbal contact preserved, logical. The patient reported symptoms such as: exertional dyspnoea, orthostatic hypotension, dizziness, decreased appetite and thirst. Oral mucosa was dry. The patient's skin was pale, no pathological changes. Coexisting diseases: arterial hypertension, generalized atherosclerosis. A patient after right breast amputation due to cancer (1986), after a stroke (2014), and a pacemaker. A DDD pacemaker implanted for sick sinus syndrome Philos II DR A - SELOX JT 53 V - Selox ST 60 (2006) was replaced with a VITATRON pacemaker due to exhausted pacemaker batteries. The postoperative course was uneventful. The basic vital parameters of the patient on admission: blood pressure 120/50 mm Hg, pulse 70 / min, body temperature 36.5°C. Drugs taken: tritace, nootropil, acard. During hospitalization, an ultrasound examination of the abdominal cavity was performed, which showed the following abnormalities: there were single cysts in the liver up to 10 mm in diameter, the duodenal wall thickened to 6 mm - in the course of inflammation, fluid in both pleural cavities; 33mm wide on the right, 20mm wide on the left. The patient was transfused with one unit of Red Blood Cell Concentrate. Blood turning started at 4.10 p.m. Two hours later, blood pressure increased to 210/100 mm Hg, and dyspnea at rest increased. The patient

reported pain behind the sternal, pressure radiating to her back. The blood flow was stopped. The results of laboratory tests show that the troponin concentration was normal. The following pharmacotherapy was applied: 20 mg furosemide intravenously, 12.5 mg captopril sublingually, a nitroglycerin infusion pump was connected at a flow of 2 mg / h. The patient had a foley catheter inserted into the bladder, about 300 ml of urine drained. Oxygen therapy was performed with the flow of 2 l / min. A cardiac monitor is connected. Vital signs were monitored. Blood pressure was increased during the transfusion of Red Blood Cells. Transfusion was continued at blood pressure of 163/74 mm Hg. Blood turning was completed at 8 p.m. The patient's condition improved temporarily and the nitroglycerin infusion was stopped. After three hours, the blood pressure increased again to 200/70 mm Hg. The patient was administered 12.5 mg of capropril sublingually. After four hours, the blood pressure was 206/74 mm Hg. The patient was restless, her breathing accelerates. The patient reported nausea. The nitroglycerin infusion was reconnected at a flow of 2 mg / h. Blood pressure gradually decreased to 160/70 mm Hg. An adverse event protocol was prepared after rolling the Red Blood Cell Concentrate. The circulatory system was overloaded. Blood was collected for laboratory tests at the consulting room of the Regional Center for Blood Donation and Blood Treatment. Container handed over after rolling. On the next day, the hemoglobin level was 8.4 [g / dl], BNP was 477.7 [pg / ml]. Taking into account the general condition of the patient, no further diagnosis (endoscopic examination) of the anemia was undertaken. Due to the increased parameters of inflammation, urinary tract infection (*Escherichia coli*), antibiotic therapy was initiated, resulting in a decrease in inflammatory parameters. The patient was discharged in a stable state.

## **Discussion**

A retrospective audit of electronic hospital medical records of patients receiving blood transfusion in a single medical emergency unit. Patients were admitted during a 6-month period and data on symptoms and vital signs were extracted from the records. Of 4,353 consecutively admitted patients, 156 patients were transfused with a total of 411 blood components. The audit identified five cases of transfusion-associated circulatory overload (incidence 3.2%) and four cases of transfusion-associated dyspnoea. Vital signs and changes in dyspnoea and blood pressure were registered within the frame of the Early Warning Score, and one case was documented as being transfusion-related in the medical record. No cases were reported to the haemovigilance system [8]. The study performed in a Tel Aviv university affiliated 400-bed multilevel geriatric hospital. Patients were admitted from the community, nursing homes, and general hospitals to the acute, rehabilitation, or long-term care wards. All the patients who received packed red blood cells transfusion during the study year were included in study. Data was collected retrospectively from the records of the charts of patients. They defined blood transfusion reactions such as objective symptoms, recorded by staff, fever, chills, shortness of breath, and vomiting within 24 hours after packed red blood cells transfusion was administrated. Fever was defined as unexpected temperature rise ( $\geq 38^\circ$  or  $\geq 1^\circ$  C above baseline, if baseline  $\geq 37^\circ$ ) during or shortly after transfusion. Vital signs such as blood pressure, pulse, peripheral oxygen saturation, and breaths number were measured five minutes after beginning of blood transfusion and every 15 minutes during first hour thereafter according to guidance of blood transfusion. Fever was the most common

reaction; 29 (72%) of those 40 cases were with reactions. Chills and vomiting were observed in three cases each (8%); four (10%) had shortness of breath. There were no lethal cases in the first 24 hours following blood transfusions [9]. Although recognized as a serious complication of hemotherapy, few data are available on the incidence of transfusion-associated circulatory overload (TACO). Detailed demographic and clinical information was obtained from records of 382 Medicare patients undergoing total hip or knee replacements (and receiving transfusions) from January 1992 to December 1993 at five Massachusetts hospitals. Seventy-eight percent of the patients were women with a mean age of 77 years. Thirty-two percent had co-morbidities including myocardial or coronary disease. Transfusion-related complications and comorbidities were identified and reviewed by transfusion experts. Patients were excluded from consideration if non-transfusion factors such as myocardial disease could have contributed to the development of acute pulmonary edema. Four (3 females, 1 male) patients (1.05%) developed TACO postoperatively. Symptoms were reversed with diuretics. Length of stay was significantly prolonged by these incidents. TACO is a frequent and serious event in an orthopedic surgical setting. It is associated with advanced age, increased health care costs, and may occur in the setting of modest transfusion volumes. The utilization of conservative transfusion criteria and fluid management in the perioperative setting may decrease the incidence of this complication in this population [10].

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