

A New Program for Automated Red Cell Exchange; A Retrospective Analysis in Children and Young Adults

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Purpose: Automated red cell exchange is widely used as treatment for acute crisis in patients with sickle cell disease (SCD) as also in prophylaxis in patients at risk for or after stroke, recurrent severe pain crisis, but also rarely in non SCD. Since this year in Europe a new CE marked device is available for automated red cell exchange and erythrocyte apheresis, the AMICUS™ system with the software version 5.1 (Fresenius Kabi, Lake Zurich, IL, USA). To evaluate the procedure in the care of children and young adults we retrospectively analyzed our first experience with this device.



A New Program for Automated Red Cell Exchange; A Retrospective Analysis in Children and Young Adults (continued)

Methods: From July to December 2016 we performed 18 automated red cell exchange in 10 patients (4 f, 6 m; median age 14.7 y, min 8.4 - max 31.8 y), 3 procedures in 2 patients with pyruvate kinase deficiency (PKD) and 12 procedures prophylactically in 6 patients with SCD and 3 procedures in 3 patients with acute crisis with SCD (acute pain crisis; severe acute chest syndrome; and splenic sequestration respectively). The system was installed according to the manufacturer's instructions. In all procedures ACD-A was used. pRBCs (matched in 64 erythrocyte antigens) were ordered from our local transfusion service, leukoreduced, in additive solution (SAGM) with a median hematocrit (hct) of 60% in all but one case with a known allergic reaction against plasma proteins. Here we used washed pRBCs with a median hct of 70%. Before and after the procedure there was a blood examination with blood cell count, blood gas analysis, electrolytes, total protein and coagulation parameters (INR, aPTT, fibrinogen, ATIII and D-Dimer). In SCD patients' hemoglobin A, F, A2 and S was determined before and after the procedure. The machine settings, the adverse events and the fraction of cells remaining were documented.

Results: The procedures were performed without any severe adverse events, even in acute crisis of SCD. The HbS level decreased from in median 42% (17 – 81%) to 11.5% (2.9–27%). There was a clear correlation between reached fraction of remaining cells (FCR) and the number how many times the RBC volume of the patient was exchanged (R2520.534) and between the expected FCR (24%; 17–36%) and the reached FCR (26.5%, 20–38%; R250.681). All procedures were performed by using peripheral venous access (22 to 18 GA). One procedure was terminated preterm due to loss of peripheral venous access. All other procedures were terminated in time (median 02:04, 01:10–03:33 [hh:mm]). All patients with acute crisis needed 1 RCE for resolving there clinical symptoms.

Conclusion: Our retrospectively analysis showed, that in our group of children and young adults the new procedure on the AMICUS platform seems to be safe and effective to treat patients with automated red cell exchange. We will now retrospectively analyze and compare our data with the system we used before.

Source: Witt V, et al. A New Program for Automated Red Cell Exchange; A Retrospective Analysis in Children and Young Adults [Abstract 49]. *J. Clin. Apher.* 2017; 32: 100-101.

Note: The Amicus RBCx System is CE marked for distribution in the EU. It is not FDA cleared for marketing in the United States of America.