Reinfusion of autoblood by means of Cell Saver 5 apparatus during Caesarean section

Ivanova N., Filippova R.D *. Potapov A.F *.

Department of Anesthesiology and Critical Care Medicine Obstetrics and Gynecology,

Perinatal Center NCM RB № 1 of Yakutsk.

North-Eastern Federal University, Institute for Medicine*

Summary. One of the main causes of maternal mortality are obstetric hemorrhage. A feature of obstetric hemorrhage is sudden and their massiveness. In recent years, new technologies are introduced to conserve blood in clinical practice. This paper describes the first clinical experience, during which the method of reinfusion of autoerythrocytes by using apparatus Cell Saver 5 is used for Caesarean section for a patient with an extremely high risk of bleeding in a Perinatal Center of the National Medical Center in Yakutsk.

Keywords: autoerythrocyte mass, central placenta previa, obstetric hemorrhage.

Introduction. One of the important problems in obstetrics has been and remains the treatment of obstetric hemorrhage. Primary role for especially massive bleeding gets infusion-transfusion therapy (ITT). Often, to compensate for the loss of blood it is required holding transfusion, and during it, there is a real risk of transmission of bloodborne infections and development of severe autoimmune reactions and complications (1,2,3). The solution of this problem may be the use of safe autologous using modern membrane technology (4,5).

Material and methods. Our experience is the first clinical use in a Perinatal Center of the National Medical Center (HRC NCM) Cell Saver 5 machine for reinfusion of autologous blood during a surgical delivery.

E. The patient, 28 years old with a diagnosis of pregnancy 35 - 36 weeks, cephalic presentation. Complicated obstetrical and gynecological history. Central placenta previa, admitted to the Department of Pathology pregnant HRC, with the threat of premature births and high risk of bleeding, since detachment centrally located placenta.

After preoperative preparation, routinely 8/31/11 under general anesthesia, with a preliminary central venous catheterization and preparation of transfusion media, operative delivery is held by Cesarean section. Duration of operation is 35 minutes, intraoperative blood loss was 1000 ml. Infusion-transfusion therapy during surgery was 1800 ml of these: crystalloids

- 800 ml; fresh frozen plasma transfusion donor - 700 ml; autoerythrocyte reinfusion using the apparatus of Cell Saver - 300 ml.

The results of the study. For studying an effect of hardware reinfusion of autoerythrocytes, dynamics of complete blood count, coagulation, acid-base status and blood gases, functional integrity of erythrocytes, as well as microbiological testing of erythrocyte mass is explored.

Comparison of the blood count (Table 1) and koagulogramma (Table 2) before and after reinfusion of autoerythrocytes showes that the rate of red blood cells (erythrocytes, hemoglobin, hematocrit, MCV, MCH, MCHC) remains practically in the same figures, but the changes of blood coagulation is not significant and does not extend beyond the normal range.

An exploration of acid-base balance (acid-base balance) and the electrolyte composition of the patient's blood is held by studying the dynamics of these indices in arterial and venous blood before and after autotransfusion for indirect estimation of oxygen-transfused usefulness of transfused autoerythrocytes. From the Table 3 one can see that after the transfusion of autoerythrocytes patient’s indicator of base deficit and the severity of metabolic acidosis is decreased, that indicates the positive effect of transfused autoerythrocyte mass to the level of microcirculation and metabolism.

To assess the functional integrity of autoerythrocyte, microscopy slides with Romanowsky stain before and after centrifugation is held. And it is traced that the degree of hemolysis of autoerythrocytes is small and does not exceed 10% of the autoerythrocyte mass.

To confirm the sterility of autoerythrocyte mass, bacteriological examination is held, which confirms the absence of microbial growth and sterility provodennoy procedure.

Conclusion. Thus, the use of reinfusion of autoerythrocytes with a new generation of modern machines of Cell Saver 5 in obstetric practice is safe and effective method of replacing blood loss. Further implementation of this method in the walls of the HRC NCM will have to expand indications for reinfusion of autoerythrocytes by using the apparatus of Cell Saver 5 (conservative myomectomy during Caesarean section, multiple pregnancy, complicated obstetric - gynecological history, etc.), which will improve the results of treatment of obstetric hemorrhage.

Russian literature:

1. Ahn, A.V., Pakhomov, ZH.,E. Kriticheskie sostojania pri akusherskix krovotechenijax. // Voprosy ginekologii, akusherstva i perinatalogii, 2010. - T. 9. - №4 - C. 33-36.

2. Kurtser, MA, Lukashin M., Panin, AV. Istinnoje vrastanije plantsetty. Organooxranjauschje operatsii. // Voprosy ginekologii, akusherstva i perinatalogii, 2009. – T .8. - №5. - C. 31-35.

3. Salov, IA, Marshals, DV. Prognoz i lechenje massivnoy akusherskoy // Voprosy ginekologii, akusherstva i perinatalogii, 2008. - T. 7. - №2. - C. 29-33

4. Vetrov, VV, Fedyura, IF. Maloobjomniy plazmoferez pri oslozhnennoj beremennosti // Gematologia i transfuziologia, 2008. - T. 53. - № 3.

5. Fedorova, TA, Sokologorsky, SV, Rogachev, O. Sostojanie sistemy gemostaza u beremennyx // Voprosy ginekologii, akusherstva i perinatalogii, 2006. - т. 5. - №6. - C. 29-35.

Table 1. blood count before and after autohemotransfusion

	before autohemotransfusion	*after autohemotransfusion*
erythrocytes (10^{12})	3,5	3,6
hemoglobin (г/л)	123	122
hematocrit (%)	30	31
MCV (average volume of autoerythrocytes) N= 80 – 100 мкм3)	87,3	88
MCH (the average content of hemoglobin in erythrocytes) Norm: 26 – 34 пг	33	34,3
MCHC (the average concentration of hemoglobin in erythrocytes) Norm: 310 -360 г/л)	381	390

Table 2. koagulogramma before and after autohemotransfusion

	before autohemotransfusion	*after autohemotransfusion*
PT (%)	9,3 – 124	10,9 – 106
ФГ (г/л)	4,8	4,3
ТТ (сек)	18,5	21,4
АЧТВ (сек)	33	30
PLT platelets	265	252
Clotting time by Lee - White (min)	4, 4	5,1
Duration of bleeding in Duque to 3 minutes.	0,3	1,0

Table 3. Acid-base status and blood electrolytes during autohemotransfusion

	before autohemotransfusion		*after autohemotransfusion*	
	artery	vein	artery	vein
pH	7,37		7,4	7,3
pO_2 (мм.рт.ст.)	88		88	48,1
pCO_2 (мм.рт.ст.)	33		27,8	37,5
HCO3 (ммоль/л)	19,2		19,6	20,4
tCO_2 (ммоль/л)	20,2		20,5	21,5
ABE	-4,7		-2,9	-4,1
potassium (ммоль/л)	3,4		3,0	3,1
sodium (ммоль/л)	137		138	137

Information about the authors:

Ivanova Natalya, graduate student of department of anesthesiology and critical care medical institute of the North - East of the Federal University named after MK Ammosov, physician anesthesiologist intensive Department of Anesthesiology, Resuscitation and Intensive Care Obstetrics and Gynecology, Perinatal Center of the National Medical Center in Yakutsk.
Address: 6770019, Yakutsk, Sergelyakhskoe Highway, 4 TsOMiD NCM OARIT Obstetrics and Gynecology.
Contact telephone number: 89241732447
E-mail Address: www. ivnage@mail.ru

Filippova, D. Rose, MD, director of maternal and child health NCM Yakutsk.
Address: 6770019, Yakutsk, Sergelyakhskoe Highway, 4 TsOMiD NCM.
Contact Phone: 390 001

Potapov Alexander Filipovich, Professor, MD, Head of the Department of Anesthesiology and Critical Care Medicine SVFU MI.
Address: 677 000, Yakutsk, ul. Peter Alekseev 83a, number 2 RB TSEMP Department of Postgraduate education and training of doctors.
Contact telephone number: 89241669781
E-mail Address: www. potapov-paf@mail.ru