

# Salvage for Postpartum Massive Haemorrhage in a Jehovah's Witness with Intravenous Iron Therapy and Cell Saver System

Tugba Sarac Sivrikoz<sup>1</sup>, Cigdem Kunt Isguder<sup>1</sup>, Muhterem Melis Canturk<sup>2</sup>, Mukadder Orhan Sungur<sup>3</sup> and Sevgi Kalayoglu Besisik<sup>4</sup>

<sup>1</sup>Division of Perinatology, Department of Obstetrics and Gynecology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

<sup>2</sup>Department of Obstetrics and Gynecology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

<sup>3</sup>Department of Anesthesiology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

<sup>4</sup>Division of Hematology, Department of Internal Medicine, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

## ABSTRACT

Intraoperative cell salvage (ICS) system performs autologous transfusion by filtering and reinfusing the shed blood into corporeal circulation during the surgery. Especially for pregnant Jehovah's Witnesses, the ICS system could be a life-saving intervention. This report describes the successful use of intravenous iron therapy and ICS during the cesarean delivery of a Jehovah's Witness diagnosed with placenta previa totalis who refused to receive any type of blood or blood product transfusion. Intravenous iron treatment initiated in the preoperative period can reduce the need for blood and blood product transfusion. The ICS system provides recognised advantages; however, its utilisation requires high technology equipment and skilled health staff.

**Key Words:** *Jehovah's witness, pregnancy, Iron therapy, Intraoperative cell salvage.*

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## INTRODUCTION

Obstetric haemorrhage in a Jehovah's Witness requires careful management by healthcare professionals. Placenta previa poses an absolute obstetric indication for cesarean delivery due to a substantially increased risk of profuse bleeding during the second half of pregnancy and/or delivery.<sup>1</sup> Optimisation of the red blood cells during the preoperative phase is required to reduce the effect of bleeding and dilution on haemoglobin levels. The intraoperative cell salvage (ICS) system performs autologous transfusion by filtering and reinfusing the shed blood into corporeal circulation during the surgery.<sup>2</sup> Recent evidence suggests that ICS may be safely used in obstetric patients, thus many international obstetric societies now recommend its use as an adjunct in the management of obstetric haemorrhage.<sup>3</sup> This case describes the successful use of preoperative iron supplementation and ICS during the cesarean delivery of a Jehovah's Witness diagnosed with the placenta previa totalis.

## CASE REPORT

A 48-year, Gravida 3, Para 1, woman was admitted to our referral centre due to the mild vaginal bleeding at 32 weeks' pregnancy. In her past medical history, she also had an open myomectomy performed one year ago in another institution. On ultrasound examination, the placenta was placed anteriorly and diagnosed with previa totalis without invasion anomaly. When the patient was informed about the possibility of intractable obstetric haemorrhage during delivery, she refused any type of blood or blood products transfusion due to their religious beliefs, Jehovah's Witness. The patient was fully informed about the ICS system, explaining in detail that only her blood would be used with this system, which is acceptable with respect to her religious belief. She gave written consent, declaring that she understood the associated risks and possible further surgical interventions during the obstetric management. She agreed with the use of the ICS system during the surgery and consented for hysterectomy in case of intractable obstetric haemorrhage.

The patient had mild hypochromic microcytic anaemia [haemoglobin (Hb) level: 10 g/dl, mean corpuscular volume (MCV): 76 fl, mean corpuscular haemoglobin (MCH): 24 pg, ferritin: 10 µg/L (normal: 20-200 µg/L)] with remaining normal blood parameters. Intravenous (IV) ferric carboxymaltose infusion of 2 gm iron was preferred for the treatment of iron deficiency. Ferric caboxymaltose was given 15 mg/kg, maximum 1000 mg as a

Correspondence to: Dr. Tugba Sarac Sivrikoz, Division of Perinatology, Department of Obstetrics and Gynecology, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

E-mail: tugbasrc@gmail.com

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single infusion and repeated after 1 week with the aim to increase haemoglobin to compensate for the possible massive haemorrhage-related decrease and related severe hypoxemia.

At 33 weeks' gestation, the patient was hospitalised due to the threatened preterm labour without active vaginal bleeding. Tocolysis was initiated to save time for betamethasone course and neuroprotection. Nifedipine treatment was started as tocolysis, antenatal corticosteroid course was completed, and prophylactic magnesium sulfate infusion was given for 12 hours. Despite tocolysis for 24 hours, regular uterine contractions failed to stop and cesarean delivery was planned. The preoperative Hb level was 10.2 g/dl. Before the operation, placental mapping was performed under the guidance of ultrasound due to the anterior placenta previa, and the most appropriate area for uterine incision was planned with the aim to reduce intraoperative bleeding. Therefore, a cesarean section was performed through a midline skin incision, and a classical fundal uterine incision was utilised. A newborn girl child, weighing 2600 grams, was delivered with Apgar score of 7 at 1 minute and 9 at 5 minutes, respectively. Placenta was completely separated; however, moderate endometrial surface bleeding occurred. Oxytocin was administered as 6 IU infusions after 3 IU IV bolus, followed by the infusion of 10 mg/Kg tranexamic acid and 1000 cc crystalloid solution. The ICS procedure was initiated due to the patient's preoperative mild anaemia coupled with the moderate blood loss during repair of the uterus. While the uterus was repaired, 1300 ml of blood was collected in the reservoir. This blood was washed with a Medtronic Autolog Cell Saver Device (Medtronic, Minneapolis, MN). The dynamic bowl was initially filled with 600 ml/min and later 250 ml/min for three minutes, and the total normal saline wash volume was 250 ml. During the wash, the centrifuge speed was variable (upto 10,000 rpm). Salvage resulted in 110 ml blood with a hematocrit concentration of 55% being returned to the patient *via* 16 G antecubital dedicated cannula. However, after uterotonic and anti-fibrinolytic infusion and adequate fluid replacement, the uterus contracted and no further active bleeding occurred. Therefore, we decided to terminate the ICS procedure. During the operation, blood pressure values and diuresis remained normal. Hb level was 9 g/dl at the postoperative 4<sup>th</sup> hour.

A week after delivery, the patient had recovered completely; Hb level was 12 g/dl on postoperative day 7, and it was 13 g/dl two weeks after delivery. The postpartum period was uneventful. Anti-D prophylaxis was not required as the patient's blood group was O-Rh positive.

## DISCUSSION

Jehovah's Witnesses are a Christian denomination who refuses any type of blood and blood complements' transfusions. There are approximately 8.2 million active Jehovah's Witnesses worldwide.<sup>4</sup> In Turkey, postpartum haemorrhage is the second-leading cause of maternal mortality occurring in 6% of all the deliveries.<sup>5</sup> Any additional factor increasing the postpartum haemorrhage risk would indicate a high-risk for maternal

mortality. The management of the Jehovah's Witness with placenta previa poses a challenging condition.<sup>6</sup> In this patient group, the first step is to cure the existing anaemia before the delivery. For pregnant women with moderate or high-bleeding risk, the recommended Hb level is 13 g/dl; however, the issue is still debatable.<sup>7</sup> In general, a standardised approach should be planned for the detection, evaluation, and management of preoperative anaemia at least 4 weeks before the scheduled elective procedure. In our case, iron deficiency could not be corrected completely in the preoperative period, since the patient's first admission was late, when the appropriate time interval was considered.

Iron supplementation is indicated in the presence of confirmed iron deficiency anaemia, especially in pregnancy. An expert panel recently reviewed the role of intravenous iron in the management of perioperative anaemia, and concluded that patients with preoperative anaemia due to iron deficiency or chronic disease should receive preoperative treatment with oral or IV iron, depending on the timescale before surgery, tolerance of oral iron, and iron status.<sup>8</sup> No response to the iron therapy would indicate the anaemia or chronic disease, suggesting that erythropoietin-stimulating agents (ESAs) need to be initiated. Limiting preadmission testing a few days before the scheduled operative procedure precludes the opportunity to evaluate and manage the patient with unexplained anaemia. Therefore, we chose to use IV iron and ferric carboxymaltose once a week before the operation.

ICS may help to decrease or prevent allogeneic transfusion in case of intractable postpartum haemorrhage.<sup>4,7</sup> For the patients expected to develop major obstetric bleeding, the main management options include uterotonic agents, recombinant intravenous coagulation factors, and ultimately uterine artery embolisation and/or hysterectomy if bleeding is more than 1500 ml.<sup>6,7</sup> The Association of Anaesthetists of Great Britain and Ireland, Royal College of Anaesthetists, and the American Association of Blood Banks recommend cell salvage in the cases of major bleeding with expected blood loss of >1 L, cross-match incompatibility, allogeneic blood refusal, and the mean transfusion requirement for the planned procedure of >1 unit of blood.<sup>9</sup> Both the American College of Obstetricians and Gynecologists and American Society of Anesthesiologists suggest cell salvage in the cases of massive postpartum haemorrhage, insufficiency of blood bank coverage or refusal of banked blood.<sup>10</sup> Mauritz and de Souza *et al.* successfully managed both anaemia and perioperative bleeding in two Jehovah's Witness cases with placenta previa and percreta using the ICS procedure.<sup>11,12</sup> The current case was the first ICS procedure for obstetric bleeding in our clinic, managed successfully and completed without complications.

Although ICS is used in many surgical disciplines, caution is advised in obstetrics due to the theoretical risk of amniotic fluid embolism (AFE).<sup>13</sup> A fatal obstetric case was reported in 2000; however, the case had multiple risk factors and the relation of AFE with cell saving was not clear.<sup>10</sup> Some of the mechanisms

that are thought to prevent AFE when using ICS are leukocyte depletion filters starting after delivery of the placenta and using a separate suction source during the operation.<sup>2,3,13</sup> Furthermore, not a single AFE case was observed in the SALVO trial in which approximately 1500 cases were evaluated.<sup>13</sup> It should be noted that cell salvage utilisation requires the high technology equipment and skilled health staff. In the current case, the surgery was completed with cell salvage system without any related complications.

In conclusion, a pregnancy should be planned after correcting the nutritional anaemia for the patients, such as Jehovah's Witnesses, refusing allogeneic transfusion. In the cases of unplanned pregnancies, IV iron replacement may help to increase Hb level preoperatively, thus reducing the need for intraoperative transfusion. The ICS may be a reasonable and promising management option without increasing morbidity in complicated obstetric cases.

#### PATIENT'S CONSENT:

Informed consent was obtained from the patient.

#### COMPETING INTEREST:

The authors declared no competing interest.

#### AUTHORS' CONTRIBUTION:

TSS, CKI, MMC: Searched the literature.

TSS, CKI: Wrote the manuscript.

SKB, MOS: Supervised the manuscript.

All the authors have approved the final version of the manuscript to be published.

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