

Blood Transfusion Practices in Obstetrics: Our Experience

Sushil Chawla¹ · Maj H. K. Bal¹ · Brig Shakti Vardhan¹ · Col T. Jose¹ · Ipsita Sahoo¹

Received: 3 September 2017 / Accepted: 12 January 2018 / Published online: 16 February 2018
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About the Author



Dr. Sushil Chawla is working as dedicated teacher in Indian Navy at Armed Forces Medical College, Pune. He has special interest in high-risk obstetrics and fetal medicine.

Abstract

Objectives To ascertain and analyze the indications for transfusion of blood components in obstetric practice at our center.

Sushil Chawla is a Surgeon Captain and Associate Professor in Department of Obstetrics and Gynaecology at AFMC; Maj H. K. Bal is an Assistant Professor in Department of Obstetrics and Gynaecology at AFMC; Brig Shakti Vardhan is a Professor and HOD in Department of Obstetrics and Gynaecology at AFMC; Col T. Jose is an Associate Professor in Department of Obstetrics and Gynaecology at AFMC; and Ipsita Sahoo is a Assistant Professor in Department of Obstetrics and Gynaecology at AFMC.

✉ Sushil Chawla
chawla_sushil@rediffmail.com

¹ Department of Obstetrics and Gynaecology, AFMC, Pune, India

Materials and Methods A prospective observational study was conducted to analyze the various indications for transfusion of blood components in a tertiary care hospital. **Results** 1.3% of all obstetric patients from our center had blood components transfusion during the study period. Postpartum hemorrhage, placental causes and anemia are the commonest causes for need of transfusion in obstetric practice.

Keyword Blood transfusion in obstetrics · Postpartum hemorrhage · Component therapy

Introduction

“A plea for the freer use of blood transfusion in obstetrics” was an article by JOHN STALL-WORTHY, in BMJ in 1939.

Various pregnancy complications and disorders of labor present as risk factors for extra blood loss during pregnancy and cause severe hemodynamic instability. This along with complications due to abortion (spontaneous or induced) and ruptured ectopic pregnancy show up as conditions needing transfusion in the day-to-day practice of obstetrics.

The reported transfusion rate in obstetrics varies from 0.16 to 2–6%. The rates are more in women with abnormal labor and deliveries. The rates for transfusion also vary and show regional variation, different practices of different hospitals and different clinicians. Studies have stated that junior doctors and surgical specialists are more likely to transfuse patients than physicians and anesthesiologists [1–3].

Over the years, there has been a tendency to reduce use of blood transfusion in obstetrics. And the same has been supported by the research papers in this field. This decline in transfusion has occurred despite the rise in operative delivery rate at various centers. Despite the decrease in rates of blood transfusion the obstetric outcome has improved [1–3]. The common causes for the pregnancy-associated cases requiring transfusion are:

1. Postpartum hemorrhage
2. Anemia
3. Preeclampsia
4. 1st Trimester bleeding
5. Abruption placenta
6. Misc

A few common risk factors lead to transfusion of blood and components during pregnancy and labor, and these factors include placental problems (previa, abruptio, accreta, retained placenta), uterine overdistension (multiple gestation, polyhydramnios), preeclampsia, DIC, preterm labor and augmentation of labor and operative delivery—vaginal or abdominal [4–6].

The transfusion practices have been marred with controversies such as single-unit versus multiple-unit transfusions, whole blood versus component usage, clinical judgement versus “trigger” hemoglobin for transfusion and varying massive transfusion protocols, on the whole giving varying reports [7–9].

This study was undertaken with the objective to ascertain the total patients receiving transfusion, indications for transfusion, various blood components used, timing of transfusion and the presence of any risk factors in the patients transfused.

Materials and Methods

A prospective observational study was carried from Jan 01, 2016–Dec 31, 2016 at a tertiary care hospital in the Department of Obstetrics and Gynecology. All the women

attending the antenatal and abortion services in OPD formed the study population; the study group included all the patients who were transfused with blood components, during this period. The data collected were analyzed and tabulated.

Results

During the study period, there were a total of 2423 deliveries in our hospital. A total of 32 women were transfused with blood components during the period. These women were from different age groups and were a mix of primigravidae and multigravidae (Table 1).

During this period, 79 units of packed red blood cells (PRBC), 66 units of fresh frozen plasma (FFP), 12 units of random donor platelets (RDP) and 3 units of single-donor platelets (SDP) were used. There was no patient who required massive blood transfusion.

Hemodynamic instability due to excessive blood was common reason for the transfusion, followed by Hb < 7 gm%, thrombocytopenia and hemolysis. One patient with ruptured ectopic pregnancy was brought to the hospital in state of shock, and hemodynamic resuscitation

Table 1 Demographic characteristics (*N* = 32)

Characteristic	No (%)
Age (years)	
< 20	3
21–30	26
31–40	2
> 40	1
Parity	
Primigravida/primipara	15
Multigravida	17
Gestational age (weeks)	
< 10	4
11–20	4
21–30	–
31–40	23
> 41	1
Type of pregnancy	
Ectopic	1
Abortion	4
Intrauterine pregnancy	
Singleton	26
Twins	1
Mode of delivery	
Vaginal delivery	16
Operative vaginal delivery	1
Cesarean delivery	10

Table 2 Obstetric disorders requiring blood transfusion

Diagnosis	
Uterine atony	8
Genital tract trauma including uterine rupture/injury	3
Placental abruption	2
Placenta previa without accreta/increta/percreta	2
Placenta previa with accreta/increta/percreta	1
HELLP syndrome	3
Anemia	8

Table 3 Blood products transfused ($n = 160$)

Blood product	n (%)
PRBC	79
FFP	66
Platelet concentrate	15

was done along with the definitive treatment as she received PRBC during the intra- and postoperative period. Four patients were with abortion-related complications. Three patients were with hemodynamic instability, and one developed anemia following prolonged postabortal bleeding. The balance cases were all related to the antepartum, intrapartum or postpartum complications (Tables 2, 3).

Eight patients were diagnosed with severe anemia during the antenatal period and were transfused with PRBCs. The trigger for the PRBC transfusion was the symptoms of the patients or if hemoglobin was < 7 gm%. Three patients with severe preeclampsia and HELLP syndrome during this period were transfused with the components as per the clinical condition. Thirteen patients had postpartum hemorrhage. Ten patients had atonic PPH, and three patients had traumatic PPH (1 rupture uterus, 1 vulval hematoma and 1 vaginal laceration); three cases with PPH had placenta previa, and one case had placenta accreta. One patient was diagnosed as a case of abruption placenta and also developed PPH later. Five patients of PPH were also cases of GDM during the pregnancy.

Discussion

The Ten Commandments for the transfusion practice in medicine state that transfusion should only be used when the benefits outweigh the risks and there are no appropriate alternatives, and laboratory tests should not be the sole deciding factor for transfusion [10].

The different components of the blood play different functions, and there is a need to realize that the component therapy is the need for the present day. The blood

component therapy should not be just started on the basis of one investigation like Hb or platelet count, but the clinical profile of the patient, present condition, possibility of rebleed etc., should also be the guiding factor. Each bag of packed RBCs has 150–200 ml RBCs and 75 ml plasma with a hematocrit of around 60%. These are indicated when we have insufficient RBCs in circulation or there is decrease in oxygen-carrying capacity of blood. Vachhani et al. in their study discouraged practice of single-unit transfusion citing it as avoidable in majority of the cases, and the risks involved in blood transfusion can cause more damage than benefit to the patient [11, 12].

Platelets or fresh frozen plasma (FFP) is to be given as required. FFP is used in correction of microvascular bleeding, multiple coagulation factor deficiencies, massive transfusion with coagulation abnormalities and platelet concentrates when the platelet counts fall below 20,000/mm³. One unit of platelets increases the platelet count by 5000–7000/l. There is no role of prophylactic platelet transfusion; one needs to investigate and treat the cause. If the coagulation profile is not available, four units of FFP are given for four units of blood transfused within 24 h [11, 12].

Transfusion is a lifesaving procedure, but approximately 1% of all transfusions cause an immediate and delayed adverse reaction, despite the measures taken to reduce risks. Transmitted infections, hemolytic reactions, transfusion-associated acute lung injury (TRALI), hypocalcemia, hypomagnesemia, hyperkalemia, problems of massive transfusion such as hypothermia, metabolic acidosis and abnormalities of coagulation should deter all of us from indiscriminate use of blood components [11, 13].

Obstetric hemorrhage is the commonest cause of maternal death, causing one-fourth of maternal deaths yearly [14]. Massive and life-threatening obstetric hemorrhage occurs in 3–5% [2] and 0.1% [14–16] of deliveries, respectively, and blood product transfusion is required in 0.3–1% [14, 15].

During pregnancy the changes in the coagulation and the fibrinolytic system in form of enhancement and inhibition respectively occur, [16] large volume blood loss causes consumptive loss of coagulation factors, which causes more bleeding and starts a vicious cycle ending up with DIC. These obstetric hemorrhages could be massive and may require replacement of one entire blood volume within 24 h or replacement of 50% of total blood volume (TBV) within 3 h, i.e., massive blood transfusion (MBT). The setting of massive transfusion protocols (MTPs) describes the process of management of blood transfusion requirements in major bleeding episodes, assisting the interactions of the treating clinicians and the blood bank and ensuring judicious use of blood and blood components [17, 18].

Increased capacity to tolerate bleeding due to physiological changes and often inaccurate estimation blood loss in obstetrics may not show change in their vital signs, resulting in a delay in the detection and treatment [16].

During the study period, the incidence of blood product transfusion for obstetric patients in our institution was 1.3% (32/2423), which was similar to previously reported studies: 0.3–1% [19, 20] by James in Europe and a Japanese center.

Patients who had blood product transfusion received two or more units of PRBCs, nine had received three PRBCs, and three patients had received four units of PRBCs, which is also similar to earlier study by Butwick et al. [21]. Thirteen patients were transfused FFP, and as per the hospital protocol those requiring both PRBCs and FFP were transfused in the ratio of 1:2, whereas a study by Borgman recommended transfusion of PRBC & FFP at a ratio of 1:1.4 [17].

Anemia during pregnancy is significant cause of maternal mortality and morbidity. The decision for transfusion was done in this study when the Hb < 7 gm%, and there were < 4 weeks for delivery or in labor. This trigger for transfusion of blood has been controversial, and the Cochrane review favors the restrictive transfusion policy for the safety of the patients [8]. Postpartum PRBC transfusion in our study was only given if patient was prone to bleeding due to some medical condition. [18].

Conclusion

Placenta complications like placenta previa and postpartum hemorrhage are the major indications for blood transfusion was the obstetric practice.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical statements The authors that all procedures performed in this study involving human participants were in accordance with the ethical standards of institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent An informed consent was obtained from all the individual participants in the study.

References

- Balki M, Dhumne S, Kasodekar S, et al.. Blood transfusion for primary postpartum hemorrhage: a tertiary care hospital review. *J Obstet Gynaecol Can.* 2008;30:1002–7.
- Eyelade OR, Adesina OA, Adewole IF, et al. Blood transfusion requirement during caesarean delivery: risk factors. *Ann Ib Postgrad Med.* 2015;13:29–35.
- Bates I, Chapotera GK, McKew S, et al. Maternal mortality in sub-Saharan Africa: the contribution of ineffective blood transfusion services. *BJOG.* 2008;115:1331–9.
- Nyflot LT, Sandven I, Stray-Pedersen B, et al. Risk factors for severe postpartum hemorrhage: a case–control study. *BMC Pregnancy Childbirth.* 2017;17:17.
- Prata N, Hamza S, Bell S, et al. Inability to predict postpartum hemorrhage: insights from Egyptian intervention data. *BMC Pregnancy Childbirth.* 2011;11:97.
- Al-Zirqi I, Vangen S, Forsen L, et al. Effects of onset of labor and mode of delivery on severe postpartum hemorrhage. *Am J Obstet Gynecol.* 2009;201:273.
- Vachhani JH, Joshi JR, Bhanvadia VM. Rational use of blood: a study report on single unit transfusion. *Indian J Hematol Blood Transfus.* 2008;24(2):69–71.
- Carson JL, Carless PA, Hebert PC. Transfusion thresholds and other strategies for guiding allogeneic red blood cell transfusion. *Cochrane Database Syst Rev.* 2010;10:CD002042.
- Carson JL, Hill S, Carless P, et al. Transfusion triggers: a systematic review of the literature. *Transfus Med Rev.* 2002;16(3):187–99.
- Derek N. Transfusion Ten commandments. In: *Handbook of transfusion medicine.* 5th ed. Norwich: TSO Publishers; 2013. p. 1–3.
- Chhabra S, Namgyal A. Rationale use of blood and its components in obstetric-gynecological practice. *J Mahatma Gandhi Inst Med Sci.* 2014;19:93–9.
- Patel VP, Patel RV, Shah PT, et al. Study of role of blood transfusion in obstetric emergencies. *Int J Reprod Contracept Obstet Gynecol.* 2014;3(4):1002–5.
- Ismail S, Siddiqui S, Shafiq F, et al. Blood transfusion in patients having caesarean section: a prospective multicentre observational study of practice in three Pakistan hospitals. *Int J Obstet Anesth.* 2014;23(3):253–9.
- Prevention of Postpartum Hemorrhage Initiative. 2011. <http://www.pphprevention.org/pph.php>.
- Balki M, Dhumne S, Kasodekar S. Blood transfusion for primary postpartum hemorrhage: a tertiary care hospital review. *J Obstet Gynaecol Can.* 2008;30:1002–7.
- Millar C, Laffan M. Hemostatic changes in normal pregnancy. In: Cohen H, O'Brien P, editors. *Disorders of thrombosis and hemostasis in pregnancy: a guide to management.* London: Springer; 2015. p. 1–13.
- Patil V, Shetmahajan M. Massive transfusion and massive transfusion protocol. *Indian J Anaesth.* 2014;58:590–5.
- Borgman MA, Spinella PC, Perkins JG. The ratio of blood products transfused affects mortality in patients receiving massive transfusions at a combat support hospital. *J Trauma.* 2007;63:805–13.
- James AH, Paglia MJ, Gernsheimer T. Blood component therapy in postpartum hemorrhage. *Transfusion.* 2009;49:2430–3.
- Matsunaga S, Seki H, Ono, Y et al. A retrospective analysis of transfusion management for obstetric hemorrhage in a Japanese Obstetric Center. *ISRN Obstet Gynecol.* 2012; 2012: 854064. Published online 2012 Feb 6.
- Butwick AJ, Aleshi P, Fontaine M. Retrospective analysis of transfusion outcomes in pregnant patients at a tertiary obstetric center. *Int J Obst Anesth.* 2009;18:302–8.