

Analysis of Intrapartum Blood and Blood Product Transfusion in Tertiary Care Centre

I.Shinde⁽¹⁾, S. Mande⁽²⁾, G. Bapat⁽³⁾

¹Dr. Ishwari Shinde, Junior Resident, ²Dr. Shubhangi Mande HOU Dept of OBGY, ³Dr. Gauri Bapat Associate Professor, MGM Medical College and Hospital, Aurangabad, Maharashtra, India.

Abstract:-

Background: Blood Transfusion is identified as one of the essential components of comprehensive emergency obstetric care which has drastically reduced the maternal mortality. we aimed to study the different causes of obstetric hemorrhage and to analyse blood and blood product transfusion during intrapartum period.

Material and Methods: This is prospective study conducted at MGM Medical College and Hospital, in Department of OBGY. (Tertiary care centre) from June 2019 – April 2020 (12 months). A total 143 cases of patients who required intrapartum blood and blood products transfusion were included.

Results: In current study we found maximum transfusion were in the age group of 21-30 years. Multigravida are at more risk for requiring transfusion. Patients with irregular ANC visits are more prone to obstetric complications, because of Lack of awareness of proper ANC care. More than half of the cases had anaemia in moderate range. PPH is the commonest indication requiring blood transfusion followed by APH and PIH. Emergency procedure are at more risk of requiring transfusion. Most of the patients were in the moderate anaemia range, only packed red cell transfusion sufficed the haemostatic requirement.

Conclusion: The results helped to evaluate the frequent indication of blood transfusion in obstetrics, the number and components of blood transfused that would be helpful to estimate the need of blood products in future, to cope up the need and to secure an adequate blood donor pool.

Keywords:- Blood transfusion, Postpartum haemorrhage, Blood components, fresh frozen plasma/packed red blood cell.

I. INTRODUCTION

Maternal mortality is recognized as an important global health problem with obstetric haemorrhage being the leading cause in developing countries. ^[1] Blood transfusion is identified as one of the essential components of comprehensive emergency obstetric care which has drastically reduced the maternal mortality. ^[2] As per WHO estimates, over a thousand of all maternal deaths are directly

due to obstetric haemorrhage. It accounts for 24% of or an estimated 127,000 maternal deaths annually. ^{[3][4]}

In India, the prevalence of anaemia among pregnant women is about 65-75%. ^[5] The causes of pregnancy associated complications requiring transfusion are:

1. Postpartum haemorrhage
2. Anaemia
3. Preeclampsia
4. 1st Trimester bleeding
5. Abruptio placenta

World Health Organization (WHO) has defined anaemia in pregnancy as the haemoglobin (Hb) concentration of less than 11g/dl.

➤ Types of Anaemia:

There are several types and classifications of anaemia. The occurrence of anaemia is due to the various red cell defects such as production defect (aplastic anaemia), maturation defect (megaloblastic anaemia), defects in haemoglobin synthesis (iron deficiency anaemia), genetic defects of haemoglobin maturation (thalassaemia) or due to the synthesis of abnormal haemoglobin (haemoglobinopathies, sickle cell anaemia and thalassaemia) and physical loss of red cells (haemolytic anaemias). ^[6]

The causes of anaemia during pregnancy in developing countries are multifactorial; these include micronutrient deficiencies of iron, folate, and vitamins A and B12.

Anaemia during pregnancy is reported to have negative maternal and child health effect and increase the risk of maternal and perinatal mortality. The negative health effects for the mother include fatigue, poor work capacity, impaired immune function, increased risk of cardiac diseases, and mortality. ^[6]

Postpartum haemorrhage (PPH) is defined as any amount of bleeding from or into the genital tract following birth of the baby up to the end of the puerperium, which adversely affects the general condition of the patient evidenced by rise in pulse rate and falling blood pressure, is called postpartum haemorrhage. ^[7] When blood loss is more than 500ml in vaginal delivery and more than 1000ml in caesarean delivery is labelled as postpartum hemorrhage⁽⁸⁾. Postpartum haemorrhage can be divided into 2 types: primary postpartum haemorrhage, which occurs within 24 hours following the birth of the baby, and secondary postpartum haemorrhage, which occurs beyond 24 hours

and within puerperium, also called delayed or late puerperal haemorrhage. [7] Around 12-13% of all deliveries lands up into PPH with a blood loss of more than 1000ml, whereas life-threatening haemorrhage occurs in 0.1% patients. [9,10]

➤ **Aim:**

Analysis of intra-partum blood and blood products transfusion in tertiary care centre.

➤ **Objectives:**

- To study the incidence of intra-partum blood transfusion.
- To study causes of blood transfusion.

II. MATERIAL AND METHODS

This is prospective study conducted at MGM Medical College and Hospital, in Department of OBGY (Tertiary care centre). The period of data collection spread over 1 year from June 2019 to April 2020.

Inclusion criteria: All patients requiring intrapartum transfusion of blood or blood products are enrolled in the study.

Exclusion Criteria: No exclusion criteria

RESULT

Table 1: Distribution of age group

Age	No. of Patients(n=143)	Percentage (%)
<20	22	15.38
21-30	107	74.83
31-40	14	9.79

Maximum transfusion rates are seen in the age group of 21-30 years

Table 2: Gravida Score of patients

Gravida	No. of Patients(n=143)	Percentage (%)
Primigravida	44	30.77
Multigravida	82	57.34
Grand Multigravida	17	11.89

In table 2, Multigravida are at more risk for requiring transfusion

Table 3: Booking Status of patients

Booking Status	No. of Patients(n=143)	Percentage (%)
Booked	27	18.88
Irregular ANC visits	109	76.22
Not booked	7	4.90

In table 3, patients with irregular ANC visits are more prone to obstetric complications, because of Lack of awareness of proper ANC care

Table 4: Haemoglobin Level of Patients

Hb (gm/dl)	No. of Patients(n=143)	Percentage (%)
Severe (<6)	5	3.50
Moderate (6.1 - 8.9)	75	52.45
Mild (9- 10.9)	51	35.66
Normal	12	8.39

In table 4, more than half of the cases had anaemia in moderate range.

Table 5: Indication of Blood Transfusion

Complications	No. of Patients	Percentage (%)
Atonic PPH	23	16.08
Traumatic PPH	18	12.59
Placental Abruption	17	11.89
Placenta Previa without Accreta/Percreta/Increta	10	6.99
Placenta Previa with Accreta/Percreta/Increta	2	1.40
HELLP Syndrome	9	6.29
Thrombocytopenia	9	6.29

In table 5, PPH is the commonest indication requiring blood transfusion followed by APH and PIH.

Table 6: Mode of Delivery

Mode of Delivery	Total No. of Delivery	Transfusion Cases	Percentage (%)
Vaginal Delivery	1862	60	3.22
Caesarean (elective)	720	15	2.08
Emergency caesarean	943	68	7.21

In table 6, Emergency procedure are at more risk of requiring transfusion

Table 7: Blood Product Transfused to the patients

Blood Product Transfusion	No. of Patients	Percentage (%)
Packed Cell Transfusion	107	74.83
PCV + Blood Components (FFP + PRC/ Cryoprecipitate)	31	21.68
Only Platelets	5	3.50

In table 7, Most of the patients were in the moderate anaemia range, only packed red cell transfusion sufficed the haemostatic requirement.

Table 8: Maternal Mortality of the patients

Causes	No. of Patients	Percentage (%)
DIC	3	2.10
Severe Anaemia	1	0.70

In spite of receiving adequate blood transfusion maternal mortality occurred due to causes like septicemia, AKI, DIC.

III. DISCUSSION

Blood transfusion in obstetric practice is documented to be life saving for both mother and the foetus. Blood transfusion is one of the essential components of comprehensive emergency in obstetric care and has shown to reduce morbidity and mortality. Transfusion in obstetric patients is challenging due to changes in maternal physiology, risk of alloimmunisation and infections in foetus.⁽¹¹⁾

In our study, the 74.84% of mothers aged of 21-30. Studies done by Solwayo Ngwenya⁽¹²⁾ and Sam Ononge et al⁽¹³⁾ revealed that patients who had postpartum hemorrhage were in the age group of 27.7 ± 6.9 years and 24.4 ± 6 years respectively. Out of 143 obstetric patients who underwent blood component transfusion, 30.77% were primigravida and 57.34% were multigravida. Whereas Shiffi Fazal et al⁽¹⁴⁾ reported no significant association of multigravida with risk of blood transfusion.

Underutilization of ANC services among pregnant women in many low and middle-income countries has been a major public health issues with only 51% attending four or more ANC visits⁽¹⁵⁾. In our study around 76% of pregnant women had irregular ANC visits. Ngatho S Mugo et al⁽¹⁶⁾ reported the prevalence of non-use of ANC was 58%, the prevalence of 1-3 ANC visits was 24% and that for 4 or more visits was 18%.

Anaemia during pregnancy is significant cause of maternal mortality and morbidity. The decision for transfusion was done during intrapartum period when the Hb was < 9 gm%. In our study 52.54% of pregnant women with moderate anaemia received blood transfusion. According Ramanathan G et al⁽¹⁷⁾ anemia increases the risk of postpartum hemorrhage. Some studies concluded that severe anemia impairs transport of hemoglobin and oxygen to uterus leading to tissue enzyme and cellular dysfunction which impairs the myometrial contractility^(18,19). Kaima A. Frass et al stated that patients with Hb of 7 or less are at increased risk of landing up into PPH as compared to patients with Hb of 7.1-10⁽²⁰⁾.

On the other hand, the most common complications during labor were found to be PPH in our study. Atonic PPH comprises 16.08% whereas traumatic PPH comprises 12.59%. Paul I. Ramler et al⁽²¹⁾ concluded in his study that the commonest cause of PPH was uterine atony (59%). He also confirmed that women with PPH leading to massive transfusion were aged over 35 years. In the present study, high parity was significantly associated with primary

postpartum haemorrhage. Similar findings confirmed by Temesgen MA et al.⁽²²⁾ It may be due to repeated stretching of muscle fibres leads to the loss of muscle tone that results in uterine atony. Traumatic PPH results from genital tract trauma. Risk factors for the same includes operative vaginal delivery and precipitous labour⁽²³⁾. In present study 12.59% cases lands up into PPH due to genital tract trauma.

In our study 7.21% of patients who underwent emergency caesarean section required blood transfusion. Whereas 3.22% cases who delivered vaginally required blood transfusion. Our findings confirmed by the study done by Homa K. Ahmadzia et al⁽²⁴⁾. They concluded that around 51% cases of primary non elective caesarean section and 31% of repeat non elective caesarean section required blood transfusion.

Normally, blood loss during birth is well-tolerated because of changes during pregnancy. In general, $< 15\%$ loss results in minimal symptoms; 15-30% causes tachycardia; 30-40% shock; $> 40\%$ loss leads to severe shock.⁽⁴⁾ In our study 74.83% required only packed cell transfusion, 21.68% required blood components along with PCV, and 3.5% patient required only platelets. Red blood cells can be transfused either as whole blood or PRBC. A unit of whole blood is 400-500 ml, with a hematocrit of 45-55%, each unit of PRBCs, has 180-200 ml of RBCs, 50-70 ml of plasma and hematocrit of 60-70%. PRBCs are indicated in decreased oxygen carrying capacity or hypoxia due to inadequate red cell mass. FFP is indicated for correction of coagulation abnormalities, micro vascular bleeding, and when the platelet counts fall below 20,000/mm³, platelet concentrates are given⁽⁴⁾.

During pregnancy, enhancement of coagulation system and inhibition of fibrinolytic system occurs, large volume blood loss causes consumptive loss of coagulation factors, which results in more bleeding and starts a vicious cycle ending up with DIC.⁽²⁵⁾ In present study one multiparous vaginal delivered with severe anemia succumbed due to acute renal failure with septicemia and 3 patients referred from outside required multiple transfusions landed up in DIC and collapsed due to multiorgan failure.

IV. CONCLUSION

Blood transfusion is lifesaving essential component of obstetric care. Acute obstetric blood loss is usually unpredictable and sudden. The decision to transfuse should be time taken to maintain adequate tissue oxygenation in the face of acute hemorrhage. Identifying the risk factors for hemorrhage in antenatal period and anticipating bleeding is essential in managing obstetric hemorrhage. A preplanned, multidisciplinary protocol yields the best results in the management. Overall incidence of blood component utilization has significantly increased in the recent years, but still, the use of whole blood is preferred by many clinicians because of its easy availability in the blood banks.

REFERENCES

- [1]. Patil V, Shetmahajan M. Massive transfusion and massive transfusion protocol. *Indian J Anaesth.* 2014;58:590–5.
- [2]. Balki M, Dhumne S, Kasodekar S, Carvalho JC, Seaward G. Blood transfusion for primary postpartum hemorrhage: A tertiary care hospital review. *J Obstet Gynaecol Can* 2008;30:1002-7.
- [3]. Say L, Chou D, Gemmill A, Tuncalp O, Moller A-B, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health* 2019; 2: e323–33.
- [4]. 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.
- [5]. Petersen LA, Lindner DS, Kleiber CM, et al. Factors that predict low haematocrit levels in the postpartum patient after vaginal delivery. *Am J Obstet Gynecol* 2002;186:737–744.
- [6]. Ohkuchi A, Onagawa T, Usui R, et al. Effect of maternal age on blood loss during parturition: a retrospective multivariate analysis of 10,053 cases. *J Perinat Med* 2003;31:209–215.
- [7]. D C Dutta's, *Textbook of Obstetrics*; 9 th edition; 474-476.
- [8]. Rath WH. Postpartum hemorrhage—update on problems of definitions and diagnosis. *Acta obstetricia et gynecologica Scandinavica.* 2011;90(5):421-8.
- [9]. Rani PR, Begum J. Recent Advances in the Management of Major Postpartum Haemorrhage-A Review. *Journal of clinical and diagnostic research: JCDR.* 2017; 11(2):QE01.
- [10]. World Health Organization. WHO recommendations for the prevention and treatment of postpartum haemorrhage. World Health Organization, 2012
- [11]. Jadon, Ashok, and Rajni Bagai. "Blood transfusion practices in obstetric anaesthesia." *Indian journal of anaesthesia* vol. 58,5 (2014): 629-36.
- [12]. Solwayo Ngwenya. Postpartum hemorrhage: incidence, risk factors, and outcomes in a low-resource setting. *International Journal of Women's Health.* 2016; 8:647-650.
- [13]. Sam Ononge, Florence Mirembe, Julius Wandabwa, Oona MR. Campbell. Incidence and risk factors for postpartum hemorrhage in Uganda. *Reproductive Health.* 2016; 13:38.
- [14]. Fazal, S., & Poornima, A. (2018). A study on transfusion practice in obstetric hemorrhage in a tertiary care centre. *Global Journal of Transfusion Medicine,* 3(1), 41.
- [15]. United Nations. The Millennium Development Goals report 2011. New York: United Nations; 2011.
- [16]. Mugo, N. S., Dibley, M. J., & Agho, K. E. (2015). Prevalence and risk factors for non-use of antenatal care visits: Analysis of the 2010 South Sudan household survey. *BMC Pregnancy and Childbirth,* 15(1), 1–13.
- [17]. Ramanathan G, Arulkumaran S. Postpartum hemorrhage. *J Obstet Gynecol Can* 2006;28(11):967–73. Ekeroma AJ, Ansari A, Stirrat GM. Blood transfusion in obstetrics and gynaecology. *Br J Obstet Gynaecol.* 1997;104: 278–84.
- [18]. Kavle JA, Stoltzfus RJ, Witter F, Tielsch JM, Khalfan SS, et al. Association between anemia during pregnancy and blood loss at and after delivery among women with vaginal births in Pemba Island, Zanzibar, Tanzania. *Health Popul Nutr* 2008;25(2):232–40.
- [19]. Jaleel R, Khan A. Severe anemia and adverse pregnancy outcome. *J Surg Pak* 2008;13(4):147–50. Bodnar LM, Scanlon KS, Freedman DS, et al. High prevalence of postpartum anemia among low-income women in the United States. *Am J Obstet Gynecol* 2001;185:438–443.
- [20]. Frass, K. A. (2015). Postpartum hemorrhage is related to the hemoglobin levels at labor: Observational study. *Alexandria Journal of Medicine,* 51(4), 333–337.
- [21]. Ramler, P. I., van den Akker, T., Henriquez, D. D. C. A., Zwart, J. J., van Roosmalen, J., van Lith, J. M. M., van der Bom, J. G., Loeff, R. M., van Goeverden, R. J., Eijlers, B., Hillebrand, A., Spelmin, S. E., Beunder, T. J., Harskamp, V., Wind, M., Koning, M. D., Cramer, R. A., Veenstra, A., Smith, S. M., ... Roos-van Milligen, E. (2019). Women receiving massive transfusion due to postpartum hemorrhage: A comparison over time between two nationwide cohort studies. *Acta Obstetrica et Gynecologica Scandinavica,* 98(6), 795–804.
- [22]. Temesgen MA. Magnitude of Postpartum Hemorrhage among Women Delivered at Dessie Referral Hospital, South Woll, Amhara Region, Ethiopia. *J Women's Health Care* 2017; 6: 391
- [23]. Wormer KC, Jamil RT, Bryant SB. Acute Postpartum Hemorrhage. [Updated 2020 Oct 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan
- [24]. Ahmadzia, H. K., Phillips, J. M., James, A. H., Rice, M. M., & Amdur, R. L. (2018). Predicting peripartum blood transfusion in women undergoing cesarean delivery: A risk prediction model. *PLoS ONE,* 13(12), 1–15.
- [25]. 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