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Original Research Article

Study of consumption of blood and blood components in emergency obstetrics patients

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ABSTRACT

Background: Most of the emergencies in the labour room, which require blood and blood product transfusion includes, complications of abortion, placenta previa, ruptured ectopic pregnancy and haemorrhage in labouring patients. Patients may come with severe anaemia and may develop post-partum haemorrhage or any other complications resulting in massive blood loss and rapid deterioration in well-being of the mother. Blood transfusion has become life-saving in management of haemorrhage in obstetric patients. However, like all treatments, it may result in acute or delayed complications.
Methods: This retrospective study has included the patients who came with obstetric emergencies requiring blood and blood products during antepartum, intrapartum and postpartum period at the obstetrics and gynaecology department, at tertiary care hospital between December 2022 to December 2023.
Results: Multigravida patients required more blood transfusion (69.23%) compared to primigravida (30.76%). Anaemia (38.46%) was the commonest indication for blood transfusion followed by post-partum haemorrhage (21.53%). Fever and shivering (3.07%) were seen to be the commonest adverse reactions. This study observed 92.3% live birth and 7.7% intrauterine foetal demise. Wound gap developed in 3(4.61%) patients following blood and blood products transfusion.
Conclusions: Transfusing blood or its components holds utmost importance in comprehensive obstetric care, as emphasised by the current study. Haemorrhage in labouring patients and anaemia are leading causes of maternal morbidities and mortalities. The most effective outcomes in management are achieved through a carefully planned multidisciplinary protocol. Prompt availability of blood and blood components helps to avert mortality in a considerable number of cases.

Keywords: Blood transfusions, Blood products, Emergency obstetrics

INTRODUCTION

Blood transfusion services play an important role in obstetric emergencies, majority of them being obstetric hemorrhage which can lead to maternal morbidities and mortalities, if not properly taken care of.[1] Most of the emergencies in labour room, which require blood and blood product transfusion includes, complications of abortion, placenta previa, ruptured ectopic pregnancy and haemorrhage in labouring patients. If anemia during pregnancy is diagnosed and treated early by regular antenatal visits, many such complications can be avoided. Definition of anemia in pregnancy according to World Health Organization (WHO) is haemoglobin levels of <11 g/dl in 1st and 3rd trimester and <10.5 g/dl in 2nd trimester.[2] Timely diagnosis and treatment of anemia are essential to avoid the need for blood transfusions and reduce maternal morbidities and mortalities.

Indian Council of Medical Research (ICMR) classification of anemia in pregnancy is defined based on maternal hemoglobin levels. Mild anemia is defined as hemoglobin levels between 10-10.9 gm/dl. Moderate anemia is defined as hemoglobin levels between 7-9.9 gm/dl. Severe anemia

is defined as hemoglobin levels between 4-6.9 gm/dl and very severe anemia is defined as hemoglobin levels <4 gm/dl.[2]

Blood transfusion is absolutely recommended when hemoglobin falls below 7 g/dl, reducing maternal morbidity and mortality.[3] According to WHO prevalence of anaemia in pregnancy in developed countries is around 14%. In developing countries, it is estimated to be around 51% and the prevalence of anemia during pregnancy in India is around 65-75%.[4] Obstetric hemorrhage, associated with pregnancy or parturition, poses a significant risk, with shock often requiring urgent blood transfusion. Approximately 60% of maternal deaths in developing nations are attributed to postpartum hemorrhage (PPH), resulting in over 1,00,000 maternal fatalities globally each year, according to statistics from the WHO.[1] Managing obstetric hemorrhage is more challenging due to pregnancy-induced hypervolemia.

Blood and blood products consumed during obstetric emergency are mentioned below.[5]

Red blood cells (RBCs)

Whole blood can be transfused, as they help in improving oxygen carrying capacity, especially for patients facing acute blood loss.

Fresh frozen plasma (FFP)

It is suitable for addressing coagulation abnormalities and microvascular bleeding when coagulation profile is deranged or in patients with coagulation factors deficiency.

Platelets

Platelet transfusions become necessary for obstetrical patients with microvascular bleeding when the platelet count falls <50,000/mm^3.

Cryoprecipitate

They are rich in fibronectin, fibrinogen, Von Willebrand's factor and factor 8 and 13. They are derived from slowly thawing FFP.

Leukocyte depleted blood

In the process of leukoreduction, leukocytes are removed and transfused. They help in preventing or delaying leukocyte-mediated adverse reactions.

The global perspective is emphasized by recognizing the significant number of women dying during childbirth or postpartum, globally. Blood transfusion plays an important role in obstetric emergencies. Its appropriate use is linked to reduced maternal mortality rates.[6] Ensuring rational blood and component usage is vital to meet demand, prevent transfusion-related risks, and bridge supply gaps. In developing countries like India, efforts should focus on maintaining and swiftly providing blood transfusion services to reduce maternal morbidity and mortality from hemorrhage. The purpose of this research is to address the prevalence, indications, and adverse reactions with blood transfusions during obstetric emergencies at a tertiary care facility in Ahmedabad, Gujarat.

Objective

Objective of this study is to identify the prevalence, Indication as well as the adverse reaction of transfusion in obstetric emergencies during antenatal and postnatal period, also to study the maternal and perinatal outcomes in these patients.

METHODS

Study design

It was a retrospective study.

Study site

The study was conducted at a tertiary care hospital, Ahmedabad.

Study duration

The duration of the study was from December 2022 to December 2023.

Sample size

The sample size was 65.

Sampling method

Convenient non probable sampling method was used.

Data entry was done in Microsoft excel.

Number, indication, type and any adverse reaction due to transfusion were recorded. Comparison of analysed data was done with various studies and discussed.

Inclusion criteria

All patients with obstetric emergencies like antepartum hemorrhage, postpartum hemorrhage, severe anemia, ectopic pregnancy, and abortions requiring blood transfusion.

Exclusion criteria

Obstetrics patients requiring elective transfusion blood and blood components.

RESULTS

A total number of 65 patients were enrolled in the study with the maximum number of patients were between the age group of 20-30 and with majority belonging to rural areas (69.23%) (Table 1). Majority of patients were un-booked (78.46%).

Table 1: Age wise distribution of patients (n=65).

Age in years	No. of patients (%)
<20	2 (3.07)
20-30	49 (75.38)
>30	14 (21.53)

Details on pre-transfusion haemoglobin levels are in Table 2.

Majority of the patients (69.23%) were multiparous. Majority of our patients had (95.38%) singleton pregnancy.

Table 2: Distribution of patients according to pretransfusion haemoglobin level (n=65).

Haemoglobin (gm/dl)	No. of patients (%)
Less than 7	18 (27.69)
7-9	40 (61.53)
More than 9	7 (10.76)

Most common mode of delivery requiring blood transfusion was vaginal delivery followed by caesarean section as shown in Figure 1.

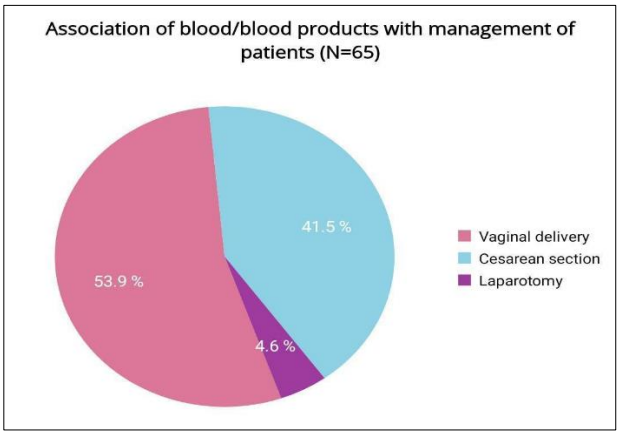

Figure 1: Association of blood and blood products with management of patients (n=65).

Most common indication of blood transfusion in our study was anaemia followed by post-partum haemorrhage as shown in Figure 2.

Total 195 units of blood and blood products were transfused out of which packed red blood cells (35.38%) were the most common type of blood product used for transfusion as mentioned in Table 3.

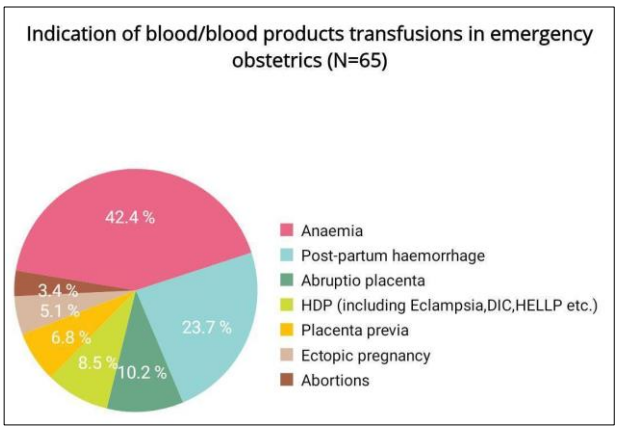

Figure 2: Indication of blood and blood products transfusion in emergency obstetrics (n=65).

Table 3: Distribution of blood and blood products unit wise (n=195).

Blood products	No. of products (%)
Whole blood	27 (13.84)
PRBC	69 (35.38)
FFP	48 (24.47)
PRC	36 (18.46)
Cryoprecipitate	15 (7.69)

The adverse reactions of blood transfusions were seen in 7.69% of total patients. Shivering and fever (3.07%) was the most common adverse reaction seen.

Maternal morbidity other than blood transfusion reactions are shown in Table 4.

Perinatal outcome of this study consisted of 92.3% live birth and 7.7% intrauterine foetal demise.

Table 4: Maternal morbidities other than blood transfusion reaction in present study (n=65).

Maternal complications	No. of patients (%)
Wound gap	03 (4.61)
Post op abdominal distension	01 (1.53)
Septicaemia	01 (1.53)
Maternal mortality	01 (1.53)

DISCUSSION

Obstetric emergencies can be lethal for mother and fetus. Acute hemorrhage can be a threat to life and timely management is of utmost importance. Causes for hemorrhage in initial stages of pregnancy include ruptured ectopic pregnancy, abortion complications and vesicular moles etc. Antepartum hemorrhage can occur in the later

stages of pregnancy. Postpartum hemorrhage or other difficulties during labour may result in rapid decline in well-being of the mother. This study was done to assess the need for blood transfusion in emergency obstetrics patients.

Out of 363 patients presented with obstetrics emergencies, 65 patients required blood transfusion. Hence, the prevalence of such transfusions in this study was 17.9%. In another study, incidence was found to be 14.4%.[7] Total 49 (75.38%) patients were aged between 20-30 years. In India, studies conducted by Chawla et al and Fazal et al also reported that blood transfusion was done in majority of patients aged between 21-30 years and 20-29 years respectively.[8,9] Blood transfusion risk increases with extremes of age.[10]

Total 69.23% and 30.76% of the study population were multigravida and primigravida respectively. Which was comparable with the study conducted by Chawla et al and Fazal and Poornima in which 53% and 50.8% patients were multigravida, respectively.[8,9] Majority (68.35%) of the patients receiving blood transfusion were multiparous in a study done by Chowdhury et al. So, multiparity as such is one of the major risk factors requiring utmost care.[11]

In this study 69.23% patients residing in rural areas and 30.76% patients belonged to urban areas. Which was comparable with another study, where 57% of patients belonged to rural areas while 43% belonged to urban areas.[12] Which indicates that urbanization as well as availability of easily accessible services may lead to reduction of the blood transfusion requirement in obstetric emergencies.

The patients with at least three antenatal care visits in the hospital were regarded as booked patients. Most patients who received blood transfusion were un-booked (78.46%). In another study by Mahalaxmi et al concluded that 73% of patients were un-booked.[7] This can be explained by the observation that a significant portion of these individuals were transferred from peripheral healthcare centers, and some of them having no prior antenatal visit records. This emphasises the usefulness of routine antenatal visits in providing iron therapy which helps in anemia prevention during pregnancy, also helps in early diagnosis and treatment for the same. This explains that the un-booked cases had more numbers of obstetric emergencies and thus the number of transfusions were very high in such patients.

95.38% of the study population had singleton pregnancy whereas twin pregnancy consisted of 4.62%. This is in correspondence with the study done by Chawla in 2018 where prevalence of singleton pregnancy was 81%.[8]

Majority of the patients had vaginal delivery (53.86%) followed by caesarean section (41.53%), laparotomy for ectopic pregnancy (4.61%) in the present study. A study done by Chowdhury also had similar finding with 59.1% having vaginal delivery and 37.03% having caesarean section.[11]

Total 60% of patients required blood transfusions due to anemia 25 (38.46%) followed by post-partum haemorrhage (PPH) 14 (21.53%). This is in accordance with the study where 30% and 32% patient required blood transfusion due to obstetric hemorrhage and severe anaemia respectively.[13] In obstetric emergency, severe anemia and obstetric hemorrhage were the most common indications of blood transfusions in study done by Chhabra et al.[14] In this study overall anemia (38.46%) was one of the most common indications for blood transfusion, followed by PPH (21.53%), which was in accordance with a study done by Bangal et al reported 20.92% cases of severe anemia and postpartum hemorrhage accounted for 36.55% of the cases.[15]

Packed cells (35.38%) was the most common blood product transfused in the present study followed by FFP (24.47%), platelets (18.46%), whole blood (13.84%) and cryoprecipitate (7.69%). These findings were in accordance with the study done by Fazal and Poornima. They reported that 87.2%, 48.1%, and 43.7% received packed red cell, fresh frozen plasma and platelet transfusion, respectively.[9]

Post blood transfusion reactions were seen in 7.69% cases in this study, out of which fever and shivering (3.07%) were the most common.

In this study out of 65 patients, 3 patients developed wound gap (2 episiotomy wound gap and 1 LSCS wound gap), 1 patient developed postoperative abdominal distention and 1 case of septicaemia was reported in patient with preeclampsia followed by DIC and multi-organ dysfunction resulting in maternal mortality.

In the present study, 92.3% were live births and 7.7% were intrauterine fetal deaths. Placental insufficiency leads to compromised blood supply to the fetus and lack of oxygen resulting in IUFD. According to study of Patel et al, 82% were live births and 12% were IUFD.[15]

The main purpose of the study is to ensure the ready availability of blood and blood components to address complicated scenarios during specific stages of obstetric emergencies. The focus is on timely and appropriate management of these emergencies, aiming to improve both maternal and perinatal outcomes.

CONCLUSION

Transfusing blood or its components holds utmost importance in comprehensive obstetric care, as emphasized by the current study. Maternal morbidity and mortality are primarily attributed to anaemia and obstetric haemorrhages. The sudden and unpredictable nature of acute obstetric blood loss necessitates timely transfusions to maintain adequate tissue oxygenation during

hemorrhagic events. Identifying antenatal risk factors for haemorrhage and anticipating bleeding are essential components of effective obstetric haemorrhage management. Optimal results in management are achieved through a pre-planned, multidisciplinary protocol that aims to minimize blood loss and maximize haemoglobin levels at the time of delivery. Establishing a supply of blood products is imperative for any institution managing obstetrics, and the judicious clinical use of blood is equally vital.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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