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Blood transfusion practices in obstetric patients at a tertiary care institute during COVID-19 first wave: The need to re-strategize

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Abstract
The COVID-19 pandemic has had an enormous impact on all aspects of life, including the blood transfusion practice. We tried to explore the reasons for blood transfusion in detail for each obstetric case that required it. Our aims were to-

1. Study the incidence of blood transfusion in obstetrics
2. Determine the reason behind the need for blood transfusion
3. Follow-up to obtain history about prophylactic iron supplementation

Out of 6049 admissions in 2020, 211 (3.4%) patients required blood product transfusion (which included two maternal mortalities). Commonest indication for blood transfusion was anemia(63.5%) followed by obstetrical hemorrhage (34.12%). Patients(60.6%) contacted telephonically indicated poor compliance to oral iron. The analysis of blood transfusions during a COVID-19 wave shows unpreparedness to cope with an enormous shortage of blood products, exposing a loophole. Hence innovative ideas and an investigation into non-compliance toward iron tablets is the need of the moment.

Keywords: anemia, blood transfusion, COVID-19, obstetric hemorrhage, PCV, blood products shortage

Introduction

Blood transfusion is a lifesaving intervention that is included in the World Health Organization (WHO) list of essential medications. Transfusion of blood and blood products is a common practice in obstetrics. The conditions requiring transfusion in obstetric patients need to be tackled very promptly to avoid severe maternal morbidity and mortality. An outbreak of pneumonia was reported on December 31, 2019 in the city of Wuhan, Hubei Province, China, which was identified and subsequently named severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), belonging to the Beta coronavirus genus of the *coronaviridae* family on January 7, 2020. As of March 11, 2020, the World Health Organization declared the disease pandemic and named it COVID-19.

The COVID-19 pandemic has had an enormous impact on almost all aspects of life, including the blood transfusion practice, number of blood donations, blood safety and movement of consumables used for blood transfusion screening resulting in blood supply shortage. The remaining sources of blood were via family replacement and scarcely available commercially remunerated donors.

The main causative factors for maternal mortality in India remain anemia, hemorrhage and sepsis. Anemia has always been a major public health problem in the postpartum period and pregnancy with prevalence estimated to be around 65% in India [1].

A few common risk factors that lead to transfusion of blood and components during pregnancy and labor include placental problems (previa, abruptio, accreta, retained placenta), uterine over distension (multiple gestation, polyhydramnios), preeclampsia, DIC, preterm labor and augmentation of labor and operative delivery— vaginal or abdominal [2].

Hence, blood transfusion is an essential component of emergency obstetric care and appropriate and timely transfusion helps in reduction of maternal morbidity and mortality [3].

Our aim is to explore the reasons for blood transfusion in detail in each obstetric case and, to ultimately use the information gained through this process to reduce the requirement of blood transfusion in the future.

Objectives

1. To study the incidence of transfusion of blood and blood products in obstetrics patients in the study period from 1st January 2020 to 31st December 2020.
2. To analyze the sample set in order to determine reason behind the need for blood transfusion.
3. Follow up with these patients to obtain a detailed history of antenatal follow-up and prophylactic iron supplementation.

Materials and Methods

This was a retrospective study

Inclusion criteria

Obstetric patients who needed blood or blood products transfusion from January 2020 to December 2020.

Exclusion criteria

Patients whose records were not available

Data was collected from the following-

1. Data from IPD register
2. Data from the blood bank
3. In patient files from the record section

The patients were contacted telephonically to ascertain the cause that led to transfusion, any relevant past history.

The data was assessed statistically.

Results

Incidence

Total number of admissions in antenatal and labor ward from January 2020 to December 2020 was 6049.

Total number of patients who were transfused with blood or blood products is 211 (3.4%)

Age of patients

Majority of patients (100 patients) belonged to age group 21 to 25. 92% patients were 30 years or less in age. There were only two patients more than 35 years of age who needed blood or blood product transfusion.

Table 1: Distribution of patients requiring blood transfusion in different age groups

Age	Number	Percentage
</=20	40	18.86
21-25	100	47.16
26-30	54	25.93
31-35	15	0.07
>35	2	0.01
Total	211	100

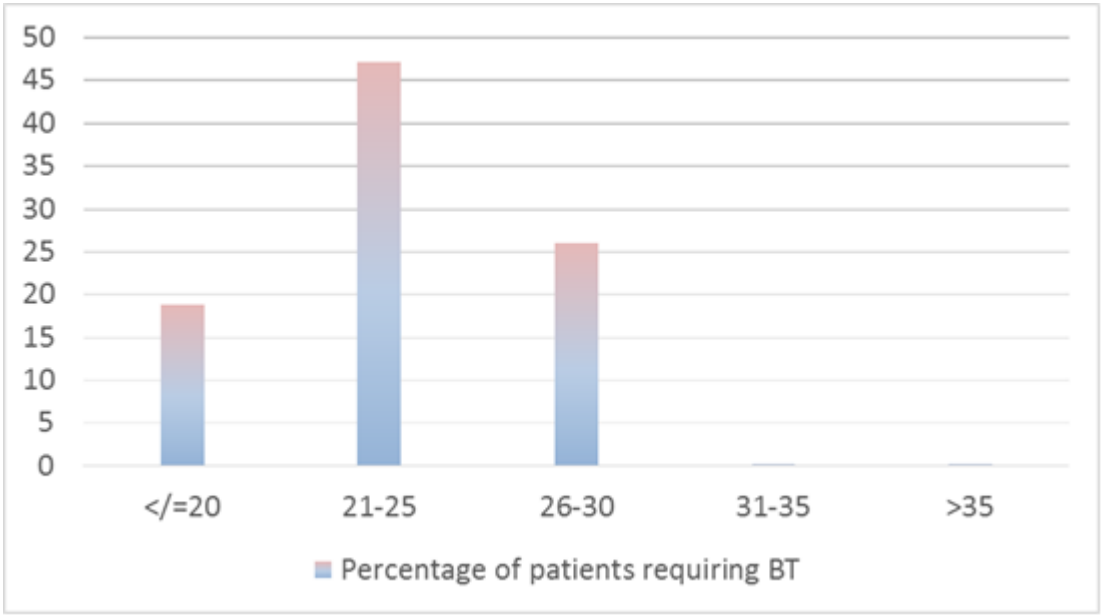

Fig 1: Distribution of patients requiring blood transfusion in different age groups

Parity

135 patients who needed blood or blood product transfusion were pregnant for second or more times. Only 76 patients (36.32%) were pregnant for the first time.

Table 2: Parity of patients who received blood transfusion

Parity	Number	Percentage
Primigravida	76	36.32
Multigravida	135	63.68
Total	211	100

Indications for transfusion

1. Anemia was the most common indication for transfusion. There were 133 cases with iron deficiency anemia who required transfusion with PCV. One patient with β thalassemia trait with anemia needed transfusion with PCV.
2. Obstetric hemorrhage indicated transfusion in 72 patients (34.12%). Of these, atonic PPH was found in 42 patients and traumatic PPH in 12 cases. Out of 12 cases of traumatic PPH, one was delivered with ventouse and two had undergone lower segment caesarean section. Rest 9 patients had a vaginal delivery. One patient with hepatic failure had coagulopathy and landed in hemorrhagic shock. She required massive transfusion (3 PCV, 4 FFP, 4 platelets). Placental abruption was present in 12 cases. Two patients with placental abruption developed DIC and needed FFP transfusion. Two patients had placenta previa and one patient had placenta accreta.
3. They had intraoperative bleeding and required transfusion with PCV. One patient each of first trimester spontaneous abortion and molar pregnancy needed transfusion due to hemorrhage.
4. Three patients had thrombocytopenia and required platelet transfusion.

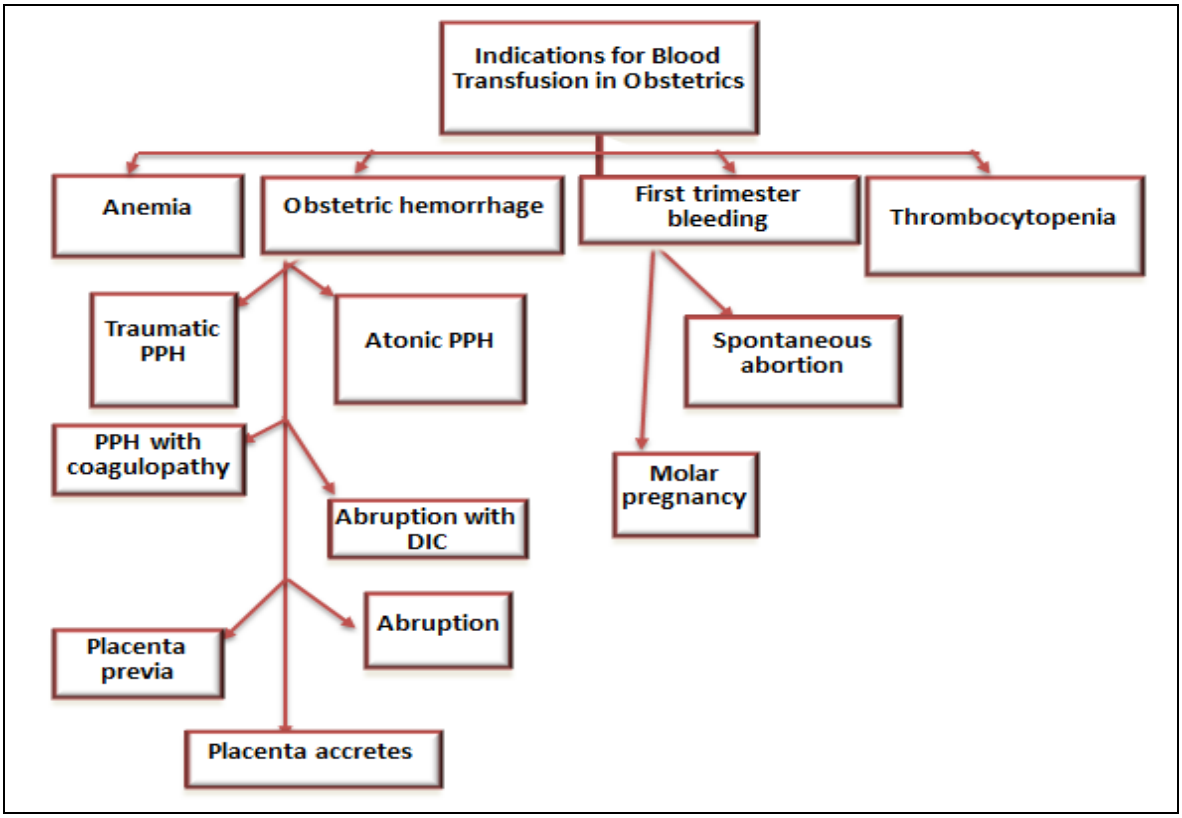

Fig 2: Indications for Blood Transfusion

Table 3: Indications for Blood Transfusion

Indication	Number	Percentage
1. Anemia	134	63.50%
2. Obstetric hemorrhage	72	34.12%
Atonic PPH	42	
Traumatic PPH	12	
PPH with coagulopathy	1	
Abruption	12	
Abruption with DIC	2	
Placenta previa	2	
Placenta accrete	1	
3. First trimester bleeding	2	0.94%
Molar pregnancy	1	
Spontaneous abortion	1	
4. Thrombocytopenia	3	1.42%
Total	211	

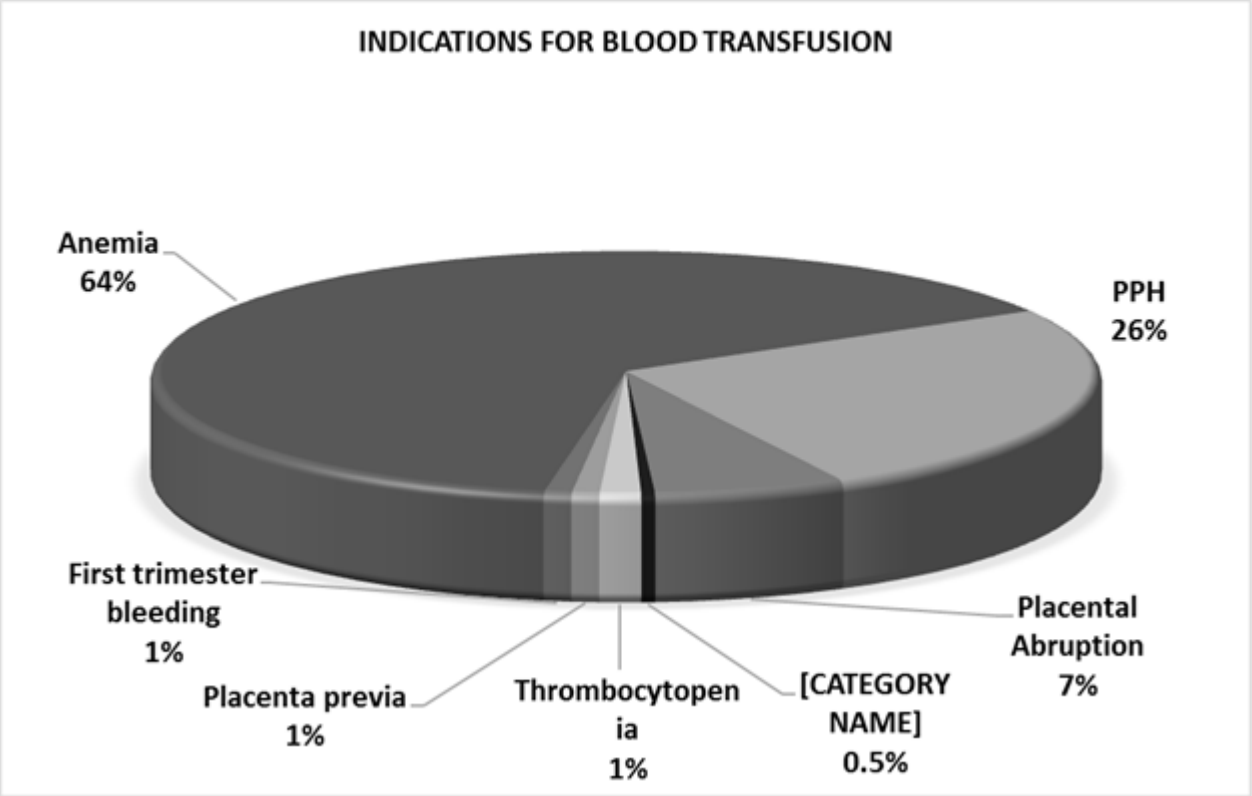

Fig 3: Indications for blood transfusion in obstetric patients

Type of transfusion

Table 4 shows that PCV was transfused in 190 patients. PCV and other blood components (FFP, RDP, and SDP) were used in 21 patients.

Table 4: Type of transfusion

Type of transfusion	Number of patients	Percentage
PCV only	190	90.04%
PCV and components	21	9.96%
Total	211	

Number of units transfused

134 patients (63.68%) received single unit transfusion. Only one patient required massive transfusion.

Table 5: Number of units transfused

Number of transfusions	Number	Percentage
Single unit	134	63.68%
2-9	76	36.31%
10 or more Massive transfusion	1	0.01%

Maternal mortality

There were two mortalities among the patients who received blood transfusion.

One patient with hepatic failure had coagulopathy and landed in hemorrhagic shock. She had been given massive transfusion (3 PCV, 4 FFP, 4 platelets). One patient with pre-eclampsia had atonic PPH. She was transfused with two PCV and four FFP.

Follow up

128 (60.6%) patients could be contacted by telephonic conversation. Out of them only 46 had consumed prophylactic iron tablets in antenatal period, that too, for one to two months. They did not have access to free iron supplements. It was bought by them.

Discussion

1. There were 211 patients who needed transfusion with blood or blood products in year 2020. Incidence is 7.7%, considering the number of deliveries in the year 2020 is 2731. This is comparable to incidence 6.8% quoted by Vasava DC *et al* [4]. The incidence of transfusion in obstetric patients was 1.6% by Jillian A. Patterson *et al* [5]. Maximum number of patients in the study group 153 (73%) were in age group 21-30 years. This is comparable to study by Vasava DC *et al* [4] where majority of patients 83% were in age group of 21-30 years of age.
2. 63.68% patients were multigravida, while 36.32 patients had conceived for the first time. Vasava DC *et al* [4] reports 79% patients requiring transfusion were multigravida.
3. Anemia was the commonest indication for transfusion in 134 patients (63.50%), of which 133 had nutritional anemia. One patient with β thalassemia trait had anemia and needed transfusion with PCV. Dipti C. Vasava *et al*, Kawthalkar A *et al* and Fazal S *et al*, have reported 63.4%, 63.8% and

61.6% patients of nutritional anemia who required blood transfusion. [4, 6, 7]. Anemia continues to top the list of indications for blood transfusion. NFHS 5 has reported 45.7% incidence of anemia in antenatal women in Maharashtra [8]. Antenatal women with anemia can be effectively managed by parenteral iron. However, patients with severe anemia and those who were near term had to be treated with blood transfusion.

4. NATA consensus statement - M. Munoz [9] *et al* recommends that women with severe anemia or late gestation (34 weeks) should be transferred to higher center. The need for transfusion should be determined by guidelines by obstetric unit. The consensus has recommended that if transfusion deemed necessary, single unit transfusion followed by clinical assessment and/or hemoglobin measurement to determine need for further transfusion.
5. Our institute is a referral center and many antenatal women with anemia are referred to our institute in late gestation. This explains highest incidence of anemia as indication for blood transfusion.
6. Detection of anemia in early gestation and treatment with parenteral iron in early pregnancy with other measures for nutrition can reduce need for blood transfusion for anemia.
7. Obstetric hemorrhage accounted for 34.12% blood transfusion. First trimester bleeding accounted for 0.9% (2 cases) of blood transfusion. One patient each, with molar pregnancy and spontaneous abortion presented with hemorrhagic shock. They needed resuscitation and blood transfusion. Vasava DC *et al* have reported 17.1% and 11.6% incidence of blood transfusion for obstetric hemorrhage and first trimester bleeding respectively. The women in our setup have a high incidence of anemia and have low BMI (20.3% in Maharashtra) as is stated in NFHS 5 [8]. Small women are particularly susceptible to hemorrhage as their blood volume expansion is less than expected [10]. The transfusion in these cases of obstetric hemorrhage is lifesaving.
8. Majority of patients (90.04%) needed only PCV, while rest needed PCV and other components. Patel VP [9] noted that 80% patients required only PCV.
9. 63.68% patients were transfused single unit PCV. 36.2% patients were given 2to 9 units of blood and components. Vaid *et al* has mentioned that 26.17% of the patients receiving at least 2 units of blood and its components transfusion [11]. A study by Bangal VB *et al*, states that maximum 2 units were transfused in 37.74% of patients followed by 3 units in 25.96% of patients [12]. There was a scarcity of blood and blood components in year 2020 due to covid pandemic. The paucity of blood forced us to restrict transfusion to single unit followed by injectable iron preparations. 31.75% patients had to procure blood or products from blood banks outside the institute.
10. Obstetric hemorrhage, pre-eclampsia with its complications and sepsis are most common causes of maternal mortality in India, while anemia is the commonest indirect cause for maternal mortality [13]. A timely transfusion can save the life in such situation. There were two mortalities out of 211 patients who received blood transfusion due to hepatic failure with coagulopathy and multiorgan failure in a case with preeclampsia with atonic PPH.
11. The use of "lowest hanging fruit" option
12. Single unit transfusion was given in 134 patients as against 76 patients who needed two or more transfusions.
13. Some clinicians have suggested the application of the "lowest hanging fruit" option to balance the demand and supply of blood and blood products during the pandemic. A typical example is the single unit policy called "why give 2 when 1 will do?" for erythrocytes does more to reduce overall transfusion requirements than simply monitoring the hemoglobin trigger. Other ways to achieve this approach entail cell salvage during surgery, minimally invasive surgical procedures and give Injectable Iron to improve Hemoglobin.
14. We could reach 128 patients telephonically. Only 33% had taken antenatal oral iron irregularly. NFHS 5 India has determined that only 30.9% antenatal women in Maharashtra consumed 180 iron folic acid tablets, while 48.2% consumed at least 100 tablets in antenatal period [8]. The compliance for 180 iron tablets consumption is far from reality in this set of women.
15. Limitations of the study -First, the study extracted data retrospectively and missing data were observed in some cases. Secondly, the theme of the study is on an early alert on blood availability during the pandemic and the authors' day-to-day perceptions to demonstrate the weakness of the region in the blood transfusion practice in view of tackling the COVID-19 challenge.

Conclusion

The analysis of the blood transfusion practice in the COVID-19 wave's period shows the unpreparedness to arrest the wave of blood chain shortage in Obstetric emergency practice. The loophole the pandemic has exposed in terms of the blood transfusion practice in obstetric practice and there is the need to adopt innovative ideas to save patients. The study for reasons for non-consumption of iron tablets and remedial factors are need of time in this setup.

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