

Role of Blood Transfusion in Obstetrics



medical science

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ABSTRACT

A prospective observational study of transfusion practices in pregnant and delivered women was conducted in our hospital in Ahmedabad city from October 2008 to July 2010. Nearly 1000 cases were studied. Selection Criteria included all emergency and registered antenatal and delivered patients. Among those 100 cases required Blood Transfusion. The Patients requiring Blood Transfusion throughout the study period 69% were Emergency cases and 31% were registered cases. Incidence of Blood Transfusion was higher (86 %), in patients who took less than 3 antenatal visits. There are two main causes of maternal morbidity and mortality: (1) Chronic anemia of pregnancy, (2) Major obstetric hemorrhage. In this study, 68 % patients required blood because of obstetric hemorrhage and 32% patients required blood because of anemia of pregnancy. Post Partum Hemorrhage was the most common cause for patients requiring Blood Transfusion. Maternal Mortality occurred in 4 patients out of 100 patients. In three of them, cause of death was directly related to postpartum hemorrhage. The Predisposing factors in the transfused patients were PIH (23 %), Medical Conditions (26 %), Previous Scar on Uterus (15 %), first trimester Hemorrhage(10%), Abruptio Placenta (14 %), Placenta Previa (6 %), Multiple Pregnancy (3 %). More active participation in terms of antenatal check-ups and skilled management of patients at the first referral units is advocated, there should be local protocols for management of massive hemorrhage in obstetrics. All major hemorrhages should be reviewed to ensure that the communication chain worked and that there was no delay in provision of blood products.

Introduction:

OBSTETRICS is “ BLOODY Business.”Pregnancy is a very precious and a happy event for a mother to be, yet, in developing countries, many woman die due to pregnancy related complications (maternal morbidity) and those who survive, suffer from severe maternal morbidity. Obstetric conditions associated with the need for blood transfusion may lead to morbidity mortality if not managed correctly. Even though the maternal mortality rate has been reduced dramatically by hospitalization for deliveries and the availability of blood for transfusion, death from hemorrhage remains prominent in the majority of mortality reports. WILLIAM's Obstetrics states that no woman should die of hemorrhage in modern times. Life-threatening maternal hemorrhage occurs in approximately 1-2% of deliveries and is a leading cause of maternal death in both industrial and developing countries. Maternal Mortality has been an indicator of maternal health services. Maternal mortality due to obstetric hemorrhage is 25-30% and anemia is 15%, both these conditions require blood transfusion. Hypertensive disorders of pregnancy, obstetric hemorrhage and severe anemia were the commonest causes of severe acute maternal morbidity (SAMM) in India. Economically deprived, illiterate people with insufficient antenatal care were more likely to suffer SAMM. Delays in recognizing and treating hemorrhage frequently lead to inadequate blood product replacement and concomitant development of disseminated intravascular coagulation (DIC). Both of these factors significantly contribute to maternal morbidity and mortality. Rising cost and non availability of blood, risk of transfusion reaction, transmission of infections has made us to limit transfusion only in indicated cases. Strict adherence to correct sampling, cross-match and administration procedures is therefore of paramount importance, even in an emergency. The stringent guidelines regarding transfusion of blood and components has put a break to the practice of the transfusion of fresh whole blood, which is replaced by appropriate blood components. Transfusion transmitted infection are HIV-1 and HIV-2, Human T-lymphotropic virus (HTLV - 1 and HTLV -2), Hepatitis C Virus, Hepatitis B, Treponema Pallidum, Malaria, Chaga's Disease, Variant Creutzfeldt - Jakob disease or “Mad Cow Disease”.General principles of transfusion are (1) All women should have their blood group and antibodies status checked at booking and at 28 weeks of gestation.^{1,2}(2) If any blood component therapy is contemplated, a sample for group-and-save must be sent to the blood transfusion laboratory.(3)

Cytomegalovirus (CMV) seronegative red cells and platelets should be used for CMV seronegative pregnant women. (4) Urgent transfusion should not be delayed if CMV seronegative components are not immediately available.(5) For women with known placenta praevia, some obstetric centers make 2 units of cross matched red cells available in the issue fridge³.Management of major hemorrhage should include clear local protocol on how to manage major obstetric hemorrhage. This should include early involvement of a consultant obstetrician, anesthetist and hematologist and the blood bank. The protocol should be practiced in ‘fire-drills’ to inform and train relevant personnel. Massive blood loss may be defined as the loss of 1 blood volume within a 24-hour period. Normal blood volume in the adult is taken as approximately 7% of ideal body weight. Other definitions include 50% blood volume loss within 3 hours or a rate of loss of 150 ml/minute.In hemorrhagic shock primary compensation is by increase in cardiac output, autonomous nervous system preserves oxygen delivery to CNS and heart, sparing the skin, fat, kidneys. Thus changes in the microcirculation affects oxygen transport at the tissue level. Urine output is most important in monitoring the circulation. (1)Red cells:Where there is no history of irregular antibodies and none are detected during screening, group-specific compatible blood can be provided within 10 minutes plus transport time. In an extreme situation and when the blood group is unknown, O Rh D negative red cells should be given.The decision to perform blood transfusion should be made on both clinical and hematological grounds.(2) Fresh frozen plasma and Cryoprecipitate:It is essential that regular full blood counts (FBC) and coagulation screens are performed during the bleeding episode. Infusion of FFP should be considered before 1 blood volume is lost. In the bleeding woman with disseminated intravascular coagulation (DIC), a combination of FFP, platelets and cryoprecipitate is indicated. The FFP and cryoprecipitate should ideally be of the same group as the recipient. If unavailable, FFP of a different ABO group is acceptable, provided that it does not have a high titre anti-A or anti-B activity.⁵ No anti-D prophylaxis is required if an Rh D negative woman receives Rh D positive FFP or cryoprecipitate.⁶ Fibrinogen levels should be maintained above 1.0 g/l by the use of FFP as above or two pools of cryoprecipitate. Dilution of coagulation factors is the primary cause of coagulopathy in major blood loss following volume replacement with crystalloid or colloid and transfusion of red cell components. The common practice is to

administer FFP 12-15 ml/kg to keep the activated partial thromboplastin time (aPTT) and prothrombin time ratios less than 1:5. Once the FFP has been ordered, it takes at least 30 minutes to thaw and issue. It should be borne in mind that, most units of FFP (as is the case with red cells, platelets and cryoprecipitate) are not virally inactivated and that transfusion with these products offers a small risk of transfusion transmitted infection.(3) Cryoprecipitate:It is cold precipitable protein fraction derived from thawed FFP AT 1-6° C,contains factor VIII, fibrinogen, fibrinogenectin, von Willebrand factor and factor XIII. 1unit/kg body weight raises plasma fibrinogen by approximately 50mg/dl in the absence of consumption or massive bleeding.Cryoprecipitate indicated in (ACOG) in fibrinogen deficiency in peri operative or peri partum period, bleeding with fibrinogen of 80-100mg/dl.(4)Platelets:The platelet count should not be allowed to fall below $50 \times 10^9/l$ in the acutely bleeding patient.⁷ A platelet transfusion trigger of $75 \times 10^9/l$ is recommended to provide a margin of safety.¹⁰ A platelet count of $50 \times 10^9/l$ may be anticipated when approximately two blood volumes have been replaced by fluid or red cell components. Rh D-negative women should receive Rh D-negative platelets. The platelets should ideally also be group compatible. Anti-Rh D immunoglobulin (at a dose of 250 ug) will be needed if the platelets are Rh D positive and the recipient Rh D negative. This is not necessary if a caesarean hysterectomy has been performed. Vaginal delivery and minor operative procedure can be done with platelet of $<50 \times 10^9/l$. (5)Recombinant factor VIIa (rFVIIa) therapy:The use of rFVIIa may be considered as a treatment for life-threatening postpartum hemorrhage but should not be considered as a substitute for, nor should it delay the performance of, a life-saving procedure such as embolisation or surgery, nor the transfer to a referral centre.⁹Anemia in pregnancy: Blood transfusion is indicated in antenatal period if Hb is $<6g/dl$ four weeks prior to delivery where there is no time to give iron. This improves anemic status and oxygen carrying capacity to withstand the strains of labour and blood loss during labour. When Hb is $<7g/dl$ in labour or immediate post partum period, blood transfusion depends on the medical history, age and symptoms. Antenatal planning required keeping Hb above 10.5g/dl.Management of intrapartum anemia:If the Hb is less than 7 g/dl in labour or in the immediate postpartum period, the decision to transfuse should be made according to the individual's medical history, age and symptoms. Reduction of operative blood loss is very important to prevent blood loss during any surgery.Improvement in surgical techniques like prompt ligation of bleeding points, diathermy and local hemostatic agents can be used.Management in postpartum anemia:If the Hb is less than 7-8 g/dl in postnatal period, where there is no continuing or threat of bleeding, the decision to transfuse should be made on an informed individual basis. In fit, healthy, asymptomatic patients there little evidence of the benefit of blood transfusion.

Aims and Objectives:

- To study role of antenatal care in patient requiring blood transfusion..
- To develop strategies that maximizes hemoglobin level at delivery as well as to minimize blood loss.
- To study importance of socioeconomic factor in prevalence of hemorrhage and anemia.
- To study causes of maternal mortality in these group of patients.
- To analyze importance of referral system and transport facilities in Emergency Obstetric Care services (EmOC).
- To analyze the need for network of blood storage facilities and ensuring transfusion services more easily accessible.
- To identify high risk pregnancy for reducing maternal morbidity and mortality and ensuring "Safe Motherhood".

Material and Methods: A prospective 22 months, observational study of transfusion practices in pregnant and delivered women

was conducted in our hospital in Ahmedabad city from October 2008 to July 2010.Nearly 1000 cases were studied. All emergency and registered antenatal and delivered patients were considered. All patients requiring blood transfusion in any trimester (first, second, third) and in AP (ante partum), IP (intra partum) or PP (post partum) period. Among those 100 cases required Blood Transfusion.In all women detailed history was taken, thorough clinical examination carried out and necessary investigation sent. Management was done according to standard protocol and guidelines.

Results: The Patients requiring Blood Transfusion throughout the study period were Emergency cases in 69 % of the cases and Registered cases in 31 % of cases. The Emergency Cases required average of 3.38 units per patient of whole blood and PCV, while Registered cases required average of 1.5 units per patient of whole blood and PCV. The Mean Units Transfused was 1.72 and 1.4 Units per patient in Whole Blood and Packed Red Blood Cells Transfusion Groups Respectively. Women given Combination Blood Products Received Larger number of Units (Mean 5.67units).In this study, 68 % patients require blood because of obstetric hemorrhage and 32% patients require blood because of anemia of pregnancy. Incidence of Blood Transfusion was higher (86 %), in patients who took less than 3 antenatal visits. Incidence of Blood Transfusion was higher in patients having less than 6.5 gm% of Hemoglobin. Post Partum Hemorrhage was Most Common cause for patients requiring Blood Transfusion. Post Partum Hemorrhage Rate for women who underwent Cesarean Section was 20 %, and Mean units of Blood Transfusion Required was 6.9, significantly more than the rate observed in group of women delivered vaginally.

Discussion:

Women given combinations of blood products received a significantly larger number of units (Mean 5.67 units), compared with whole blood and packed red blood cell-only groups. 27 % patients received 1 unit of blood transfusion, 27 % of patients received 2 units of blood and only 10 % received more than 8 units of blood transfusion. Similar results were obtained in study conducted by Kalpholz Henry et al(1990), where requirement for more than 8 units was only 4%. Incidence of Blood Transfusion was higher (86 %), in patients who took less than 3 antenatal visits. In this study, predisposing factors in the transfused patients were PIH (23 %), Medical Conditions(26 %),Previous Scar on Uterus (15 %), first trimester Hemorrhage(10%), Abruptio Placenta (14 %), Placenta Previa (6 %), Multiple Pregnancy (3 %). In study conducted by Anorlu, R.L.Orakwe, C.O., Abudu. O.O., Akanmu, A.S. et al (2006) data shows some of the conditions requiring blood transfusion are :Caesarean section (68.8%),Previous caesarean section (20.4%),Antepartum hemorrhage (16.9%),Pregnancy induced hypertension (15.6%), Anemia and malaria (14%),Induction of labour (13%), Rupture of uterus (8%) and Sick cell anemia (5.2%).Average number of Blood Transfusion required (mean 13.5 units) was higher in more than 150 km distance group patients. Incidence of PPH increases with increasing Parity. Post Partum Hemorrhage rate for women delivered vaginally was 16 % (Mean units of BT required 3.2). Post Partum Hemorrhage Rate for women who underwent Cesarean Section was 20 % (Mean units of BT required 6.9), significantly more than the rate observed in group of women delivered vaginally. Similar results were obtained in study conducted by Magann, Everett et al(2005) where mean units of BT were 6 in patients who underwent cesarean section, higher than mean units of BT 5.1 in vaginal delivery group . Antepartum Hemorrhage was more common in third para patients Maternal Mortality occurred in 4 patients out of 100 patients. In three of them cause of death was directly related to POSTPARTUM HAEMORRHAGE. Hemorrhage was the most important direct cause of maternal mortality. Although, obstetric hemorrhage was tackled vigorously, prevalence of nutritional anemia and poor

general condition, failed to prevent the maternal tragedy. More active participation in term of antenatal check ups and skilled management of patients at the first referral units is advocated. Anemia, accounted for indirect cause of maternal mortality. Preexisting anemia, worsens as pregnancy advances, leading to congestive heart failure and death, it also impedes the mother's ability to resist infections or cop with hemorrhage and increases likelihood of dying in childbirth by a factor of four .

Conclusion: There should be local protocols for management of massive hemorrhage in obstetrics .There should be familiarity with the local protocol with relevant members of staff (clinicians, midwives, biomedical scientists, porters).All major hemorrhages should be reviewed to ensure that the communication chain worked and that there was no delay in provision of blood products.

TABLE I: CASES: EMERGENCY Vs REGISTERED

Cases	No. of patients	Percentage
Emergency Cases	69	69 %
Registered Cases	31	31%

TABLE II: AVERAGE UNITS OF BLOOD TRANSFUSIONS IN EMERGENCY Vs REGISTERED CASES

Cases	Average No. of Whole blood/ Packed cell volume given Per Patient	Average No. of Total Blood Components given per Patients
Emergency Cases	3.38	4.3
Registered Cases	1.5	2.54

TABLE III: COMPARISON BETWEEN REQUIREMENT OF BLOOD COMPONENTS

Patient Receiving	No. of Patients (percentage)	Average No. of Units per Patient
Only Whole Blood	50 %	1.72
Only PCV	5 %	1.4
Combinations of Blood Products	45 %	5.67

TABLE IV: AMOUNT OF BLOOD TRANSFUSION REQUIRED

No. of BT	No. of Patients	Percentage
1 BT	27	27 %
2 BT	27	27 %
≥ 8 BT	10	10 %

TABLE V: CAUSE WISE DISTRIBUTION OF PATIENTS REQUIRING BLOOD TRANSFUSION

Cause(Etiology)	No. of patients	Percentage
Obstetric Hemorrhage	68	68 %
Anemia of pregnancy	32	32 %

TABLE VI: RELATION OF ANTENATAL VISITS WITH PATIENTS REQUIRING BLOOD TRANSFUSION

Antenatal visits	No. of patients	Percentage
≤3	86	86 %
>3	14	14 %

TABLE VII: CLINICAL PRESENTATION

Type of presentation	No. of cases	Percentage
Painless Bleeding per vaginum	19	19 %
Painful Bleeding per vaginum	15	15 %
No bleeding only Labour pain	37	37 %
Leaking Per Vaginum	2	2 %
Postpartum bleeding	7	7 %
Others(fever,jaundice,anemia)	20	20 %

TABLE VIII: DISTRIBUTION OF CASES IN RELATION TO HEMOGLOBIN

Hemoglobin (gm/dl)	No. of cases	Percentage
≤6.5	48	48 %
6.6—8.5	34	34 %
>8.5	18	18 %

TABLE IX: PREDISPOSING FACTORS

Condition	No. of patients	Percentage
Pregnancy induced hypertension	23	23 %
Multiple pregnancy	3	3 %
Scar on uterus	15	15 %
Medical condition (Anemia, Fever, Jaundice,etc..)	26	26 %
First trimester Hemorrhage	10	10 %
Placenta Previa	6	6 %
Abruptio Placenta	14	14 %
Retained Placenta	2	2 %
Lacerated Cervix	1	1 %

TABLE X: INCIDENCE OF HEMORRHAGE AS PER OBSTETRIC PERIOD

Particular	No. of patients	Percentage
Antepartum	23	33.8 %
Intrapartum	9	13.2 %
Postpartum	36	52.9 %

TABLE XI: PARITY WISE DISTRIBUTION OF ANTE PARTUM HEMORRHAGE

Parity	No. of case with Obstetric Hemorrhage	No. of patients having Antepartum Hemorrhage	Percentage of Antepartum Hemorrhage
Primi	28	10	35.71 %
Para 1	12	4	33.33 %
Para 2	18	6	33.33 %
Para 3	7	3	42.85 %
Para ≥ 4	3	0	0 %

TABLE XII: PARITY WISE DISTRIBUTION OF POST PARTUM HEMORRHAGE

Parity	No. of case	Post partum Hemorrhage	Percentage
Primi	28	16	57.14 %
Para 1	12	4	33.33 %
Para 2	18	9	50 %
Para 3	7	4	57.14 %
Para ≥ 4	3	3	100 %

TABLE XIII: POSTPARTUM HEMORRHAGE AFTER VAGINAL Vs CESAREAN BIRTH

Type of Delivery	No. of Patients of Postpartum Hemorrhage	Percentage	Average No. of Blood Transfusion Required Per Patient
Vaginal Delivery	16	16 %	3.2
LSCS	20	20 %	6.9

TABLE XIV: MEDICAL Vs SURGICAL MANAGEMENT

Type of Management	No. of patients	Percentage
Medical Management (without Surgical management)	36	36 %
Medical + Surgical Management	64	64 %

TABLE XV: MATERNAL MORTALITY

Particular	No. of patients
Total no. of patients under study	100
No. of Maternal death	4

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