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Blood Transfusion Practice in Obstetrics and Gynecology

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Objective -To assess the transfusion requirement in obstetrics and gynecology and to find out if the blood products are transfused judiciously. **Methods** - Our center supplies whole blood, red cell concentrate (RCC), fresh frozen plasma (FFP), cryoprecipitate and platelet concentrate to several hospitals in the city. During a 10 month period, requisitions were received from 10563 patients and 29177 units were supplied. The details like units transfused per patient and type of product supplied for different obstetric, gynecological and neonatal indications were analysed. **Results** - Out of 3897 units used by obstetricians and gynecologists for 1797 patients, 2340 (60%) were whole blood, 583 were (21.90%) RCC and remaining 704 (18.1%) included FFP, cryoprecipitate and platelet concentrate. Whole blood was given to 50.5% anemic pregnant women and to majority of the surgery cases. Out of 367 units transfused to disseminated intravascular coagulation (DIC) patients, 254 (66.76%) were components. The single unit transfusion was given to 37.25% women. **Conclusion** - Our center supplied 13.4% of the blood units for obstetric, gynecological and neonatal indications. Component therapy was judiciously used for neonatal and DIC cases. Inappropriate use in the form of single unit as well as whole blood transfusion was common. CME programs are needed to create awareness about the component therapy amongst clinicians.

Key Words: component therapy, whole blood, red cell concentrate, fresh frozen plasma, platelet concentrate, single unit transfusion, judicious use of blood

Introduction

Blood transfusion can be a life saving intervention. However, before prescribing blood/blood product, it is essential to weigh the risks of transfusion against the benefit to the recipient. Transfusion audit is necessary to ensure an appropriate use of blood. Because of the availability of component therapy, the clinicians can now transfuse only the required component of blood, without overloading the circulation or without risking the inherent hazards of whole blood transfusion. Since a blood donor can safely donate 450 ml blood, the transfusion of a single unit of blood to any adult patient does not serve much purpose. WHO[1] strongly discourages the transfusion of a single unit as well as the whole blood and recommends the review of blood usage, blood ordering strategies and active interaction between the clinician and blood center to achieve appropriate use of blood.

Obstetricians and gynecologists utilize a large number of blood units. Anemia is common during pregnancy as iron requirement is increased. During the last trimester of pregnancy, platelets are activated, fibrinolytic system is suppressed and there is an increased susceptibly to thrombocytopenia. Hence the mother faces a risk of significant hemorrhage, particularly during labor. Infants also need transfusion therapy for various complications like hyperbilirubinemia, hemorrhagic disorders and several problems associated with prematurity. In gynecology menorrhagia, hysterectomy and surgery for the cancer of reproductive organs, are the main indications requiring blood transfusion.

The aim of the present study is to assess the transfusion requirement and review the transfusions given to obstetric/gynecological patients, particularly the transfusions of single unit and whole blood.

Material and Methods

The study was undertaken at our center which is a major blood bank in India. Our blood bank supplies whole blood and components like red cell concentrate (RCC), platelet concentrate, fresh frozen plasma (FFP) and cryoprecipitate to patients referred by the government hospitals, municipal hospitals, private hospitals and nursing homes. The reception counter staff receives duly filled in requisition forms. They enter all the details in the Integrated Blood Bank Management software developed by M/s. Applitech Solution Ltd., Ahmedabad, India. The computer generates patient identification (ID) numbers. Sometimes due to spelling errors or wrong information the same patient requiring repeated blood transfusions may get different ID numbers. Therefore, certain details like full name, address, age, sex, diagnosis, hospital's name etc. were entered in the Microsoft Excel worksheet and data were sorted to identify patients receiving multiple patient ID numbers. Transfusion

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records of such patients were pooled together, retaining the original ID number. Data were analysed on the basis of indication for the transfusion, type of blood component transfused and units transfused per patient. The main criteria used to review the transfusion practice were the use of whole blood and single unit transfusions.

The statistical analysis of the data was carried out on the computer using standard statistical formula.

Results

During 10 months' period, 12500 requisitions were received from different hospitals in the city and 21977 units of whole blood or blood components were supplied to 10563 patients. A total of 1797 (17%) patients were referred by the obstetric/gynecological hospitals. They utilized 3897 (13.4%) blood units. Thus, the average utilization of blood units/case was 2.17.

Table I shows that the overall incidence of whole blood usage was 60%. Minimum utilization of whole blood was for the infants while majority of the gynecological patients received the whole blood transfusion. χ^2 test revealed a statistically significant reduction in whole blood utilization for infants compared to obstetric/gynecological patients ($p < 0.01$).

Data were further analysed on the basis of indications for transfusion. Table II shows the blood utilization by obstetric and gynecological patients. 50.5% anemic women received the whole blood. None of the disseminated intravascular coagulation (DIC) patients received the single unit transfusions but for other indications about 25% to 44% patients were given single unit transfusions. Blood component utilization was more in DIC patients as only 33.24% blood units were used as whole blood. Whole blood was more frequently used for surgical cases. χ^2 test revealed that significantly lower number of whole blood units was utilized for cancer surgery compared to obstetric gynecological surgeries ($p<0.01$).

Table III presents the data on blood utilization in infants. Whole blood was more frequently used during neonatal surgery. RCC was mainly used to correct anemia in premature infants while FFP and platelets were used to treat hemorrhagic disease of the newborn, septicemia and complications associated with prematurity.

There were no reactions reported to any of the blood transfusions in the study.

TABLE I : Whole Blood / Components Used for Obstetric / Gynecological Patients

Type of cases	Number of cases	Whole Blood		RCC		FFP/Platelets		Total units Transfused
		n	%	n	%	n	%	
Obstetric	877	1234	58.85	573	27.32	290	13.83	2097
Infants[a]	530	388[b]	41.72	141	15.16	401	43.12	930
Gynecological	390	718	82.53	139	15.98	13	1.19	870
Total	1797	2340	60.05	853	21.89	704	18.06	3897

n = number RCC = red cell concentrate FFP = fresh frozen plasma

[a] Infants received pediatric units containing about 30 to 100 ml blood/blood components.

[b] Statistically significant reduction in whole blood utilisation in infants compared to obstetric and gynecological patients ($p< 0.01$).

Table II : Blood Utilisation for Obstetric / Gynecological Patients

Indication for transfusion	Number of cases	Total units transfused	Units per case	Single unit transfusion		Whole blood transfusion	
				n	%	n	%
Obstetric indications							
Anemia	497	970	1.95	187	37.62	490	50.5
APH/PPH/Pl. pr.	227	512	2.26	94	41.41	402	78.5
DIC	24	367	15.29	0	0.00	122	33.24
LSCS/ectopic pregnancy / tubal ligation	129	248	1.92	34	32.35	220	88.7
Gynecological indications							
Menorrhagia	133	304	2.29	55	41.35	229	75.33
Hysterectomy	200	409	2.05	88	44.00	369	90.22
Cancer surgery	57	157	2.75	14	24.56	120	76.43
Total	1267	2967	2.34	472	37.25	1950	65.72

n = Number APH= antepartum hemorrhage PPH = postpartum hemorrhage
Pl.pr. = placenta previa DIC = disseminated intravascular coagulation

Table III : Utilisation of Blood For Infants

Indication for transfusion	Number of cases	Units transfused	Units/ case	Whole Blood		Red Cell Concentrate		FFP/Platelets	
				n	%	n	%	n	%
HDN/Hyper-bilirubinemia	69	111	1.61	59	53.15	31	27.93	21	18.92
Hemorrhagic disease of newborn	76	159	2.09	60	37.73	5	3.15	94	51.12
Septicemia	149	309	2.07	118	38.19	26	8.41	165	53.39
Prematurity/anemia	123	197	1.60	64	32.29	51	25.89	82	41.62
Infection	34	49	1.44	16	32.65	25	51.02	8	16.33
Surgery	23	27	1.17	25	92.59	0	0.00	2	7.41
Miscellaneous / unknown cause	56	78	1.39	46	58.97	3	3.85	29	37.18
Total	530	930	1.75	388	41.72	141	15.16	401	43.12

HDN = hemolytic disease of newborn n = number FFP = fresh frozen plasma

Discussion

During the last 15 years "Transfusion Medicine" has merged as a separate specialty. Most of the blood banks in the western countries provide only blood components while some Indian blood banks are processing 100% whole blood units into components and are refusing to supply the whole blood. Criteria have been established for appropriate use of blood components[2-4]. However the stand-alone blood bank like ours finds it difficult to practice component therapy because we supply blood to several hospitals. The present study is an attempt to interact with obstetricians and gynecologists who use about 17% of the blood units.

Pregnant women have a greater risk of anemia but the transfusion can be avoided by prevention of anemia through education about nutrition and prophylactic administration of iron and folic acid. The WHO[5] criteria for transfusion for pregnancy anemia are:

Before 36 weeks: (a) Hb <5 g/dl without signs of cardiac failure or hypoxia (b) Hb 5 to 7 g/dl in presence of evidence of cardiac failure, hypoxia, infection etc. and

After 36 weeks : (a) Hb = 6 g/dl (b) Hb 6 to 8 g/dl in presence of hypoxia, infection and pre-existing heart disease.

In the present study, 497 anemic pregnant women were transfused with 970 blood units. Though whole blood is definitely contraindicated for correction of anemia[4], about 50% women received whole blood. Single unit transfusion can raise the Hb only by 1 to 1.5 g/dl in an adult patient and therefore the patient is not much benefited. Considering the transfusion risks such transfusion should have been prevented in 187 (37.62%) women. The Hb concentration of pregnant women receiving transfusions for anemia ranged from 1.5 g/dl to 13 g/dl (data not shown), about 25% of them had Hb level >8 g/dl.

Acute blood loss is one of the main causes of maternal mortality. Obstetric bleeding may be unpredictable and massive. One must identify the cause of bleeding and treat it. A pregnant woman has a higher risk of DIC. When profuse bleeding occurs, transfusions of FFP, platelet concentrate and cryoprecipitate are indicated[6]. DIC requires replacement of clotting factors, which are provided by FFP containing fibrinogen, coagulation factors like factor VIII, IX, antithrombin III, protein C etc. Cryoprecipitate is given when fibrinogen level is < 1.0 g/L[7]. About 15 packs of cryoprecipitate are needed to stop the bleeding [5]. For replacement of red cell mass, RCC is required. Generally the whole blood is of little value unless it is absolutely fresh (<6 hours old). Since it is preserved at 2° to 6° C, labile coagulation factors in the

plasma of whole blood are denatured. To prevent coagulation, defects arising from stored RCC one unit of FFP should be transfused per 4 to 6 units of RCC[5]. Platelet concentrate should be transfused only when the platelet count is <50000/μl. In the present study 30% blood units transfused to DIC patients were whole blood units but the patients also received appropriate components. However, the incidence of single unit transfusion was about 41.4% among the women having antepartum or postpartum hemorrhage or menorrhagia. These cases should have been managed without any transfusion.

The present study shows that majority of the surgeons used whole blood for surgeries. Since the red cell mass is the same in whole blood and RCC, blood loss during the surgery could be easily managed by transfusing RCC. Generally the RCC provided by the blood bank has 55% to 65% hematocrit and there is no difficulty in infusing it. If the blood is collected in SAG-M blood bag system, then the RCC are suspended in SAG-M solution containing saline, adenine, glucose and manitol. By using RCC, one can reduce the risk of infection associated with the plasma in the whole blood and also save the plasma for patients having coagulation disorders.

Surprisingly, most of the neonatologists were aware of the component therapy. Even for an exchange transfusion some of them asked for RCC of the mother's group and plasma of the baby's group as recommended by Gupte[8], instead of demanding the whole blood. For septicemia and various hemorrhagic disorders of the newborn, blood components were preferred over the whole blood.

Thus, the present study shows that the obstetricians and gynecologists do not use blood judiciously. Marti-Carvajal et al[9] have reported that in Venezuela, only 47% obstetric transfusions were appropriate. In their study, none of the obstetricians had used the whole blood, as it is not provided by the blood banks in their country. Present study recommends that to improve the appropriate use of blood, transfusion medicine experts should conduct CME programs for clinicians to update their knowledge about the component therapy.

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