

RATIONALIZATION OF ROUTINE CROSSMATCHED BLOOD ARRANGEMENT FOR CAESAREAN DELIVERIES AND ANALYSIS OF RISK FACTORS REQUIRING BLOOD TRANSFUSION

Saleem Parvez Bajwa, Sayyad Muhammad Zaheer Haider, C. Aqeel Safdar, Saima Masood, Farrukh Shehzad, Mubashar Hameed, Hassan Raza

Combined Military Hospital Lahore, Pakistan

ABSTRACT

Objective: To assess the incidence of blood transfusions required in Caesarean section (CS) and evaluate the rationale of routinely arranging cross matched blood for every patient.

Study Design: A chart review retrospective descriptive study.

Place and Duration of Study: This study was conducted at the Anesthesia Department of Combined Military Hospital (CMH), Lahore, from June 2011 to May 2013.

Patients and Methods: In this retrospective study we reviewed all singleton CS performed using data from blood bank registry and all CS patient's charts obtained from the Records Department of the hospital. Clinical variables including demographic characteristics, estimated blood loss, indications for CS, preoperative haemoglobin and indications for transfusion were gathered. Patients transfused with blood had their medical records reviewed by two reviewers to confirm accuracy and identify risk factors for haemorrhage.

Results: A total of 6250 caesareans deliveries were performed over the study period. Out of these 381 patients were transfused (6.09%). Blood typing and screening was done for 3260 cases (52%) and blood was arranged for 2320 (37%). Among blood receiving patients 250 patients (65.62%) were emergencies. Ninety eight patients (25.72%) were primigravida. Indications for transfusion mentioned in the charts were preoperative anaemia (18.37%), repeat caesarean sections (39.37%), placenta previa (6.56%), severe preeclampsia (17.06%), failed progress in labor and other rare causes (18.37%).

Conclusion: Transfusion risk in patients undergoing routine CS is low. Factors indicating risk for transfusion include preoperative anaemia, repeat caesareans, severe preeclampsia, obstructed labor and placenta previa. In the absence of these risk factors routine arrangement of the blood does not enhance patient care.

Keywords: Blood transfusion, Caesarean section, Transfusion hazards.

INTRODUCTION

Caesarean section (CS) has been identified as one of the commonest indications for blood transfusion in obstetric practice¹. In normal pregnant females there is an increase of plasma volume by about 55%, producing dilutional anemia and reducing blood viscosity². At term blood volume is increased by 1000 to 1500 ml in most women, allowing them to easily tolerate blood loss associated with delivery. Average blood loss during vaginal delivery is 400 -500 ml, compared with 800-1000 ml for a caesarean section². So if patient's preconditions are acceptable and surgical process remains smooth

there is little risk of morbidity or mortality³.

Objective data from the studies carried out internationally show a low incidence of need of blood transfusion during caesarean deliveries⁴. However because of possible litigations and accountability fears, especially in private and military hospitals, majority of patients have blood typing and screening, in addition to one or two units of blood crossmatched for each. The safety of mother and baby and emotional state of the relatives, creates an added pressure over the involved anaesthetists and obstetricians. The heightened expectations in the general population of appropriate outcome and fear of litigation may have affected standing operating procedures resulting in injudicious transfusions. This creates major economical burden over poor families who are getting services as private patients⁵. On the average screening and typing test costs 1500 Pak rupees and every unit of blood transfusion

Correspondence: Dr Saleem Parvez Bajwa, Dept of Anaesthesia, CMH Lahore, Pakistan

Email: spbajwa565@yahoo.com

Received: 28 Nov 2013; revised received: 26 Feb 2014;

accepted: 17 Mar 2014

costs further Pak rupees 2000, this is many times more in some private hospitals. In addition blood transfusion still exposes the patients to many risks like, HIV infections, viral hepatitis and immunological reactions, a very high price to pay⁶.

But at the same time hemorrhage is among leading causes of direct maternal mortality in obstetric practice⁷. It is major contributor to the maternal mortality in developing countries⁸. Blood loss in caesarean section is not always anticipated. This usually happens in well documented high risk cases, like abnormal placental location and attachment to uterine wall (placenta previa, placenta accreta, and placenta increta), lesser experience and expertise of obstetricians, preeclampsia, HELPP syndrome, repeat caesarean sections, uterine anomalies and uterine or cervical tears⁹. But blanket arrangement of crossmatched blood for every patient without known expected indications needs to be discouraged. Objective evidence is deficient from all levels of hospitals in our country. Judicious blood transfusion practices require to be vehemently implemented¹⁰.

The objective of our study was to assess the incidence of blood transfusions required in CS and evaluate the rationale of routinely arranging crossmatched blood for every patient.

PATIENTS AND METHODS

This descriptive study was conducted at the Anesthesia Department of Combined Military Hospital (CMH), Lahore, from June 2011 to May 2013. Inclusion criteria were all singleton emergency or elective CS. Patients who were transfused blood preoperatively were excluded from this study. Population for this study is families of military personnel and middle class civil population. Data pertaining to age, parity, booking status, indication for CS, blood loss at surgery, units of crossmatched blood reserved in the blood bank, and units of the blood transfused was extracted and analyzed.

In addition patients having systemic diseases not related to pregnancy were excluded from the study. Medical records of the

patients were obtained from the hospital record department. In addition data from blood bank registry and obstetric data were collected from respective departments and were compared for accuracy. The data was recorded on a pre-designed proforma.

Decision of intra operative blood transfusion was made on clinical assessment of the patients.

Data analysis was carried out through SPSS version 17. Descriptive statistics were used to describe the results i.e mean and standard deviation (SD) for quantitative variables while frequency and percentages for qualitative variables.

RESULTS

A total of 6250 caesarean sections were performed over the research period of two years. The average age of patients was 28.30 (Range 17.50 to 41.80) year. Blood typing and screening was done for 3260 (52.16%) patients and blood was arranged for 2320 (37.12%) patients (fig-1). Only 381 patients required blood transfusions intra-operatively or postoperatively (average 1.7 units /patient) and hence the incidence of transfusion was barely 6.10%. Ninety eight (25.72%) Patients were primigavida out of the 381 patients who received blood transfusions. Moreover, 250 (65.62%) cases were treated as emergency, 70 patients (18.37%) had a haemoglobin level below 10 gm/dl, 150 patients (39.37%) had repeat caesareans, 61 (16.01%) patients among these were having Pregnancy Induced Hypertension (PIH) with pre eclampsia and 4 (1.5%) had fulminant eclampsia. Out of these 25 patients (6.56%) were diagnosed as having placenta previa of second degree or more severity. Among patients who received transfusions 55 (14.44%) belonged to negative blood groups.

DISCUSSION

The indications for CS, preoperative anaemia, and heavy blood loss during CS are important risk factors for blood transfusions¹¹. Severe haemorrhage requiring blood transfusion can be predicted in majority of patients on the basis of antenatal risk factors⁹. In

our study incidence of blood transfusion is barely 6.1%. Incidence is quite variable in the international studies depending upon the health status of nations, available medical facilities, awareness in population, and institutional practices¹². A retrospective study of similar nature carried out in United States of

condition¹⁸. According to WHO prevalence of anaemia in pregnancy in South East Asia is around 56%¹⁹. Even a moderate blood loss in critically anaemic patients can threaten the life of patient²⁰. In our study out of 381 transfusions receiving patients 70 (18.37%) had their haemoglobin less than 10 gm/dl. Incidence of

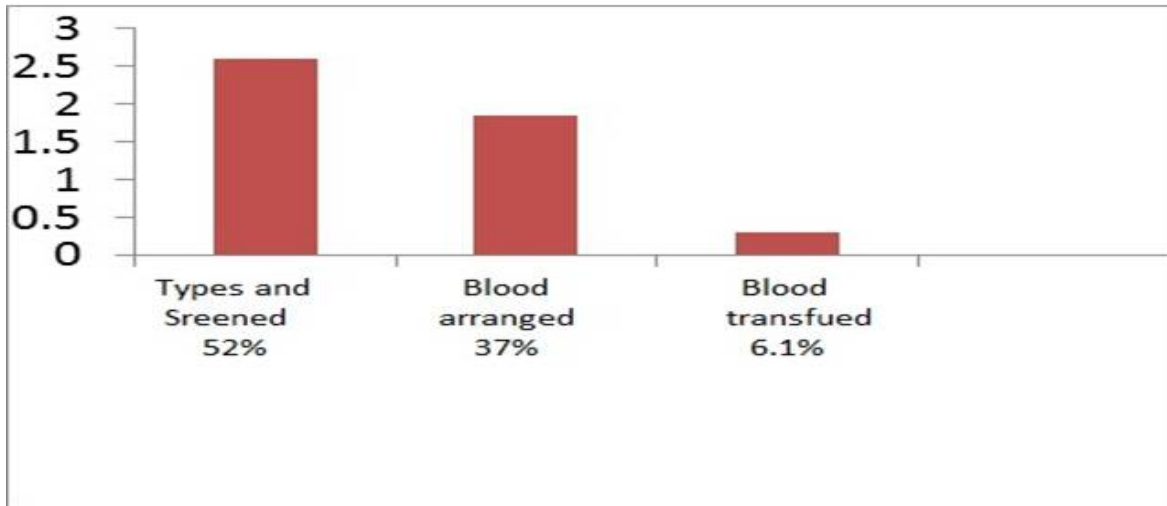


Figure: Percentages of blood screened, typed and transfused.

America showed 3.30% incidence of blood transfusion in caesarean deliveries¹². However a study carried out in India depicted an incidence of blood transfusion 25.20%¹³. A similar study carried out at Austria showed the incidence of blood transfusion in caesarean sections 0.63 %¹⁴.

In our study repeat CS, preoperative anaemia, severe PIH with preeclampsia and failed progress in the labor were the main causes of blood transfusion. These results are comparable with international studies. Out of 381 patients who received blood 150 (39.37%) patients had previous history of CS. Women who delivered the first child by caesarean delivery have increased risk for malpresentations, placenta previa, ante partum haemorrhage, placenta accreta, prolonged labor and uterine rupture¹⁵. Blood loss increases with increase in number of caesarean sections¹⁶.

In the Subcontinent, anaemia is the commonest haematological disorder that may occur in pregnancy because of malnutrition and lack of balanced diet¹⁷. In addition added stress of pregnancy further deteriorates the anaemic

placenta previa is about 1% of hospital deliveries; this can result in serious hemorrhage²¹. Among those who received blood sixty one (16.01%) patients were having PIH with preeclampsia and four patients had fulminant eclampsia. Among these patients²⁰ were having platelets below accepted level contributing to blood transfusions along with platelet transfusions.

In our study 65.62% of patients who received blood transfusion were emergency cases following fetal distress or failed progress in labor due to malpresentation, cephalopelvic disproportions or uterine dystocia. Excessive haemorrhage in these cases was due to uterine atony, uterine rupture, and cervical or vaginal tears²².

Although the incidence of severe transfusion reactions is now very low²³, in recent years it has become apparent that there is an immunological price to be paid for the transfusion of blood products which leads to increased incidence of morbidity and mortality. Moreover blood is a finite resource with a

limited shelf life and is associated with considerable processing cost. Therefore utilization of this resource needs critical review to identify areas of overuse and thus reduce the risk and hospital cost⁵. In our study blood was arranged for 37% patients and blood type and screen was done for 52% of the patients, where as only 6.1% patients required transfusion. This expresses irrational economical burden on hospital resources and paying patients⁵.

The risk of intra operative death for women who undergo caesarean section is very low (about 6 in 100,000) but heavy bleeding and Medelson syndrome are among the most common causes of death⁷. Efforts should be made to reduce blood transfusion without increasing maternal morbidity and mortality. However blood replacement should never be withheld whenever truly indicated. Patients with severe haemorrhage can enter a lethal downward spiral characterized by hypothermia, coagulopathy, and metabolic acidosis. To abort the cycle, replacement of the appropriate blood products and correction of physiological derangements is important²⁴. The prediction of postpartum blood transfusion is difficult²⁵. Anesthesiologists should always be vigilant, but not extravagant. Haphazard ordering of blood without evidence is simply not good practice.

CONCLUSION

In the absence of significant risk factors for haemorrhage in caesarean section in a tertiary care hospital setting, routine blood type, screen testing and arrangement of blood does not enhance patient care. These should be reserved only for high risk CS. Factors indicating risk for transfusion include preoperative anaemia, repeat caesareans, severe preeclampsia, obstructed labor and placenta previa. However blood transfusion should never be withheld when indicated. Clinical acumen and institutional guidelines have to be adhered to in this commonly performed surgery.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

REFERENCES

- Rouse DJ, Macpherson C, Landon M, Varner MW, Leveno KJ, Moawad AH. Blood transfusion and cesarean delivery. *Obstet Gynecol.* 2006; 108(4): 891-7.
- Pritchard JA: Changes in the blood volume during pregnancy and delivery. *Anesthesiology.* 1965; 26: 393-9.
- Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic. *Lancet.* 2006; 367: 1066-74.
- Camaan WR, Datta S. Red cell use during cesarean delivery. *Transfusion.* 1991; 31: 12-5.
- Ransom SB, Fundaro G, Dombrowski MP. Cost effectiveness of routine blood type and screen testing for cesarean section. *J Reprod Med.* 1999; 44: 592-4.
- Goodnough LT. Risks of blood transfusion. *Crit Care Med.* 2003; 31(12 Suppl): S678-86.
- Clark SL, Belfort MA, Dildy GA, Herbst MA, Meyers JA, Hankins GD. Maternal death in 21st century: causes, prevention and relationship to cesarean delivery. *Am J Obstet Gynecol.* 2008; 199(1): 36.e1-5.
- McCormick ML, Sanghvi HC, Kinzie B, McIntosh N. Preventing postpartum hemorrhage in low resource settings. *Int J Gynaecol Obstet.* 2002; 77: 267-75.
- Combs CA, Murphy EL, Laros RK Jr. Factors associated with hemorrhage in cesarean deliveries. *Obstet Gynecol.* 1991; 77: 77-82.
- Cousins LM, Teplick FB, Poltier DM. Pre-cesarean blood bank orders: a safe and less expensive approach. *Obstet Gynecol.* 1996; 87(6): 912-16.
- Stones RW, Paterson CM, Saunders NJ. Risk factors for major obstetric haemorrhage. *Eur J Obstet Gynecol Reprod Biol.* 1993; 48(1): 15-8.
- Eusaph AZ, Iqbal S, Rana T, Asghar F. Evaluation of practices of blood transfusions during cesarean section. *Ann King Edward Med Uni.* 2011; 17(2): 183-6.
- Goundan A, Kalra JK, Raveendran A, Bagga R, Aggarwal N. Descriptive study of blood transfusion practices in women undergoing cesarean delivery. *J Obstet Gynaecol Res.* 2011; 37(10): 1277-82.
- Chua SC, Joung SJ, Aziz R. Incidence and risk factors predicting blood transfusion in caesarean sections. *Aust N Z J Obstet Gynaecol.* 2009; 49(5): 490-3.
- Sheiner E, Sarid L, Levy A, Seidman DS, Hallak M. Obstetric risk factors and outcome of pregnancies complicated with early postpartum hemorrhage: a population-based study. *J Matern Fetal Neonatal Med.* 2005; 18: 149-54.
- Sherman SJ, Greenspoon JS, Nelson JM, Paul RH. Identifying the obstetric patient at high risk of multiple-unit blood transfusions. *J Reprod Med.* 1992; 37: 649-52.
- Maitra S, Gowda SAS. Iron and Oxidative Stress in pregnancy. *Asian J Med Res.* 2012; 1(1): 9-11.
- Lokara PO, Karanjekkar VD, Gattani PL, Kulkarni AP. A study of prevalence of anemia and sociodemographic factors associated with anemia among pregnant women in Aurangabad city India. *Ann Nigerian Med.* 2012; 6: 30-4.
- World Health Organization (WHO) The prevalence of Anaemia in women: a tabulation of available information. Geneva, Switzerland: WHO; 1992. WHO/MCH/MSM/92.2.
- Maihotra M, Sharma JB, Batra S, Sharma S, Murthy NS, Arora R. Maternal and perinatal outcome in varying degrees of anemia. *Int J Gynaecol Obstet.* 2002; 79: 93-100.
- Faiz AS, Ananth CV. Etiology and Risk factors for placenta previa: An overview and meta-analysis of observational studies. *J Matern Fetal Neonatal Med.* 2003; 13(3): 175-90.
- Jansen AJ, van Rhenen DJ, Steegers EA, Duvekot JJ. Postpartum hemorrhage and transfusion of blood and blood components. *Obstet Gynecol Surv.* 2005; 60(10): 663-71.
- Goodell PP1, Uhl L, Mohammed M, Powers AA. Risk of haemolytic transfusion reactions following emergency-release RBC transfusion. *Am J Clin Pathol.* 2010; 134(2):202-6. doi: 10.1309/AJCP9OFJN7FLTADB.
- Duranteau J, Harrois A. Hemorrhagic Shock. *Rev Prat.* 2006; 56(8): 849-57.
- Wikkelsø AJ, Hjortø S, Gerds TA, Møller AM, Langhoff-Roos J. Prediction of postpartum blood transfusion -risk factors and recurrence. *J Matern Fetal Neonatal Med.* 2014. [Epub ahead of print][Accessed on 2014 Feb 21].