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MASSIVE TRANSFUSION AND BLOOD PRODUCT DYNAMICS IN OBSTETRIC HYSTERECTOMY: A ONE-YEAR PROSPECTIVE STUDY FROM A TERTIARY CARE CENTRE IN NORTH INDIA

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ABSTRACT: Obstetric hysterectomy (OH) is a maternal near-miss event most often required for catastrophic obstetric hemorrhage, with blood transfusion being unavoidable. This prospective observational study conducted over one year (February 2023–January 2024) at a tertiary care center in North India evaluated blood and blood product utilization and maternal outcomes in women undergoing OH. Among 3,759 deliveries, 37 women underwent OH (incidence 9.84/1,000), with placenta accreta spectrum being the leading indication (64.8%). All patients required packed red blood cell transfusion (mean 4–6 units), while fresh frozen plasma, platelets, and cryoprecipitate were used in 50%, 20%, and 6.6% of cases, respectively. Maternal deaths occurred only in cases requiring massive transfusion (>10 PRBC units), predominantly associated with PAS. The study emphasizes that optimal transfusion support, early activation of massive transfusion protocols, and blood bank preparedness are critical for improving outcomes in obstetric hysterectomy, especially in resource-limited settings.

KEY WORDS: Obstetric hysterectomy, Post partum hemorrhage, Placenta accreta, Blood

INTRODUCTION

Obstetric hysterectomy (OH) remains a radical yet often lifesaving procedure, performed when conservative measures fail to control catastrophic hemorrhage. The most frequent indications include placenta accreta spectrum (PAS), uterine rupture, and severe postpartum hemorrhage (PPH). Hemorrhage continues to be the leading cause of maternal death worldwide and contributes to nearly one-third of maternal deaths in low- and middle-income countries (LMICs).[1] In such situations, survival depends not only on the timeliness and skill of surgical intervention but also on the availability of blood and blood products. In PAS, for instance, blood loss may exceed five liters, underscoring the indispensable role of transfusion support in maternal survival. [2]

Although several Indian and international studies have reported the incidence and clinical profile of OH, relatively few have systematically addressed transfusion requirements [3,4]. This represents a critical gap in the literature, particularly given the logistical challenges of ensuring timely blood availability in LMICs. The present prospective study was designed to evaluate transfusion dynamics in OH over a one-year period in a tertiary referral center in North India, with particular focus on patterns of blood and blood product use and their influence on maternal outcomes.

MATERIALS AND METHODS

This prospective observational study was conducted at the Department of Obstetrics and Gynecology, Government Medical College and Rajindra Hospital, Patiala, from February 2023 to January 2024. All women undergoing OH during the study period were included, irrespective of delivery route or whether hysterectomy was performed intrapartum or postpartum.

For each patient, demographic details, obstetric history, and indication for hysterectomy were recorded. Intraoperative blood loss was estimated by measuring suctioned blood, weighing blood-soaked drapes, and visual assessment. The number and type of blood and blood products transfused including PRBCs, FFP, platelets, and cryoprecipitate were documented.

Transfusion reactions and maternal outcomes, including survival and complications, were also assessed.

Data were analyzed using SPSS version 21. Results were expressed as mean, range, and percentages.

RESULTS

During the study period, a total of 3,759 deliveries were conducted, among which 37 required obstetric hysterectomy (OH), giving an overall incidence of 9.84 per 1,000 deliveries. The mean maternal age of these women was 30.3 years (range: 24–42 years). Nearly all were multiparous, and 62% were gravida three or above. A significant majority (73%) were either unbooked or referred cases.

The most frequent indication for OH was placenta accreta spectrum (PAS), contributing to 64.8% of cases. The next common cause was intractable postpartum hemorrhage (PPH), seen in 24.3%, while uterine rupture accounted for the remaining 10.8%.

The average blood loss during surgery ranged between 2.5 and 3 liters, although in patients with PAS, losses often exceeded 5 liters. Blood transfusion was universally required. All 37 women received packed red blood cells (PRBCs), the number varying from 2 to 14 units, with a mean requirement of 4–6 units. Fresh frozen plasma (FFP) was administered in 50% of cases, mainly in those who developed coagulopathy or disseminated intravascular coagulation (DIC), with an average of 3–4 units. Platelet concentrates were transfused in 20% of women, usually in the context of DIC and massive hemorrhage, with a mean of six units. Cryoprecipitate was required in 6.6% of patients, largely for refractory hypofibrinogenemia.

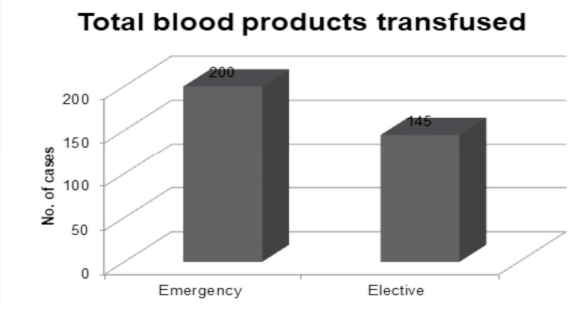


Figure 1:- Transfusion of blood products during Emergency vs Elective OH.

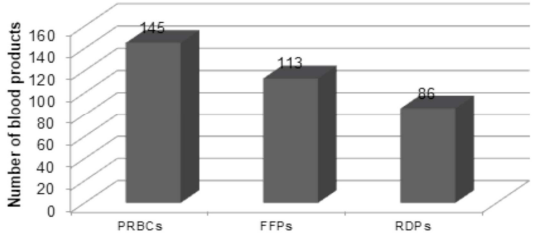


Figure 2: The figure depicts utilisation of blood products during OH.

Transfusion-related complications were rare. Only one patient experienced a febrile non-hemolytic transfusion reaction, and no major adverse events were documented. Maternal mortality was noted exclusively in PAS cases, particularly among those who required transfusion of more than 10 units of PRBCs.

DISCUSSION

The findings of this study highlight that transfusion support is inevitable in obstetric hysterectomy and often substantial. Although the average PRBC requirement was 4–6 units, PAS cases frequently demanded more than 10 units, emphasizing the massive nature of hemorrhage associated with this condition.

The incidence of OH in the present study (9.84 per 1000 deliveries) was markedly higher than that reported from high-income countries, where rates range between 0.2 and 0.7 per 1000 deliveries. [1] However, the findings are consistent with those from other LMICs, where late referrals, higher cesarean rates, and limited access to conservative measures or interventional radiology are common.[4]

Patterns of transfusion in this study were also consistent with international literature. Approximately half of the women required FFP and one-fifth required platelets, which aligns with reports from Western studies where 40–60% of OH cases need component therapy.[2] Although cryoprecipitate use was relatively infrequent, it proved essential in the management of refractory hypofibrinogenemia, highlighting its critical role in obstetric blood banks. [5]

Importantly, maternal mortality was observed only among PAS patients requiring more than 10 PRBC units, underscoring the fact that survival depends as much on blood bank preparedness as on surgical expertise. In LMICs, where component availability is often limited, early requisition and rapid-release systems are crucial. From a systems perspective, implementation of massive transfusion protocols (MTPs) tailored to obstetrics is urgently needed, along with pre-emptive mobilization of blood products in antenatally diagnosed PAS cases. [6,7]

The implications of this study extend beyond individual

patient management. Anticipating transfusion requirements, involving blood banks early in cases of suspected PAS, and strengthening component availability at peripheral centers may significantly reduce maternal mortality. Future research should focus on multicenter audits of transfusion practices, cost-effectiveness analyses, and training programs to improve obstetric hemorrhage response systems.

CONCLUSION

This study demonstrates that blood transfusion is universal and central to the management of obstetric hysterectomy. The mean requirement of 4–6 PRBC units, frequent need for FFP and platelets, and occasional use of cryoprecipitate reflect the scale of transfusion support required. Maternal mortality was confined to PAS patients requiring massive transfusion, reaffirming that outcomes depend as much on blood bank preparedness and transfusion protocols as on surgical skill. Strengthening blood bank infrastructure, implementing obstetric-specific MTPs, and ensuring timely component availability are critical steps toward reducing maternal morbidity and mortality in high-burden, resource-limited settings.

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