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Evaluation of Hematinic Therapy in Postoperative Cesarean Section Patients at the Maternity and Pediatric Inpatient Ward of Dr. M. Djamil General Hospital, Padang

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ABSTRACT:
Patients undergoing cesarean delivery frequently experience postpartum anemia as a consequence of perioperative blood loss, which is reflected in reduced hemoglobin and hematocrit concentrations. This study was conducted to examine the effectiveness of hematinic therapy in improving hematological parameters among post–cesarean section patients. A descriptive, non-experimental study employing a prospective cross-sectional design was carried out using data obtained from medical records and direct patient observation. The findings showed that mean hemoglobin and hematocrit levels declined from 9.3 g/dL and 27.8% prior to surgery to 8.5 g/dL and 25.7% following cesarean delivery. Subsequent administration of hematinic therapy resulted in measurable improvements in both parameters, with the greatest increases observed in patients who received folic acid supplementation. Overall, hematinic therapy was found to be effective in enhancing hemoglobin and hematocrit levels in post–cesarean section patients.

KEYWORDS:cesarean section; hematinic therapy; hemoglobin; hematocrit; postpartum anemia

I. INTRODUCTION

Anemia remains a major public health concern among women during pregnancy and the postpartum period, particularly following cesarean section (CS). Postpartum anemia is primarily caused by a combination of pre-existing maternal anemia and excessive blood loss during delivery, which is more pronounced in cesarean procedures than in vaginal births. This condition is characterized by reduced hemoglobin (Hb) and hematocrit (Hct) levels, leading to impaired oxygen transport and subsequent adverse maternal outcomes(1). Cesarean section is a common obstetric surgical intervention indicated for both maternal and fetal reasons. However, it is associated with a higher risk of perioperative blood loss, averaging approximately 1,000 mL, compared to vaginal delivery. Several studies have demonstrated that women undergoing CS are at significantly increased risk of postpartum anemia, especially those with low preoperative hemoglobin levels or obstetric complications such as postpartum hemorrhage (PPH) (2). The World Health Organization (WHO) continues to emphasize the importance of preventing and managing maternal anemia as part of efforts to reduce maternal morbidity and mortality globally (3). The clinical consequences of postpartum anemia are substantial. Anemic mothers are more likely to experience delayed wound healing, increased susceptibility to infection, prolonged hospitalization, fatigue, reduced physical capacity, and impaired mother–infant bonding. Moreover, postpartum anemia has been associated with an increased risk of postpartum depression, which may negatively affect maternal quality of life and neonatal care (4). These complications underscore the need for effective therapeutic strategies to restore hematological parameters after delivery. Management of postpartum anemia includes the administration of hematinic therapy such as oral or intravenous iron supplementation, folic acid, and blood transfusion in severe cases. Recent evidence suggests that iron supplementation, particularly intravenous iron, can effectively improve hemoglobin levels and reduce anemia-related symptoms, while blood transfusion is reserved for patients with severe anemia or hemodynamic instability (2). Despite the availability of various treatment options, data evaluating the effectiveness of different hematinic therapies in post–cesarean section patients, especially in developing countries, remain limited. Therefore, this study aims to evaluate the effectiveness of hematinic therapy in improving hemoglobin and hematocrit levels among post–cesarean section patients

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admitted to the Maternity and Pediatric Inpatient Unit of Dr. M. Djamil General Hospital, Padang. The findings of this study are expected to provide evidence-based insights to optimize the management of postpartum anemia in clinical practice.

II. METHOD

Study Design and Setting

This study employed a non-experimental, prospective, cross-sectional design. The research was conducted from February to April 2024 at the Maternity and Pediatric Inpatient Unit of Dr. M. Djamil General Hospital, Padang, a tertiary referral hospital in Indonesia.

Study Population and Sample

The study population comprised all post–cesarean section patients admitted to the Maternity and Pediatric Inpatient Unit during the study period. The study sample included post–cesarean section patients who received hematinic therapy and met the predefined inclusion criteria. A time-limited sampling technique was applied, in which all eligible patients who met the inclusion criteria during the specified study period were consecutively enrolled.

Inclusion and Exclusion Criteria

Inclusion criteria were as follows:

1. Post–cesarean section patients receiving hematinic therapy.
2. Patients with complete medical records, including diagnosis, maternal age, gestational age, indication for cesarean section, length of hospital stay, and hemoglobin and hematocrit values.
3. Patients who consented to participate in the study.

Exclusion criteria included:

1. Incomplete or illegible medical records.
2. Neonatal death.
3. Maternal death before receiving hematinic therapy.

Data Collection and Research Instruments

Data were collected prospectively using secondary data sources, primarily patient medical records. A structured data collection form was used to record relevant demographic, clinical, and laboratory variables. Interpretation of hemoglobin and hematocrit levels was conducted according to the Clinical and Interpretation Guidelines of the Indonesian Ministry of Health (2011).

Variables and Outcomes

The primary outcomes of this study were changes in hemoglobin and hematocrit levels following hematinic therapy. Hematinic therapies evaluated in this study included packed red cell (PRC) transfusion, oral ferrous sulfate, and folic acid supplementation.

Data Analysis

Data analysis was performed descriptively. The data processing steps included:

1. Data selection, ensuring all data met inclusion criteria.
2. Data entry, conducted using Microsoft Excel.
3. Data cleaning, to identify and correct inconsistencies or missing values.
4. Descriptive analysis, to summarize patient characteristics and changes in hemoglobin and hematocrit levels before and after hematinic therapy.

III. RESULT

A total of 30 post–cesarean section (CS) patients who received hematinic therapy at RSUP Dr. M. Djamil Padang between February and April 2024 met the inclusion criteria and were included in this study.

Maternal Age Distribution

Most patients were within the healthy reproductive age group (20–35 years), accounting for 21 patients (70%). Patients aged >35 years comprised 7 patients (23%), while those aged <20 years accounted for 2 patients (7%) (Table 1).

Table 1. Distribution of Patients Based on Maternal Age

Maternal Age Group	n	%
< 20 years	2	7
20–35 years	21	70
> 35 years	7	23
Total	**30**	**100**

Gestational Age at Delivery

The majority of patients delivered at term gestation (36–40 weeks), comprising 19 patients (63%). Preterm gestational ages were less common, with 7 patients (23%) at 31–35 weeks, 3 patients (10%) at 27–30 weeks, and 1 patient (3%) at 22–26 weeks (Table 2).

Table 2. Distribution of Patients Based on Gestational Age

Gestational Age (weeks)	n	%
22–26	1	3
27–30	3	10
31–35	7	23
36–40	19	63
Total	**30**	**100**

Obstetric Complications

Placenta previa was the most common obstetric complication, affecting 8 patients (27%), followed by previous cesarean section (6 patients; 20%). Breech presentation and premature rupture of membranes were each observed in 5 patients (17%), while severe preeclampsia occurred in 4 patients (13%). Congenital anomalies and thrombocytopenia were each identified in 1 patient (3%) (Table 3).

Table 3. Distribution of Patients Based on Obstetric Complications

Complication	n	%
Breech presentation	5	17
Severe preeclampsia	4	13
Premature rupture of membranes	5	17
Placenta previa	8	27
Previous cesarean section	6	20
Congenital anomaly	1	3
Thrombocytopenia	1	3
Total	**30**	**100**

Length of Hospital Stay

Most patients experienced a hospital stay of ≥5 days, accounting for 18 patients (60%), while 12 patients (40%) were hospitalized for <5 days (Table 4).

Table 4. Distribution of Patients Based on Length of Hospital Stay

Length of Stay	n	%
< 5 days	12	40
≥ 5 days	18	60
Total	**30**	**100**

Type of Hematinic Therapy

The predominant hematinic therapy was packed red cell (PRC) transfusion alone, administered to 23 patients (77%). Combination therapy of PRC with ferrous sulfate was given to 4 patients (13%), while PRC combined with folic acid was administered to 3 patients (10%) (Table 5).

Table 5. Distribution of Patients Based on Type of Hematinic Therapy

Type of Therapy	n	%
PRC transfusion	23	77
PRC + ferrous sulfate	4	13
PRC + folic acid	3	10
Total	**30**	**100**

Hemoglobin and Hematocrit Levels

Laboratory evaluation revealed that 29 patients (97%) had hemoglobin levels <12 g/dL, while only 1 patient (3%) had hemoglobin levels ≥12 g/dL. Similarly, 27 patients (90%) exhibited hematocrit levels <35%, whereas 3 patients (10%) had values ≥35% (Table 6).

Table 6. Distribution of Patients Based on Hemoglobin and Hematocrit Levels

Parameter	Category	n	%
Hemoglobin	<12 g/dL	29	97
	≥12 g/dL	1	3
Hematocrit	<35%	27	90
	≥35%	3	10

term. Placenta previa was the most frequent obstetric complication. Most patients required PRC transfusion, and nearly all exhibited low hemoglobin and hematocrit levels, highlighting the high burden of postpartum anemia in this population.

DISCUSSION

This study provides an overview of hematinic therapy utilization among post–cesarean section (CS) patients at a tertiary referral hospital, highlighting maternal characteristics, obstetric complications, therapeutic approaches, and hematological profiles. The findings demonstrate a substantial burden of postpartum anemia among patients undergoing cesarean delivery, emphasizing the importance of timely and appropriate hematinic management.

The majority of patients in this study were within the healthy reproductive age group (20–35 years). This finding is consistent with global obstetric trends, where most cesarean deliveries occur in women of optimal reproductive age due to both elective and emergency indications (5). Despite being within the optimal age range, a high prevalence of anemia was observed, indicating that maternal age alone does not confer protection against postpartum hematological deterioration, particularly following surgical delivery.

Most patients delivered at term gestation (36–40 weeks), which aligns with previous studies reporting that term pregnancies still carry a significant risk of postpartum anemia when cesarean delivery is performed (6; 7). Cesarean section is associated with higher blood loss compared to vaginal delivery, contributing to a greater decline in hemoglobin and hematocrit levels, even in term pregnancies.

Placenta previa emerged as the most common obstetric complication in this study. This condition is well-documented as a major risk factor for excessive intraoperative bleeding and postpartum anemia due to abnormal placental implantation and impaired uterine contractility (8). Additionally, a notable proportion of patients had a history of previous cesarean section, which further increases the risk of abnormal placentation and hemorrhage in subsequent pregnancies. These findings underscore the cumulative risk of repeat cesarean deliveries on maternal hematological outcomes.

The length of hospital stay was ≥5 days in most patients, suggesting increased clinical complexity and recovery time. Previous studies have shown that postpartum anemia is associated with prolonged hospitalization, delayed wound healing, increased fatigue, and reduced functional capacity (9). Therefore, effective hematinic therapy may play a critical role in reducing hospital stay and improving postpartum recovery.

Regarding therapeutic management, packed red cell (PRC) transfusion was the predominant intervention, either as monotherapy or in combination with oral iron or folic acid. This practice aligns with international guidelines recommending blood transfusion for patients with moderate to severe anemia or hemodynamic instability following childbirth (7). However, transfusion carries potential risks, including transfusion reactions, infection, and immunomodulation. Consequently, recent literature emphasizes the importance of optimizing iron supplementation strategies to reduce unnecessary transfusions (6; 10).

Laboratory findings revealed that nearly all patients had hemoglobin levels below 12 g/dL and hematocrit levels below 35%, confirming a high prevalence of postpartum anemia in this population. Similar prevalence rates have been reported in low- and middle-income countries, where antenatal iron deficiency, peripartum blood loss, and limited postpartum follow-up contribute to persistent anemia (11). Postpartum anemia has been associated with impaired maternal quality of life, postpartum depression, and reduced breastfeeding success, further emphasizing the need for comprehensive management strategies (9).

The findings of this study highlight the need for improved antenatal screening, perioperative blood loss prevention, and standardized postpartum anemia management protocols. Integrating individualized hematinic therapy and strengthening the role of multidisciplinary care may help reduce the burden of postpartum anemia, particularly in high-risk cesarean section patients.

IV. CONCLUSION

This study shows that cesarean section is associated with a significant reduction in hemoglobin and hematocrit levels. Mean hemoglobin and hematocrit decreased from 9.3 g/dL and 27.8% before surgery to 8.5 g/dL and 25.7% after cesarean section, indicating postoperative anemia. Packed red cell (PRC) transfusion improved hematologicalparameters, with increases of 21.65% in hemoglobin and 24.26% in hematocrit. Greater improvements were observed when PRC transfusion was combined with hematinic supplementation. PRC combined with ferrous sulfate increased hemoglobin and hematocrit by 42% and 35%, respectively, while PRC combined with folic acid showed the highest improvement (62.33% and 65%).These findings suggest that combination therapy, particularly PRC with folic acid, is more effective in improving hematological recovery in post–cesarean section patients than PRC transfusion alone.

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