

**Literature Review****Blood Transfusion in Obstetric Cases****Transfusi Darah pada Kasus Obstetri****Ali Sungkar, Raymond Surya**

*Department of Obstetrics and Gynecology  
Faculty of Medicine Universitas Indonesia  
Dr. Cipto Mangunkusumo General Hospital  
Jakarta*

**Abstract**

**Objective:** To discuss about blood loss in an obstetric setting, the role of blood transfusion, and patient blood management.

**Methods:** Literature review.

**Results:** Severe anaemia with hemoglobin level less than 7 g/dL or late gestation (more than 34 weeks) and/or significant symptoms of anaemia, the recommendation is giving only single unit transfusion followed by clinical reassessment for further transfusion. In postpartum hemorrhage (PPH), massive transfusion protocols are commonly used description as large volume of blood products over a brief period to a patient with uncontrolled or severe hemorrhage, transfusion more than 10 RBC units within 24 hours, transfusion more than 4 RBC units in 1 hour with anticipation of continued need for blood, replacement of more than 50% of total blood volume by blood products within 3 hours. All obstetric units have a clear-cut massive transfusion protocol for the initial management of life-threatening PPH, considering early transfusion therapy with RBCs and FFP.

**Conclusions:** Patient blood management aims to maintain hemoglobin concentration, optimize haemostasis, and minimize blood loss in effort to improve patient outcomes. Massive transfusion protocol in management of life-threatening should depend on each obstetric unit.

**Keywords:** blood transfusion, obstetric cases, patient blood management.

**Abstrak**

**Tujuan:** Untuk mendiskusikan tentang hilang darah dalam obstetrik, peran transfusi darah, dan patient blood management.

**Metode:** Kajian pustaka.

**Hasil:** Anemia berat dengan nilai hemoglobin kurang dari 7 g/dL atau kehamilan lanjut (lebih dari 34 minggu) dan/atau gejala nyata anemia, rekomendasi ialah memberikan satu unit transfusi diikuti dengan penilaian klinis untuk transfusi lebih lanjut. Pada perdarahan postpartum, protokol transfusi masif umum digambarkan sebagai volume darah yang dibutuhkan jumlah banyak dalam periode singkat, transfusi lebih dari 10 sel darah merah dalam 24 jam atau lebih dari 1 jam, penggantian lebih dari 50% total volume darah dalam 3 jam. Seluruh unit obstetrik memiliki protokol transfusi masif yang jelas untuk tata laksana awal perdarahan postpartum dengan mempertimbangkan transfusi awal untuk komponen sel darah merah dan FFP.

**Kesimpulan:** Patient blood management bertujuan untuk menjaga konsentrasi hemoglobin, optimalisasi hemostasis, dan minimalisasi hilang darah untuk meningkatkan luaran pasien. Protokol transfusi masif dalam tata laksana yang mengancam nyawa sangat bergantung pada setiap unit obstetrik.

**Kata kunci:** kasus obstetri, patient blood management, transfusi darah.

**Correspondence author.** Raymond Surya. raymond\_s130291@yahoo.co.id

## INTRODUCTION

Obstetric hemorrhage is the leading cause of maternal mortality worldwide. World Health Organization (WHO) stated that >78,000 women (around 27% of all maternal death) were due to obstetric hemorrhage in 2013.<sup>1</sup> Apart from mortality, obstetric hemorrhage impacts to women's health. Survey from WHO found that 1.2% of women experienced postpartum hemorrhage with 17.6% of those resulting in severe maternal outcomes such as "near miss" of resultant organ dysfunction.<sup>2</sup> The US Centers for Disease Control (CDC) stated that severe maternal morbidity includes ICU admission or transfusion of 4 or more whole blood or packed RBC units.<sup>3</sup> This is reflected in the need of quantitative blood loss required in every obstetric setting.<sup>4</sup> Meanwhile, blood transfusion is an important process as a temporary measure during anaemia. Blood transfusion replaces blood loss during procedures, injuries, and upkeep blood levels when the body fails to produce blood properly.<sup>5</sup> This issue raises the concern whether blood loss during obstetric cases can be replaced by blood transfusion. This article will discuss about blood loss in an obstetric setting, the role of blood transfusion, and patient blood management.

### Anaemia during Pregnancy

There are many significant physiological changes that happen during pregnancy. Pregnancy increases plasma volume by 40 to 50 percent in the 32<sup>nd</sup> week greater than red blood cell (RBC) mass which causes hemodilution. It causes physiological anaemia in pregnant mothers. Apart from that, iron metabolism also increases during the second and third trimester making women more prone to anaemia.<sup>6</sup> A recommendation that full blood count should be obtained to screen for anaemia at first antenatal visit and 28 weeks, as well as any time during pregnancy if symptoms of anaemia are present (1A). Anaemia in pregnancy does not always require transfusion, as they can be replaced with preventive or treatment-based nutritional support, adequate antenatal care, and risk factor management.<sup>7</sup>

In severe anaemia with hemoglobin level less than 7 g/dL or late gestation (more than 34 weeks) and/ or significant symptoms of anaemia,

the recommendation is to refer to secondary care clinic to make further investigation (1C). In the absence of bleeding, only single unit transfusion followed by clinical reassessment for further transfusion (1C).<sup>7</sup>

### Postpartum Hemorrhage

Pregnancy can also increase in hypercoagulation due to increase in procoagulant factors including von Willebrand factor (vWF), FVII, FVIII, FIX as well as decreased anticoagulant factors, such as protein S.<sup>8</sup> This adaptation is to minimize the risk of postpartum hemorrhage (PPH). American Society of Obstetrics and Gynecologists (ACOG) revitalize program defines that postpartum hemorrhage as cumulative blood loss more than 1,000 mL blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after birth process regardless the route of delivery.<sup>9</sup>

Successful management of obstetric hemorrhage consists of investigation for underlying etiology, administering targeted therapies, and transfusion whether needed. Protocols for massive transfusion and emergency-released blood products are essential for maternity unit through collaboration with blood bank.<sup>10</sup> Massive transfusion protocols are commonly used description as large volume of blood products over a brief period to a patient with uncontrolled or severe hemorrhage, transfusion more than 10 RBC units within 24 hours, transfusion more than 4 RBC units in 1 hour with anticipation of continued need for blood, replacement of more than 50% of total blood volume by blood products within 3 hours. ACOG recommends initial transfusion ratio for PRC: fresh frozen plasma (FFP): platelets of 1:1:1 and it is similar with replacement of whole blood. Actually, more important than ratio is the specific protocol for multicomponent therapy in each institution. For example, women with suspected disseminated intravascular coagulation (in cases of placental abruption or amniotic fluid embolism) should obtain cryoprecipitate.<sup>9</sup> Meanwhile, Royal College of Obstetricians and Gynecologists (RCOG) stated no firm criteria for initiating red cell transfusion and the decision is given to clinical judgement. In an extreme situation or blood group is unknown, group O RhD-negative red cells should be given with risk for

incompatible in patient with irregular antibodies. This guideline stated that FFP should be given at a dose of 12-15 ml/kg for every 6 units of red cells during major obstetric hemorrhage. It aims to maintain prothrombin time (PT) and activated partial thromboplastin time (APTT) ratio less than 1.5 x normal. Meanwhile, cryoprecipitate is given to keep fibrinogen level above 1.5 g/dL.<sup>11</sup>

A 2018 study in India did a prospective observational report regarding the use of transfusion during pregnancy in a tertiary care hospital. It is reported only 1.3% of obstetric patients are given transfusion of blood components in the study. The study also cited similar findings, whereas 0.3-1% of obstetric cases in Europe and Japan, require blood transfusion. The study stated placenta complications, such as placenta previa, and postpartum hemorrhage as the indications of transfusion in obstetrics. The parameters of transfusion used in the study are patient with hemoglobin concentration below 7 g/dL, and those who were in-patient for below 4 week for delivery or in labor. These parameters are not based on guideline and the study has cited Cochrane favoring restrictive transfusion policy while stating their treatment as 'controversial'.<sup>12</sup>

### Patient Blood Management

Patient Blood Management (PBM) is application of evidence-informed medical and surgical concept to maintain hemoglobin concentration, optimize hemostasis, and minimize blood loss in effort to improve patient outcomes.<sup>13</sup> Three pillars of PBM consist of perioperative erythropoiesis be optimized, blood losses be minimized and tolerance to anaemia be harnessed. It is continuous process from preoperative, intraoperative, and postoperative. Blood transfusion has several risks such as transmission of infectious agents, transfusion reactions, ABO mismatch, transfusion-related acute lung injury, transfusion-associated circulatory overload.<sup>14</sup>

In non-massive bleeding or bleeding is controllable, several RCTs and systematic reviews outside PPH support a restrictive transfusion strategy only perform transfusion in Hb concentration below 7 g/dL. Several trials had showed the benefit such as for severely ill patients with septic shock and hypovolemic

shock.<sup>15,16</sup> In Network for the Advancement of Patient Blood Management, Hemostasis and Thrombosis (NATA) consensus, FFP transfusion with 15-20 ml/kg in severe ongoing PPH guided by abnormalities in coagulation test (such as PT, INR and/or APTT >1.5 times normal or clotting time prolongation).<sup>7</sup> In unknown of laboratory results, NATA suggests administration of FFP transfusion at least in 1:2 FFP:RBC ratio until result of hemostatic.<sup>17</sup> A consensus stated that platelets with dose of 6-10 ml/kg should be transfused at platelet counts <75×10<sup>9</sup>/L (or when point-of-care testing indicates impaired platelet function), aiming to maintain a level >50×10<sup>9</sup>/L during ongoing PPH.<sup>7</sup> Meanwhile, NATA suggests all obstetric units have a clear-cut massive transfusion protocol for the initial management of life-threatening PPH, considering early transfusion therapy with RBCs and FFP.<sup>7</sup>

### CONCLUSION

Transfusion in obstetric cases can be caused due to anaemia during pregnancy or postpartum hemorrhage. Patient blood management aims to maintain hemoglobin concentration, optimize hemostasis, and minimize blood loss in effort to improve patient outcomes. Massive transfusion protocol in the management of life-threatening should depend on each obstetric unit.

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