



## Bioscientia Medicina: Journal of Biomedicine & Translational Research

Journal Homepage: [www.bioscmed.com](http://www.bioscmed.com)

### Intensive Strategy Resuscitation of Hemorrhagic Shock Patients with Ectopic Pregnancy in the Intensive Care Unit: A Case Report

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#### ARTICLE INFO

##### Keywords:

Ectopic pregnancy  
Hemorrhagic shock  
Intensive care  
Resuscitation

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All authors have reviewed and approved the final version of the manuscript.

<https://doi.org/10.37275/bsm.v7i6.828>

#### ABSTRACT

**Background:** Ectopic pregnancy is a health problem in women of reproductive age whose products of conception implant outside the endometrium. Fluid resuscitation and maintenance and adequate treatment in intensive care unit can reduce mortality and morbidity in patients. **Case presentation:** A 19-year-old woman came to the emergency department of Dr. M. Djamil General Hospital Padang with complaints of pain in the lower abdomen for 8 hours before entering the hospital. Physical examination results and obtained anemic conjunctiva (+)/(+). Check-up result in deep vaginal touch (VT) was obtained portion rocking pain (+). Then inspection culdosynthesis with results (+). The patient was diagnosed with acute abdominal ec suspected ruptured ectopic pregnancy at G2P1A0H1 gravid 8-9 weeks with severe anemia. After undergoing laparotomy, the patient was admitted to the ICU for 2 days. **Conclusion:** Adequate resuscitation of fluids and blood products and overcoming shock causes are crucial in managing hemorrhagic shock in the intensive care unit.

#### 1. Introduction

Ectopic pregnancy is one of the most common causes of maternal death in the first trimester of pregnancy. An ectopic pregnancy occurs when the fertilized egg does not implant in the endometrial wall, such as the fallopian duct, and can even occur intraabdominal pregnancies. Ectopic pregnancies usually occur during the first trimester of pregnancy. An ectopic pregnancy cannot generally develop until term and can be life-threatening to the pregnant individual. Because ectopic pregnancies can be life-threatening if the ectopic pregnancy is not treated properly, patients need to be treated as properly and quickly as possible with medication or surgery.<sup>1-4</sup>

Ectopic pregnancy is a common occurrence in all women of reproductive age. Doctors should be aware of the possibility of ectopic pregnancy in female patients of reproductive age. Prompt and appropriate early diagnosis is essential to reduce maternal mortality and morbidity and improve the success rate of management. Understanding the treatment, eligibility criteria required follow-up, and options of each treatment option can help clinicians to treat ectopic pregnancies with hemorrhagic shock and can ensure patient safety.<sup>2</sup>

Hemorrhagic shock is one of the leading causes of death in America and is increasing every year. There are more than 60,000 deaths in the United States each

year, and most of these are trauma-related. 20% of all in-hospital trauma deaths are due to inadequately controlled bleeding, and Nearly 30% of pre-hospital trauma deaths occur as a result of uncontrolled bleeding. Massive transfusion protocol (MTP) is the standard of care in managing hemorrhagic shock.<sup>5</sup>

Patients with bleeding are very common in the intensive care unit (ICU). Bleeding often occurs due to various causes, with bleeding prevalence gradually increasing until 50% is reported in some ICU populations. This high incidence is associated with increased morbidity and mortality in patients with hemorrhagic shock. Administration of fluids and blood products is an important management tool in the treatment of patients with ongoing bleeding, but the transfusion of blood products also carries theoretical and measurable risks.<sup>6</sup> So that proper and adequate management in the ICU is needed in the management of ectopic pregnancy with hemorrhagic shock so as to reduce mortality and morbidity in patients.

## 2. Case Presentation

A 19-year-old woman came to the emergency department of Dr. M. Djamil General Hospital Padang with complaints of pain in the lower abdomen 8 hours before entering the hospital. The first day of the woman's last menstruation (HPHT) was 56 days before experiencing complaints. Physical examination results and obtained anemic conjunctiva (+)/(+). Check-up result in deep vaginal touch (VT) was obtained portion rocking pain (+). Then inspection nucleosynthesis with results (+). After suspected experience of pregnancy, ectopic, inspection support ultrasound of abdomen and laboratory. Results inspection ultrasound obtained. Much free fluid is in the sub diaphragm right and left, hepatorenal spaces, until the lower abdomen. They looked complex mass in the Posterior cavity of Douglas with suspected clot blood. Uterus anteflexion, no growing; the border is gloomy; the uterine cavity is not widened. There is no gestational sac in it. Organ abdomen was other in limit normal. The conclusions of the ultrasound examination are many fluid-free intraperitoneal accompanied mass complexes in the

posterior uterus, which are suspected to clot blood. Results inspection Laboratory obtained pregnancy test (HCG) positive, Hb 5.4 g/dL, Hematocrit 16 %.

Patient with G2P1A0H1 gravid 8-9 weeks with severe anemia. In the Emergency Department, we give blood transfusions, and then the patient undergoes emergency surgery. After undergoing a laparotomy emergency, the patient was admitted to the ICU for two days. During the treatment period, the patient has severe anemia. The patient underwent mechanical ventilation for one day, accompanied by arterial blood gas analysis monitoring. Fluid maintenance, hemodynamic monitoring, and monitoring of cumulative balance and urine output patients are intensively monitored in the Intensive Care Unit. Postoperative management was successfully treated in the ICU.

## 3. Discussion

In this case report, it was reported that a 19-year-old woman came to the emergency department of Dr. M. Djamil General Hospital Padang with complaints of pain in the lower abdomen 8 hours before entering the hospital. After a physical examination and supporting examination, the patient was diagnosed with ectopic pregnancy. Intra abdominal, emergency laparotomy was performed, and then the patient was admitted to the intensive care unit.

When a patient is admitted to the ICU after surgery to treat the cause of bleeding, the first thing to do is evaluate the shock's severity. Therefore, appropriate laboratory tests and close monitoring of the hematology, hemodynamics, and respiratory system should be performed.<sup>7</sup>

On admission to the ICU, the patient's blood pressure dropped to 70/42 mmHg with a Mean Arterial Pressure of 51 mmHg, HR 123 x/minute. While waiting for the blood to be ready, we gave fluid resuscitation with colloids, and a complete blood test was examined after surgery.

Colloids are one of the options for hemodynamics. Colloid delivery increases oncotic/colloidal osmotic properties that are beneficial in the microcirculation,

and the volume required in the vasculature is more diminutive, providing an outdoor advantage to prevent continued or recurrent bleeding due to high pressure/volume in the macrocirculation. However, the characteristics of these colloids also have the disadvantage that they can cause interference with coagulation and immune response and impaired renal function by many colloids.<sup>8,9</sup> Shock is a clinical syndrome that results from hemodynamic and metabolic disturbances characterized by the failure of the circulatory system to maintain adequate perfusion to the body's vital organs.<sup>8</sup>

Fluid administration is a drug used in shock patients. Fluid administration is beneficial to increase cardiac output, thereby increasing fluid distribution throughout the body, which aims to increase oxygen delivery to cells. Various physiological interactions of cardiac function and venous return determine the response to fluid administration. Replacements of transient blood loss with adequate fluids aim to prevent reperfusion ischemia and optimize tissue oxygenation and microcirculation dynamics.<sup>10-12</sup>

The severity of shock should be analyzed to set resuscitation goals in trauma patients with severe bleeding who undergo emergency surgery to address the cause of bleeding. Control of bleeding is of utmost importance, and this will improve the hypoperfusion state and prevent multiorgan failure in the patient. At the same time, a minimum perfusion level and permissive hypotension should be established to avoid exacerbation of bleeding (systolic blood pressure between 80 - 90 mmHg, MAP 65 mmHg). Once bleeding is under control, the patient's hemodynamic status should be reassessed. Blood pressure and heart rate are essential physical examinations that can be used to estimate the severity of hypovolemia.<sup>7</sup>

The patient's Hb value on admission to the ICU was 6.7 g/dl with a hematocrit of 19, and then the patient was given a blood transfusion of 4 units of PRC and 4 units of FFP. The provision of blood transfusion is crucial in the management of hemorrhagic shock. Without adequate fluid administration, significant blood loss can disrupt tissue perfusion to essential

organs, resulting in multiorgan failure. When a patient is admitted into the ICU, shock and physiological alterations must be identified and corrected.<sup>7,13,14</sup>

European Society of Intensive Care Medicine recommendations for blood transfusion in intensive care Units is given with a high ratio transfusion strategy (at least one unit of plasma per 2 units of packed red blood cells) vs. a low ratio transfusion strategy in critically ill patients with massive bleeding from trauma.<sup>6</sup> The observational trauma evidence suggests high transfusion ratios ranging from 1:1 to 1:2 fresh frozen plasma (FFP): RBC results in a large mortality benefit early on.<sup>5,6</sup>

The American College of Obstetricians and Gynecologists recommends MTP for comprehensive postpartum hemorrhage management. Administration of Massive Transfusion Protocol (MTP) is one of the appropriate options. Massive Transfusion Protocol in patients with bleeding in postpartum hemorrhage helps accelerate the transfusion process to secure hemodynamics. Most protocols have been adapted from trauma evidence, with the criteria for activating MTP being the anticipation of replacing 50% or more of the blood volume within 2 hours or continued bleeding after 4 RBC Units in less than 2 hours. Although a 1:1:1 ratio strategy is recommended, a recent systematic review concluded that an FFP/RBC ratio greater than or equal to 1 is associated with better patient outcomes.<sup>5</sup>

The patient's albumin at ICU admission was 2.8 g/dl. In postoperative patients with massive bleeding, the target albumin should be more than 3 g/dl to avoid the administration of vasopressors and inotropic.

Hypoalbuminaemia is related to an increase in mortality risk in the Intensive Care unit. Albumin has multiple physiological effects. One of the most common is the preservation balance of colloid-osmotic insistence, which regulates the acid-base balance, brings out hormones and drugs, and has some impact on immunology.<sup>10,15</sup>

From the blood gas analysis examination, the patient had an acid-base balance disorder, namely metabolic acidosis (with pH 7.30, BE -6.4, and HCO<sub>3</sub>-

19.5). One of which could occur due to massive bleeding. After giving adequate fluids, a blood gas analysis examination was repeated, and the acid-base balance returned to normal.

In patients with severe trauma with massive bleeding that occurs in patients treated in the ICU, the body usually compensates for its metabolic conditions. Hence, patients with severe trauma often have severe metabolic acidosis and hypothermia. Metabolic acidosis can affect platelet function, clotting factors, and thrombin formation. If this condition is not adequately treated, it can increase patient mortality with a greater need for transfusion of blood products. Several studies have shown that metabolic acidosis with a pH level of 7.1 or less is borderline for severe coagulation pathway compromise. In addition, a base excess (BE) of -12.5 or less can indicate that inadequate perfusion has occurred. These parameters will be corrected if adequate fluid and blood resuscitation is performed and tissue perfusion is restored to normal.<sup>7</sup>

In addition to blood and fluid resuscitation management, this patient was also given anti-bleeding drugs, namely tranexamic acid. The European Society of Intensive Care Medicine Guidelines recommend the early use of tranexamic acid in critically ill patients with postpartum hemorrhage. Tranexamic acid administration may reduce mortality from bleeding in critically ill patients with postpartum hemorrhage. However, more evidence-based research studies are needed to evaluate the role of enteral and low-dose intravenous tranexamic acid and the potential role of tranexamic acid as a management agent in refractory hemorrhage.<sup>6</sup>

After adequate resuscitation, after 24 hours of close monitoring in the ICU, a repeat routine blood test was performed, resulting in a Hb of 11.2 g/dl. Hemodynamics stabilized, and the patient was discharged from the ICU in good condition.

#### 4. Conclusion

Adequate resuscitation of fluids and blood products and overcoming shock causes are crucial in

managing hemorrhagic shock in the intensive care unit.

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