



CASE REPORT

# Recombinant factor VIIa after amniotic fluid embolism and disseminated intravascular coagulopathy

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## KEYWORDS

Activated recombinant factor VIIa;  
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## ABSTRACT

This case report illustrates the successful use of activated recombinant factor VIIa in the management of severe postpartum hemorrhage secondary to amniotic fluid embolism.

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Postpartum hemorrhage secondary to disseminated intravascular coagulopathy is a common complication of amniotic fluid embolism [1]. This condition is frequently associated with high morbidity and mortality, and survival depends on rapid fluid resuscitation and correction of coagulopathy. Activated recombinant factor VIIa has been successfully used for the management of obstetric hemorrhage [2,3], but there are no case reports of successful management of amniotic fluid embolism with activated recombinant factor VIIa. We present the first successful use of recombinant

activated factor VIIa for treatment of disseminated intravascular coagulopathy secondary to amniotic fluid embolism.

A 26-year-old primigravida was in spontaneous labor at 39 weeks of pregnancy. The amniotic membrane was ruptured and augmentation of labor with oxytocin initiated. Persistent fetal bradycardia was noted 30 min later and an emergency cesarean section was performed under general anesthesia. Two minutes after delivery, the patient was suddenly hypotensive, with a systolic blood pressure of 50 mm Hg and a drop of end tidal carbon dioxide to 10 mm Hg. She was unresponsive to intravenous ephedrine and phenylephrine but responded to intravenous epinephrine. After 5 min of resuscitation, her systolic blood pressure was 105 mm Hg, with a sinus tachycardia of 150 beats per

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minute. There was evidence of coagulopathy, as there was increased bleeding from the surgical site despite good uterine contraction as well as oozing from her peripheral intravenous cannula site and her oral cavity. A preliminary diagnosis of amniotic fluid embolism was made. Investigations taken 20 min after the hypotensive episode revealed prolonged prothrombin time (21 s), activated partial thromboplastin time greater than 180 s, an international normalized ratio of 1.66, and a platelet count of  $50 \times 10^9/L$ . Blood gas had a pH of 7.178, a  $PaO_2$  of 184 mm Hg, a  $PaCO_2$  of 32 mm Hg, a base excess of  $-16$ , and  $HCO_3$  levels of 12 mmol/L. Hemostasis was not secured after 2 h of resuscitation with 1 L of fresh frozen plasma and 2 U of platelet concentrate. Total blood loss was estimated to be 3 L. Fluid resuscitation consisted of 3.5 L of Ringer lactate solution, 500 mL of gelafundin, and 6 U of red blood cells. Intravenous recombinant factor VIIa (rFVIIa; Novoseven®), 90  $\mu g/kg$ , was administered and hemostasis was secured within 30 min. The patient's immediate postoperative international normalized ratio was 1.13, and she had a prothrombin time of 15.3 s, an activated partial thromboplastin time of 35.7 s, a platelet count of  $169 \times 10^9/L$ . A disseminated intravascular coagulopathy test was positive, with a fibrinogen concentration of 1.5  $\mu mol/L$ , D-dimer levels greater than 2  $\mu g/mL$ , and no soluble fibrin monomers. The patient was discharged from the hospital in good health on the fifth postoperative day.

Management of postpartum hemorrhage caused by disseminated intravascular coagulopathy secondary to amniotic fluid embolism includes the use of blood products as well as uterine artery embolization and hysterectomy [1]. To our knowledge, we are the first to report a case of successful management of disseminated intravascular coagulopathy secondary to amniotic fluid embolism using recombinant factor VIIa. Kretzschmar et al. [4] first reported the use of recombinant factor VIIa in a patient with disseminated intravascular coagulopathy secondary to amniotic fluid embolism. However, the patient died from multiorgan failure despite hysterectomy, pelvic packing, massive blood products transfusion, and administration of recombinant factor VIIa. Our favorable outcome could have been due to several factors. Amniotic fluid embolism presents as a spectrum of disease of various severity from subclinical to rapidly fatal.

Our patient's amniotic fluid embolism may not have been severe. However, it has been suggested that successful control of bleeding requires optimal timing and optimal dose. There has been no study to determine the optimal time for administration of recombinant factor VIIa, but early administration—before the onset of metabolic complications, severe coagulopathy, prolonged hypoxia, and multiple transfusions—may have contributed to the successful outcome in our patient [5].

The recommended dose of recombinant factor VIIa to treat bleeding in patients with hemophilia is 90–120  $\mu g/kg$ . The optimal dose of recombinant factor VIIa in the management of uncontrolled medical bleeding in patients without hemophilia is unknown. The range of doses that has been used successfully for treatment of serious bleeding was from 20 to 120  $\mu g/kg$ .

There are many published case reports on, and uncontrolled trials of, the successful management of severe uncontrolled bleeding with recombinant factor VIIa in patients without hemophilia, but randomized controlled trials are still lacking. This report illustrates the successful use of recombinant factor VIIa in the management of severe postpartum hemorrhage secondary to amniotic fluid embolism.

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