**A Case of Uterine Inversion and Postpartum Hemorrhage Treated with Recombinant Factor VIIa**

**Authors:** Matthew L. Kolz, M.D., Ph.D., Alexander Butwick, FRCA, Edward T. Riley, M.D.
**Affiliation:** Department of Anesthesia, Stanford University School of Medicine, Stanford, California

**Introduction:** Uterine inversion is a rare event, estimated to occur in 1 of 6,400 deliveries[1], and can be a life-threatening cause of postpartum hemorrhage. Early fluid resuscitation and manual replacement of the uterus are prerequisites to a successful outcome[2]. We report an unusual case of uterine inversion with massive hemorrhage requiring general anesthesia for manual uterine replacement followed by treatment with recombinant Factor VIIa (rFVIIa) for continued postpartum bleeding.

**Case:** A 21 year-old female (G2P1) presented to our hospital in labor. She was healthy with no known medical problems. Her labor was precipitous, and she vaginally delivered a healthy baby. Anesthesia was not consulted prior to her delivery. Immediately following third stage of labor, the patient developed profuse vaginal bleeding and, on attempted uterine massage by the obstetrician, was found to have an inverted uterus.

On examination, she was lethargic and pale, but communicative. Her heart rate (HR) was 130 and blood pressure (BP) was 90/40. Large bore intravenous access was obtained, oxygen was delivered by face mask, and stat labs were sent including a hematocrit (Hct) of 27.4% and a request for packed red blood cells (PRBC). After an unsuccessful attempt was made by the obstetrician to reinvert the uterus with the aid of sublingual nitroglycerin spray, the decision was made to proceed to the operating room (OR) for a general anesthetic. The patient was transported to the OR with oxygen and fluid resuscitation through a rapid infuser.

A rapid sequence induction and intubation were performed with ketamine and succinycholine. A radial arterial line was placed and the patient's HR was 135 and BP was 90/35. Intravascular resuscitation efforts continued with 1500 ml of colloid followed by crystalloid and vasopressors while a general anesthetic was maintained with low dose volatile agents. Utilizing general anesthesia, the surgeons were able to manually replace the uterus. Following a brief delay in obtaining blood from the blood bank and immediately prior to administering this blood, the patient's Hct was obtained as 4.9% with transient ST segment changes on the electrocardiogram. In the operating room, the patient received 8 units PRBC and 12 liters crystalloid and oxytocin was started. She was awakened, extubated uneventfully, and transferred to the postoperative care unit (PACU) with HR 110, BP 134/74, and Hct 33.9%.

Over the course of her PACU stay, further vaginal bleeding (200 mls every 30 minutes) continued and the patient was transfused 8 units of fresh frozen plasma and 10 units of cryoprecipitate along with 2 additional units of PRBC. An interventional radiology consult was obtained for possible uterine artery embolization. Prior to proceeding with an interventional procedure, two doses of rFVIIa were given intravenously (50 mcg/kg and 25 mcg/kg). Following the second dose, the patient was reexamined by the obstetrician and minimal blood was expressed. The patient was observed overnight in the intensive care unit and no further bleeding episodes or complications occurred. She was discharged on postoperative day two.

**Discussion:** This case highlights the urgency of diagnosis and treatment of uterine inversion. If uterine inversion is diagnosed, the uterus needs to be manually replaced at the earliest opportunity. This can usually be performed following tocolytic therapy, but if initial attempts to revert the uterus prove unsuccessful, early recourse to general anesthesia is necessary. Aggressive fluid resuscitation is advised, and massive postpartum hemorrhage can be expected in severe cases. Even after uterine replacement, hemorrhage may continue due to atony. Uterotonic agents such as oxytocin are normally given to decrease atony following replacement of the uterus and prevent uterine re-inversion. Although originally licensed for the treatment of hemophilia, rFVIIa has been used successfully in a number of case reports for the management of severe postpartum hemorrhage[3]. In our case, rFVIIa provided therapeutic