

## **Anesthesia management for emergency cesarean section in a patient affected by von Willebrand's disease with perinatal distress**

D. Galante

University Department of Anesthesia and Intensive Care, University Hospital Ospedali Riuniti of Foggia, Italy

Corresponding author: D. Galante University Department of Anesthesia and Intensive Care, University Hospital Ospedali Riuniti of Foggia, Viale L. Pinto, 71122 Foggia, Italy, Email: [dario.galante@tin.it](mailto:dario.galante@tin.it)

### **Key points**

Clinical evaluation of patients with coagulopathies is critical for determining the anesthetic technique. Evaluation should be individualized, considering risks and benefits of the technique. This issue is important in patients undergoing emergency cesarean section with perinatal distress

### **Abstract**

Von Willebrand's disease is the most common hereditary coagulation disorder in young women. This report aimed at describing the case of obese patient with von Willebrand's disease scheduled for cesarean section. We report the case of an obese patient, 26 years old, with von Willebrand's disease, admitted to the emergency room in early labor. Cesarean section was indicated because the baby shows signs of distress. Patient had hematomas on both arms and legs and history of abdominal wall hematoma in previous hernia repair. Coagulation tests were mildly changed. General anesthesia was preferred and induced after factor VIII concentrate infusion. Both mother and newborn had satisfactory outcomes.

Clinical evaluation of patients with coagulopathies is critical for determining the anesthetic technique. Evaluation should be individualized, considering risks and benefits of the technique. Cesarean section for these patients should be avoided whenever possible and replaced by less invasive methods. Factor VIII concentrate therapy is the best treatment option for correcting specific deficiency.

**Keywords:** von Willebrand's disease; cesarean section; anesthesia; perinatal distress.

### **Introduction**

Von Willebrand's disease (vWD) is the most common hereditary coagulation disorder in women, affecting up to 1% of the population and many cases are diagnosed in childhood. It has a negative impact on the quality of life of affected individuals, therefore it is important that the condition be recognized and diagnosed. The coagulopathy has higher chances of causing gestation and delivery problems. The severe manifestation of the disease, however, has a lower incidence of approximately 1:10.000 (1). This report aimed at presenting the case of an obese labor patient with vWD, scheduled for cesarean section, focusing on anesthetic management.

### **Case report**

The patient, 26 years old, 115 kg, 165 cm, was conducted to the obstetric emergency in early labor. Patient was classified as physical status ASA III due to von Willebrand's disease and obesity according to historical information. Her obstetric history included three gestations with vaginal delivery and recent hernia

repair which has evolved with postoperative abdominal wall hematoma. Patient had no pre-natal care during this gestation. At physical evaluation, patient presented several limb hematomas, without any other signs of bleeding.

Preoperative tests revealed 24.8% hematocrit, 8.5 mg/dl hemoglobin, 142.000 platelets, 75% prothrombin time (PT), 41.2/35s partial thromboplastin time (PTT), 2.67 D-dimers, 511 mg/dl fibrinogen, 1 m 5 s bleeding time and 4 m 14 s clotting time. Cesarean section was indicated due to the baby shows signs of distress. According to hematologist's orientation, patient was premedicated with 10 U cryoprecipitate and factor VIII concentrate.

After intravenous incannulation with 18G and 14G needles, patient received 1000 ml crystalloids and premedicated with intravenous ranitidine 100 mg and ondansetron 4 mg. Balanced general anesthesia was induced with rapid sequence technique, with propofol 180 mg and succinylcholine 80 mg. After 100% oxygenation by facial mask for 3 minutes, tracheal intubation was performed with 7.0 ID endotracheal cuffed tube and mechanically controlled ventilation was started with FiO<sub>2</sub> 0.4 and PEEP of 5 cm H<sub>2</sub>O. Anesthesia was maintained with sevoflurane 2 % in a mixture of Air/O<sub>2</sub> and cisatracurium 0.15 mg/kg. After extraction of live male fetus with 3400 g and Apgar 5 and 6, patient received intravenous 100 µg alfentanil, 1 g cefazolin and oxytocin 20 UI. After beginning of oxytocin infusion, there was an episode of cutaneous facial rash spontaneously resolved without treatment. Patient received further 1500 ml crystalloids and perioperative bleeding was considered minor. Procedure lasted 55 minutes. Postoperative pain treatment was performed with intravenous continuous infusion of morphine 0.04 mg/kg/h. Patient received continuous intraoperative factor VIII infusion, which was maintained for 8 hours, followed by one dose every 12 hours for 4 days. Coagulation was daily monitored with PTT, being the first postoperative result 51.9 s without

clinical significance. Patient was discharged in the 4<sup>th</sup> postoperative day with good evolution with outpatient follow up.

### **Discussion**

vWD is an autosomal dominant hereditary disease characterized by deficiency or defect of von Willebrand's factor (vWF), which is the protein responsible for one stage of platelet aggregation. In addition, vWF binds to coagulation cascade factor VIII protecting it against degradation. So, vWD, which is primarily a platelet function disorder, may secondarily promote coagulation disorders by coagulating factor VIII deficiency. vWD may be classified in three types. Two major forms are type 1 with quantitative vWF deficiency, corresponding to 75% of cases; and type 2 with qualitative defect, corresponding to approximately 17% of cases. Bleedings in type 2 are more frequent and severe as compared to type 1. Type 3 is less frequent (1% of patients) and clinically more severe. It is important to determine patient's type because it helps treatment, allowing specialists to act on the specific deficiency (2). In our case, this classification was impossible due to the absence of previous follow up. In general, there is mucosal bleeding but in parturients bleeding is more frequent after delivery than during gestation and is associated to surgical delivery and perineal injury. If vWD is suspected, history of menorrhagia or other mucosal bleedings and family history of the disease should be investigated (3). During third trimester gestation, fibrinolytic activity is suppressed and coagulation factors tend to increase (especially fibrinogen), resulting in hypercoagulation, which may promote clinical improvement in vWD patients. After delivery, patients return to pre-pregnancy state and coagulation problems may be present in the post-delivery period. Patients with moderate disease tend to be more subject to post-delivery as compared to intra-delivery problems. Although not reporting bleedings, patient presented several hematomas and had history of post hernia repair abdominal wall hematomas.

Recommended laboratory monitoring is hematocrit, hemoglobin, prothrombin time, thromboplastin time and bleeding time. In addition, specific factor VIII, vWF antigen and vWF activity dosages are suggested (3). vWF levels may be measured by factor VIII antigen or by the activity of ristocetin co-factor, which measures functional vWF properties in platelet aggregation. When factor VIII:C levels are below 25%, PTT will be prolonged. Low factor VIII levels are major determinants of delivery hemorrhages. Factor VIII complex function may be estimated by bleeding time. In most cases, there are normal platelet morphology and number, and bleeding time is increased. Bleeding time should always be requested if this diagnosis is suspected and is the test correlating the best with bleeding trend. In our patient, bleeding time was normal, not suggesting major clinical repercussion. During cesarean sections or other surgical procedures, factor VIII:C levels should be 80% or more, and bleeding time should be normal. Careful surgical hemostasis and effective uterine contraction may compensate increased bleeding time. In our case we avoided to perform epidural or spinal anesthesia due to the risk of post-regional anesthesia hematoma in women with hematological disorders or totally anticoagulated so we preferred to perform general anesthesia as recommended in recent literature (4). Moreover, patient had no clinical follow up, with unknown coagulopathy severity, abnormal physical evaluation and history of hematoma in previous surgery. Because patient was admitted already in labor, a deeper investigation of the disease with coagulation factors dosage was impossible. If coagulation tests are normal with bleeding time below 10 minutes and platelet count above 100.000, there is no counter indication for epidural catheter in patients with moderate disease. Coagulation tests should be normal before catheter is removed. Spinal anesthesia may be a safe option for elective surgeries. There are two major therapeutic agents to prepare patients with vWD: desmopressin (DDAVP) and blood products containing

concentrated factor VIII and vWF. DDAVP transiently increases factor VIII and vWF releasing them from storage sites to plasma, being an effective treatment for type 1 disease. In general, high factors concentrations last 8 to 10 hours. Recommended dose is subcutaneous 0.3 µg/kg or nasal 300 µg. Infusions may be repeated every 12 or 24 hours, if needed. In our case, DDAVP has been discussed with the hematologist and considered unnecessary, since type of disease was unknown and there was factor VIII concentrate available for intravenous administration. Major risk for fluid retention in patients under this therapy has been observed. In addition, since there is variable response to desmopressin, a test infusion is recommended some weeks before surgery or delivery to measure response and evaluate possible adverse events. Blood transfusion is the treatment of choice when there is bleeding or when it should be prevented in cases were desmopressin is considered insufficient for hemostasis. Large volume fresh frozen plasma may be used. Fresh frozen plasma is in general enough to correct coagulation defects, but when there is major fibrinogen depletion (< 0.8 g/l) 10 to 15 units of cryoprecipitate are needed. Cryoprecipitate has 5 to 10 times more factor VIII and vWF as compared to fresh plasma (5). Cryoprecipitate transfusions are recommended (15 to 20 units) when preoperative bleeding time is abnormal or factor VIII:C levels are below 50%. Cryoprecipitate every 12 or 24 hours normalizes factor VIII levels and stops or prevents bleeding. Factor VIII and vWF are currently preferred for being free from viral transmission risk. Recommended dose is 40 to 60 UI/kg once a day. For surgical procedures, factor VIII should be dosed every 12 hours in surgery day and then every 24 hours. To every 1 UI/kg concentrate there is 2 UI/dl factor VIII increase. Thrombocytopenia (platelet count below 50.000) may require correction with platelet concentrate transfusion.

We have initially used cryoprecipitate at hematologist's indication. After new consultation, factor VIII was made

available and therapy was replaced. PTT was used for monitoring because results are faster allowing therapy control. PTT is able to measure intrinsic coagulation pathway activity, which involves factor VIII activity. Although not being the golden standard to evaluate this disorder, it may be an alternative in cases when factor VIII dosage is unavailable or when results cannot be obtained as promptly as needed. vWD patients evaluation should always take into consideration clinical manifestations of the disease, which, together with specific coagulation factors dosages, are the most important elements to determine the severity of the disease. When these tests are unavailable, bleeding time and PTT measures may be useful. Factor VIII concentrate is currently the most widely indicated therapy for specifically correcting the disorder without viral transmission risk. If this therapy is not available, fresh frozen plasma or cryoprecipitate transfusion is recommended. Surgical gestation interruption in these patients should be restricted, and vaginal delivery should be the choice, whenever possible, to decrease maternal risks. The best anesthetic option for coagulopathy patients is still controversial and should be decided in a case-by-case basis as demonstrated by

Butwick et al (6) that successfully performed a neuroaxial anesthesia with regard to type 1 vWF.

#### References

1. Robertson J, Lillicrap D, James PD. Von Willebrand disease. *Pediatr Clin North Am* 2008; 55: 377-92.
2. Lusher JM - Screening and diagnosis of coagulation disorders. *Am J Obstet Gynecol* 1996;175:778-783.
3. Gershon RY, Alleyne A - Preoperative Evaluation of the Parturient with Coexisting Disease: Part I - Disease of the Cardiac, Renal and Hemathologic Systems, Norris M - *Obstetric Anesthesia*, 2<sup>nd</sup> Ed, Philadelphia, Lippincott Williams & Wilkins, 1999; 29-62.
4. Ito H, Satoh M, Seo N. Anesthetic management of cesarean section in a patient with type II von Willebrand disease. *Masui* 2008; 57: 203-5
5. Manucci PM - How I treat patients with von Willebrand disease. *Blood* 2001; 97: 1915-1919
6. Butwick AJ, Carvalho B. Neuraxial anesthesia for cesarean delivery in a parturient with type 1 von Willebrand disease and scoliosis. *J Clin Anesth* 2007; 19: 230-3.