Spinal anesthesia for cesarean delivery in von willebrand

Spinal anesthesia for cesarean delivery in von Willebrand disease

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Abstract

Von Wiliebrand disease (vWD) is a very common clotting disorder encountered in clinical obstetric anaesthesia practice. This disorder needs appropriate preoperative evaluation to choose the best technique of anaesthetic management. Evaluation needs to be individualized to consider the risk and benefits of each technique, either general or neuraxial anaesthesia. The risk of spinal or epidural hematoma following neuraxial techniques is rare, owing to increase in coagulation factors in pregnancy. General anesthesia is best avoided due to airway related issues, unless required in caesarean delivery with fetal distress. There is very few published case reports on use of spinal anaesthesia in vWD parturient for caesarean delivery. We present a case of spinal anaesthesia in a parturient with vWD for caserean delivery. The indication of spinal anaesthesia for caesarean delivery with regard to vWD are reviewed.

Keywords: von Willebrand’s disease(vWD); caesarean section; anesthesia.

Introduction

With the prevalence of 1% to 2% in general population, Von Willebrand disease (vWD) is the most common hereditary clotting disorder. vWD is associated with quantitative deficiencies of von Willebrand factor (vWF) and factor VIII, which result in mild to moderate bleeding episodes (1).

Both vWF and factor VIII increase in pregnancy with a peak in the third trimester (2, 3).

Spinal anesthesia may be considered for patients with vWD due to improvements in the coagulation profile in pregnancy. There are only a few case reports describing the use of Spinal anesthesia for labor or delivery in patients with vWD (4-7). The severe manifestation of the disease occurs in approximately 1: 10. 000 cases (8). We present the anesthetic management of a patient with vWD for cesarean delivery

Case Report

35yr old Primigravida, a known case of von Willebrand disease (vWD), was admitted at 36weeks of gestation in view of vWD and placenta previa type 2A for safe confinement. She was diagnosed with vWD at the age of 18 yrs following tooth extraction and also gives history of excessive bleeding following incision and drainage of right cheek abcess at the age of 21 yrs.

Her elder sister is also a known case of vWD detected at 21 yrs of age following cervical polypectomy. Her younger brother was also diagnosed to have vWD following circumcision at 7yrs of age.

On admission, her weight was 88 kg, with a height of 157 cm.

Laboratory evaluation after admission shows :-

Hematocrit – 30% (reference range, 35%-47%).

PT- (T)-14. 9 (C)14. 6 INR- 1. 02 (reference range, 9. 8 – 12. 8 sec).

APTT- (T)-51 (C)-32 (reference range, 24-38 sec).

vWF antigen – 12% (obser. value) (reference range,).

Factor VIII assay-

Ristocetin coefficient-

Ultrasound report shows SLIUG of 36wks + 2days, BPP 8/8, low lying placenta grade 2A, single loop of cord the neck and AFI 15. 5. Fetal heart rate was reassuring and parturient was continuously monitored in our antepartum unit.

Obstetric plan was to continue expectant line of management till 38 wks of gestation. Patient was explained regarding the options and the potential risks of Neuraxial anaesthesia for vaginal or caesarean section, which would depending on her coagulation status at the time of delivery.

At 37 weeks gestation, patient experienced painful and regular uterine contractions(verbal pain score10/10), her cervical dilatation was 4 cms. The decision for emergency caesarean section was taken by the attending obstetrician following spontaneous rupture of membranes with fetal distress. . Before surgery, her coagulation studies showed a factor VIII assay of , a vWF of more than , and a ristocetincoefficient of . Her preoperative hematocrit (Hct) was (reference range, 35%-47%).

The patient received metoclopramide 10 mg IV, ranitidine 50 mg IV and coloaded with 500ml of ringer lactate solution.. As per recommendations of our physician desmopressin acetate(DDAVP) 300ug via nasal route was

given. An oxytocin infusion of 5 units in ringer lactate was started as per Shyjus' technique of Naturalized caesarean section. With the patient placed in left lateral position, LSAB was attempted with 25G Quincke babcock spinal needle. First attempt at locating the subarachnoid space at the L3-L4 interspace was successful. We injected intrathecally 1. 8 mL of hyperbaric 0. 5% bupivacaine with 10 ug fentanyl, a total volume of 2ml. The patient was placed supine with left lateral tilt. A sensory level to pinprick and light touch at T4 was recorded.

The patient required a total of 100ug of phenylephrine for threatment of hypotension(MAP <60mmHg). During the perioperative period, no respiratory complications occurred, and the patient's oxygen saturation remained higher than 97% . Surgery proceeded uneventfully and delievered a male baby of birthweight of 3. 78Kg. Child cried soon after birth with Apgar scores of 8 and 8 at one minute and 9 and 9 at 5 minutes.

Estimated surgical blood loss was 1000 mL. An oxytocin infusion (10 IU in

500 mL lactated Ringer's solution) was commenced after delivery of the placenta. No neurological complications or post partum haemorraghe occurred after surgery.

The patient's postpartum course was uneventful, and before discharge her Hct was and her factor VIII assay was . She was discharged on postoperative day five. After discharge, no episodes of excessive bleeding were reported and the patient had an uneventful recovery.

Discussion

vWD is an autosomal dominant hereditary disease characterized by deficiency or functional defect of von Willebrand's factor (vWF), which is a key component of primary and secondary haemostatic process that occurs in response to vascular injury. 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 coagulation factor VIII: C deficiency. More than 20 different types of vWD exist but vWD may be classified into three types. Type 1 with quantitative vWF deficiency, corresponding to 60%- 80% of cases. It is characterized by a 5% to 30% reduction in vWF and factor VIII: C but retains a structurally normal multimeric configuration (1). Type 1 vWD is typically

transmitted with autosomal dominant inheritance. Type 2 vWD encompasses qualitative defects in vWF and is subdivided into 4 main subtypes (2A, 2B, 2M, and 2N). Type 2B vWDcan be particularly problematic because this subtype is normally accompanied by thrombocytopenia, which can be exacerbated in pregnancy (9). Type 3 is less frequent (1% of patients) clinically more severe and is characterized by negligible or absent levels of vWF, as well as significantly reduced levels of factor VIII coagulant. It is important to determine patient's type of vWD because it helps treatment, allowing anaesthesiologist to act on the specific deficiency (10). In our case, this classification was not possible due to the absence of previous follow up.

The risk of bleeding in women with type 1 vWD may recede in the antepartum period because of progressive increases in factor VIII and vWF during pregnancy. However, uncertainty exists regarding the extent of these changes in pregnancy. Stirling et al (2) found substantial increases in vWF

and factor VIII levels by term in healthy parturients (375% and 200% respectively). In contrast, Sanchez-Luceros et al (3) found much smaller increases in vWF and factor VIII levels (60% and 6% respectively). Although our patient had a favorable coagulation profile in pregnancy, we followed previously recommended advice suggesting that factor VIII levels be monitored in the days before parturition because of the variable increases seen in pregnancy (11). There are no clear guidelines on laboratory monitoring or indications for regional or general anesthesia for patients with type 1 vWD, and we would have performed general anesthesia if the factor VIII and vWF levels had been below reference range.

There are only a few cases in the literature describing the use of neuraxial anesthesia for labor or cesarean delivery in patients with vWD. Cohen et al (4, 7) reported two patients with vWD who received epidural analgesia in labor without any complications; however the

vWD subtypes were not described. Milaskiewicz et al (5) similarly described the use of epidural anesthesia for cesarean delivery in a patient with type 1 vWD. Jones et al

(6) performed combined spinal-epidural labor analgesia ina patient with type 2A vWD and severe preeclampsia. Those authors reported no technical problems institutingneuraxial anesthesia and no postpartum bleeding complications. Kadir et al (10) produced a case series of patients with vWD, including the use of regional anesthesia in 8 of these patients. However, no information regarding the anesthetic technique used or the patients’ vWD subtypes was provided.

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 (14). vWF levels may be measured by factor VIII antigen or by the activity of ristocetin co-factor, which measuresfunctional vWF properties in platelet aggregation. Whenfactor 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.

Desmopressin acetate is a synthetic analogue of vasopressin that increases plasma vWF and factor VIII levels. There is increase in vWF levels of up to three to five times higher than baseline levels within 30 to 60 minutes after DDAVP administration (13). 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. Patients

with type 1 vWD are likely to show a good response to DDAVP. In our case, DDAVP was given to maintain optimal levels of factor VIII and vWF before regional anesthesia and cesarean delivery, as variations in the hemostatic response to pregnancy have been reported in different types and subtypes of vWD (10). Cohen et al (4) similarly described the use of DDAVP in a patient with vWD receiving epidural analgesia in labor. Desmopressin acetate has been more commonly used as prophylaxis against postpartum bleeding in patients with type 1 vWD before delivery. Prophylactic regimens may be important, as several case series have reported a high frequency of primary (6%-9%) and secondary (20%-28%) postpartum hemorrhage in patients with vWD without peripartum prophylaxis (9, 10). However, there are many adverse effects associated with DDAVP administration, including mild tachycardia, headache, and flushing. Fluid retention can also occur because of an antidiuretic effect, especially if accompanied by excessive IV fluid administration (8). Furthermore, no episodes of thrombosis have been reported by patients with vWD after therapy with DDAVP (11).

In other vWD subtypes, there are variable responses to DDAVP. 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.. In type 2A vWD, factor VIII levels can increase in response to DDAVP. In type 2B vWD, the use of DDAVP is

not recommended, as transient thrombocytopenia and increases in abnormal vWF levels may occur. Patients with type 3 vWD are normally unresponsive to DDAVP because of near absent levels of plasma vWF. Intermediate and high purity infusions of vWF and factor VIII Humate-P (or Haemate-P; ZLB

Behring, Marburg, Germany) and Alphanate (Grifuls, Los Angeles, CA) are more commonly used in patients who show inadequate response to DDAVP, such as those with types 2 and 3 vWD [15]. Infusions of these commercially available concentrates produce higher than expected plasma levels of factor VIII, and the use of Humate-P has been previously described for patients with vWD receiving neuraxial labor analgesia [6, 7]. However, supraphysiologic levels of factor VIII may be associated with thrombus formation, and postoperative deep venous thrombosis has been reported after surgery in nonobstetric patients with vWD receiving repeated infusions of factorVIII

concentrates [16, 17]. Alternative plasma concentratesexist with disproportionate levels of vWF and factor VIII, delayed onset time of these replacement regimens [17].

Antifibrinolytic amino acids(EACA) are also useful adjuncts to DDAVP or plasma concentrates for patients with vWD undergoing minor or major surgery.

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 (11). 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 orprevents bleeding. Factor VIII and vWF are currentlypreferred for being free from viral transmission risk. Recommended dose is 40 to 60 Ul/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 Ul/kg concentrate there is 2 Ul/dl factor VIII increase. Thrombocytopenia (platelet count below 50. 000) may require correction with platelet concentrate transfusion.

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. The risk of spinal hematoma is rare after spinal anesthesia in obstetric patients (1: 200 000), and this complication is usually reported in the presence of severe coagulopathy (18). Nonetheless, the coagulation status of our patient was carefully monitored to ensure that hematologic goals were achieved before neuraxial anesthesia. The decision to proceed with regional versus general anesthesia was made after risk-benefit consideration. In addition,

our patient maintained a strong desire to avoid general anesthesia for her cesarean delivery.

Close monitoring of factor VIII and vWF is advised for all patients with type 1 vWD because of the potential variability in these levels during pregnancy. Although our patient’s coagulation status was within acceptable limits, we recommend that any decision to use a regional anesthetic technique should

be individualized. Further formal evaluation of neuraxial anesthesia in this patient population is necessary to establish consensus for routine practice of this technique.

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