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Spinal Anesthesia for Cesarean Delivery in a Patient Receiving Fondaparinux

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ABSTRACT

Fondaparinux sodium, a selective inhibitor of factor Xa, is a new anticoagulant being used for thromboprophylaxis in all patient populations. We outline a case of neuraxial anesthesia for cesarean delivery in a patient with recent fondaparinux use and discuss most recent literature recommendations.

INTRODUCTION

Fondaparinux sodium, a selective inhibitor of factor Xa, is a new anticoagulant used for thromboprophylaxis and therapeutic anticoagulation in pregnant patients with a history of heparin-induced thrombocytopenia or heparin allergy (Table 1).[1,2] There is no clear agreement on what interval should pass between the last dose of fondaparinux and the performance of spinal anesthesia to minimize the risks of spinal hematoma and thromboembolism. We report the use of spinal anesthesia for cesarean delivery, without complications, in a patient 36 hours after her last dose of fondaparinux.

CASE

A 32-year-old gravida 3, para 1, abortus 1 woman with a history of factor V Leiden mutation, hypertension, and deep vein thrombosis before the current pregnancy presented for a scheduled repeat cesarean delivery at 38 weeks' gestational age. During previous heparin and low-molecular-weight heparin therapy for thromboembolism treatment and prophylaxis, severe itching occurred, and she was started on warfarin sodium. When she became pregnant, warfarin was discontinued, and fondaparinux sodium (7.5 mg subcutaneously daily) was prescribed. Physical examination revealed an obese (166 kg) woman, with a possible difficult airway. Her last dose of fondaparinux had been 30 hours before her scheduled delivery time. She had had nothing by mouth for 8 hours, and her morning laboratory results, including coagulation studies, were within normal limits. A literature search at that time provided no definitive recommendations in this case setting. We decided to delay the case for 5 hours and to then proceed with spinal anesthesia, using a single pass, at 36 hours after her last dose of fondaparinux. She began wearing compression hose and used pneumatic compression devices while she waited.

Spinal anesthesia was performed using a midline technique with a 25-gauge Whitacre needle and a single pass at the L3-L4 intervertebral space. The patient was premedicated with nonparticulate antacid [citric acid–sodium citrate (30 mL)] and metoclopramide hydrochloride (10 mg) and then received a 1-L crystalloid bolus. After cerebral spinal fluid was observed, an injection of bupivacaine hydrochloride (12 mg) with preservative-free morphine [morphine sulfate (0.15 mg)] and fentanyl citrate (10 μg) was administered into the subarachnoid space, without pain or paresthesia on injection. The patient was then immediately placed in the supine position with left uterine displacement. Ten minutes following the subarachnoid injection, a sensory level of T3, adequate for surgical anesthesia, was noted. Phenylephrine hydrochloride and lactated Ringer solution were administered as needed to treat intraoperative hypotension. Following an uneventful delivery, the Apgar scores were 9 and 9. For postoperative analgesia, bilateral transversus abdominis plane blocks were performed with ultrasonographic guidance and ropivacaine hydrochloride (150 mg total). The pneumatic compression devices placed before surgery were continued until 24 hours after surgery, when anticoagulation was restarted. The patient had no evidence of venous thrombosis or neurological sequelae from the spinal anesthesia. She received neurological

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Table 1. Fondaparinux Clinical Points

Fondaparinux Sodium
Pentasaccharide low-molecular-weight heparin class
Indirect, selective, and reversible factor Xa inhibitor, also factor IXa activity
Administered subcutaneously
Half-life of 17 h on average (normal renal function), actual measured half-life is 13-21 h
Not reversible
Does not cross the placenta
Pregnancy class B (considered safe in animal fetal studies and not tested in pregnant patients)
Outpatient use with no need for monitoring
Safe in heparin-induced thrombocytopenia–positive patients and in heparin-allergic patients

checks every 4 hours for the first 24 hours after surgery. Postoperative days 1 through 4 were uneventful, without any evidence of neurological sequelae following neuraxial anesthesia. She was discharged on postoperative day 4 on a regimen of warfarin.

DISCUSSION

Fondaparinux is an anticoagulant with proven benefits. It is 50% more successful at preventing venous thrombosis than low-molecular-weight heparin in patients undergoing orthopedic surgery, rarely causes heparin-induced thrombocytopenia, and is safe in patients with extensive allergies, including allergy to heparin.[3] A few drawbacks are associated with its use. Inability to fully monitor the actions of fondaparinux with a simple laboratory test requires a battery of tests—such as Xa levels, prothrombin time, partial thromboplastin time, international normalized ratio, and possibly thromboelastography—to be administered before neuraxial anesthesia.[4] Caution is necessary owing to the lack of research on drugs used for neuraxial anesthesia. This concern also extends to debate about the exact dosing for thromboprophylaxis vs treatment, for which there are few comparison data in the literature.

Until there is greater use and subsequent reporting in the literature, neuraxial anesthesia should be limited to a single attempt at atraumatic needle placement. In the event of failure, conversion to general anesthesia should occur, with maintenance of a minimum of pneumatic compression devices and compression hose for thromboprophylactic patient care.

Table 2. Recommendations by National Societies on Fondaparinux Sodium Use and Neuraxial Anesthesia

Society	Recommendations	Modifiers
American Society of Regional Anesthesia	Avoid neuraxial anesthesia except under conditions used in clinical trials (single needle pass, atraumatic needle placement, avoidance of indwelling neuraxial catheters)	None
Spanish Consensus Forum	Contraindicated	None
German Society of Anaesthesiology	Discontinue 22 h before neuraxial blockade, remove catheter 2-4 h before resuming therapy	Normal renal function, creatinine clearance $<$ 50 mL/min/1.73 m2
Nederlands Vereiging Voor Anesthesiologe	Contraindicated	None
Austrian Society of Anaesthesiology	Discontinue 36 h before neuraxial blockade, remove catheter 4 h before resuming therapy	None
European Society of Regional Anaesthesia and Pain	Interval before puncture/catheter removal of 36-42 h, interval after puncture/catheter removal of 6-12 h	With prophylactic dose of 2.5 mg/d only
Belgian Society of Anaesthesiology	Discontinue 36 h before neuraxial blockade, remove catheter 12 h before resuming therapy	None

SI conversion factor: To convert creatinine clearance level to milliliters per second per 1.73 m^2, multiply by 0.0167.[5]

CONCLUSION

Management of parturients on a regimen of fondaparinux poses a significant challenge to anesthesiologists, as there is limited clinical experience with this medication. Our patient had multiple risk factors for thrombosis, including factor V Leiden mutation, previous thromboembolism, obesity, and cesarean delivery. Patients who are heterozygous for factor V Leiden mutation have activated protein C resistance and may have a 50-fold increase in their risk of venous thromboembolism during pregnancy, so continuation of the prophylaxis is warranted as long as is safely possible before surgery. Our patient was on a daily subcutaneous regimen of fondaparinux sodium (7.5 mg)—a dose that is intermediate between the 2.5 mg recommended for prophylaxis and the 10 mg recommended for treatment in patients weighing more than 100 kg—making it especially difficult to gauge a safe interval between discontinuation and surgery. A review of the recommendations from various professional organizations revealed no consensus on the ideal interval between the last dose of fondaparinux and the performance of neuraxial anesthesia (Table 2).[5] If our experience can be generalized, an interval of 36 hours between the last dose of fondaparinux and the administration of spinal anesthesia may be sufficient for safe performance of neuraxial anesthesia.

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