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CASE REPORT

Peripartum Management of Dual Antiplatelet Therapy and Neuraxial Labor Analgesia After Bare Metal Stent Insertion for Acute Myocardial Infarction

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A 31-year-old woman at 32 weeks' gestation presented with an ST segment elevation myocardial infarction with subsequent bare metal stent placement. A multidisciplinary team coordinated the delivery plan, including anticoagulation and delivery mode. Because the patient was at high risk for stent thrombosis, clopidogrel was discontinued after 4 weeks and bridged with eptifibatide for 7 days. Eptifibatide was stopped for induction of labor. Twelve hours after eptifibatide was discontinued, hemostatic function was assessed with thromboelastography before initiating neuraxial analgesia. A successful operative vaginal delivery was performed, followed by an uncomplicated recovery. Clopidogrel was resumed 24 hours postpartum. (Anesth Analg 2012;115:613–5)

Acute myocardial infarction (AMI) during pregnancy has an incidence of 0.6 to 1 per 10,000 deliveries and an associated maternal mortality from 5.1% to 37%.[1,2] With the continuing trend of delayed childbearing, increases in maternal obesity, and diabetes, it is expected that AMI in pregnancy will increase.[3]

When coronary stents are inserted during the third trimester of pregnancy, the need for prolonged dual antiplatelet therapy (DAPT) may complicate peripartum obstetric and anesthetic management. There is a paucity of literature regarding the anesthetic management of a parturient who has received bare metal stents to treat AMI within 6 weeks of delivery. We report a successful neuraxial technique that minimized interruption of DAPT with subsequent forceps-assisted vaginal delivery.

CASE PRESENTATION

Consent for publication of this case was obtained from the patient, and the University of Michigan IRB declared the report exempt from approval. A 31-year-old woman G2P1 at 32 weeks' gestation with no medical history of, family history of, or risk factors for myocardial infarction presented to the emergency department of an outside hospital with substernal chest pain of 1-hour duration. An ST segment elevation myocardial infarction (STEMI) was confirmed with a 12-lead electrocardiograph (ECG). She was immediately taken to the cardiac catheterization laboratory, and positioned supine with left uterine displacement, continuous fetal heart rate monitoring, and abdominal shielding. Through the right femoral artery approach, the angiogram revealed a complete thrombotic occlusion of the mid-left anterior descending artery. Three bare metal stents were implanted, 3 × 28 mm, 3 × 23 mm, and 3 × 18 mm from distal to proximal, respectively. The patient tolerated the procedure well without sedation, and had stable vital signs and reassuring fetal heart monitoring with complete resolution of chest pain. At the time of percutaneous coronary intervention, the patient received an initial loading dose of clopidogrel 600 mg along with epitifibatide and heparin infusions. Afterward, the patient began DAPT with clopidogrel 75 mg, aspirin 81 mg daily, and metoprolol 25 mg twice daily. Testing was negative for hyperlipidemia and thrombophilia. Her troponin and CK-MB levels peaked at 73 ng/mL and 233 U/L, respectively. An echocardiogram the following day revealed an ejection fraction of 45%–50% with hypokinesis of the apical and anterior walls.

Once stabilized, the patient was transferred from the outside hospital for delivery planning and management. A multidisciplinary meeting was held with physicians from the cardiology, maternal fetal medicine, and anesthesiology services. Given that the patient's risk for stent thrombosis was high (3 long stents were placed at the time of a recent acute coronary syndrome), the cardiology consultant recommended DAPT for 12 months.[4–7] A plan was made to induce labor at 37 weeks' gestation to limit risk of spontaneous labor, facilitate a careful transition off DAPT to allow for epidural labor analgesia, and minimize the interval without DAPT.

Low-dose aspirin was continued throughout the peripartum course. Clopidogrel was stopped at 36 weeks' gestation, 1 week before planned induction of labor, and the patient was transitioned to the eptifibatide infusion at 2 μg/kg/min for 7 days. At 37 weeks' gestation the eptifibatide infusion was stopped at 8 AM concurrent with induction of labor with misoprostol. The platelet count remained unchanged during

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treatment with eptifibatide. At 4 PM, a thromboelastogram was evaluated for antiplatelet effects. The thromboelastogram was mildly hypercoagulable with no residual antiplatelet effects. Her prothrombin time, partial thromboplastin time, international normalized ratio, and fibrinogen were normal. We provided the patient with early epidural analgesia before significant pain 12 hours after the eptifibatide infusion was discontinued. A bolus of 10 mL of bupivacaine 0.125% over 15 minutes was administered, and epidural analgesia was started with an infusion of bupivacaine 0.125% with fentanyl 2 μg/mL at 10 mL/h. Peripartum monitoring included a radial arterial line, continuous 5-lead ECG monitoring, pulse oximetry, and oxygen administration by nasal cannula. The patient labored on the labor and delivery unit attended by an obstetric nurse and an intensive care unit nurse. She remained comfortable during labor and did not have any episodes of breakthrough pain. A single dose of metoprolol 2.5 mg was administered for tachycardia (heart rate approximately 120 beats per minute [bpm]) unrelated to pain.

The patient had an uneventful forceps-assisted vaginal delivery after 12 hours of neuraxial labor analgesia. The estimated blood loss was 500 mL. The epidural catheter was removed 4 hours after delivery. Another loading dose of clopidogrel 600 mg was administered 24 hours after catheter removal, followed by clopidogrel 75 mg daily. The patient and neonate had no bleeding complications, and the patient had no neurologic sequelae from the neuraxial block.

DISCUSSION

Percutaneous coronary intervention is the therapy of choice for acute STEMI in pregnancy and poses minimal risk of fetal radiation exposure (<1 rad if the abdomen is shielded).[8] However, pharmacologic therapy after STEMI with a coronary intervention is complicated in pregnant patients. The 2009 American College of Cardiology/American Heart Association Guidelines for the Management of Patients with STEMI and bare metal stent placement recommend DAPT for 12 months, regardless of stent type.[6] It is recommended that patients continue aspirin therapy indefinitely. Low-dose aspirin regimens do not increase stent thrombosis events when compared with standard aspirin dosage, and may minimize risk for premature closure of the fetal ductus arteriosus when compared with standard dose therapy.[9,10] Other pharmacologic adjuvants for patients after a STEMI include β-blockers, angiotensin-converting enzyme inhibitors, aldosterone blockers (for cases complicated by left ventricular dysfunction), and statins. Angiotensin-converting enzyme inhibitors, statins, and aldosterone blockers are contraindicated in pregnancy.

Eptifibatide is a short-acting glycoprotein IIa/IIIb inhibitor with a half-life of 2.5 hours. It provides reversible platelet inhibition that can be restored 4 hours after stopping the infusion.[11] It has been used to bridge from clopidogrel to limit time off of DAPT during the perioperative period. In a recent case series, bridging therapy was shown to be effective in preventing adverse cardiac outcomes and was not associated with major bleeding in patients undergoing noncardiac surgery.[12,13] The high cost of eptifibatide may preclude its use in some cases.

Experts recommend postponing delivery until 2 to 3 weeks postinfarction to minimize the risk of reinfarction due to the additional cardiac demands associated with delivery.[8,14] The choice between vaginal delivery and cesarean delivery remains controversial. A review of 125 cases with peripartum myocardial infarction found no convincing support for one method of delivery over the other; the authors suggested that an individual approach be used.[14] A scheduled cesarean delivery avoids prolonged labor and ensures that an optimal medical team comprising an experienced obstetrician, obstetric anesthesiologist, cardiologist, and pediatrician can be present. However, cesarean delivery is an intermediate risk procedure with greater hemodynamic fluctuations, blood loss, and postoperative pain, as well as increased risk of infection, respiratory complications, and higher maternal mortality in comparison with vaginal birth.[15]

Theoretically, for women post-STEMI, labor with appropriate analgesia followed by an assisted vaginal delivery will minimize risk in comparison with conventional labor. Experts recommend that vital signs, oxygen saturation, ECG, and fetal heart rate should be monitored continuously. Measures to minimize cardiac workload and oxygen demand include (1) positioning the patient in the left lateral position, (2) aggressively treating pain, anxiety, tachycardia, and hypertension,[3] (3) minimizing the duration of expulsive efforts during the second stage of labor, and (4) preventing uterine atony and excessive blood loss. High-quality analgesia not only mitigates the hemodynamic consequences of pain but, after complete cervical dilation, facilitates a period of passive descent of the fetal head.[16] Medications to decrease pain and myocardial demand such as IV nitroglycerin, opioids, β-blockers, and calcium antagonists may be used with the understanding that nitroglycerin and calcium antagonists have tocolytic effects and may prolong labor.[3]

Regardless of mode of delivery, active management of the third stage of labor with oxytocin, vigorous fundal massage, and controlled cord traction minimizes the risk for postpartum hemorrhage.[17] Oxytocin delivered by slow IV infusion or IM injection, in contrast to a rapid IV infusion or bolus, will minimize hemodynamic consequences of oxytocin (e.g., decreased systemic vascular resistance, increased cardiac output), myocardial oxygen demand, and myocardial ischemia.[18,19] Methylergonovine should be avoided as it may cause coronary artery vasospasm.

In our case, the multidisciplinary care team decided that an assisted vaginal delivery would be the desired mode of delivery, provided the patient's anticoagulation status allowed insertion of an epidural catheter. American Society of Regional Anesthesia (ASRA) guidelines recommend an 8-hour waiting period after stopping the eptifibatide before catheter placement. The guidelines state that the safety of neuraxial techniques with glycoprotein IIa/IIIb inhibitors is unknown, and current guidelines are based on the prescribing information and radiology/cardiology intervention experience.[20] There are many case reports and case series demonstrating thromboelastogram use as an additional measure of coagulation status before initiation of a neuraxial procedure.[21–23] Although this patient was taking aspirin, the thromboelastogram did not reveal any antiplatelet effects mirroring the results of other studies that have shown aspirin does not change thromboelastogram variables.[24] Case reports and case series alone neither validate the safety nor establish guidelines to determine safety. However, ASRA guidelines, the patient's overall clinical picture, and thromboelastogram

results were used collectively to provide evidence that in our judgment, the risk:benefit analysis favored benefit. We do not advocate the use of the thromboelastogram to guide placement of neuraxial techniques in situations that are not in accordance with ASRA guidelines, because no current evidence supports this practice.

In summary, a multidisciplinary approach that considered anticoagulation, timing, and mode of delivery, and neuraxial block insertion provided a safe and effective plan with overall good outcome for a mother who had an STEMI within 6 weeks of delivery.

DISCLOSURES

Name: Melissa E. B. Bauer, DO.
Contribution: This author was the consultant anesthesiologist on the multidisciplinary team caring for the patient, and helped review the current literature, interpret and discuss the case, and wrote the manuscript.
Name: Samuel T. Bauer, MD.
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