Acute Reversible Stress-Induced Cardiomyopathy Associated with Cesarean Delivery under Spinal Anesthesia

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Stress-induced cardiomyopathy (SIC), also known as transient left ventricular apical ballooning or Tako-tsubo cardiomyopathy, is characterized by reversible left ventricular dysfunction, chest pain or dyspnea, ST-segment elevation, and minor elevations in serum levels of cardiac enzymes, in the absence of significant coronary artery disease. Although its pathogenesis is incompletely understood, intense emotional or physical stress is a well-recognized precipitant. We present a case of SIC with severe left ventricular dysfunction but minimal ECG changes in a young, woman who received spinal anesthesia for elective cesarean delivery.

A 31-year-old healthy woman was admitted at 40 weeks gestation for elective repeat cesarean delivery. Both her previous and current pregnancies were uncomplicated. Her first cesarean delivery was performed uneventfully with epidural anesthesia. She had no family history of heart disease and appeared calm on entry into the operating room. Successful spinal anesthesia was achieved with hyperbaric bupivacaine (12 mg), fentanyl (10 μg) and morphine (0.2 mg). Initial blood pressure and heart rate obtained in the preoperative area were 107/65 mm Hg and 71 bpm respectively and were almost unchanged at the initiation of spinal anesthesia. Roughly 15 minutes later, she developed sinus bradycardia (36 bpm) and hypotension (60/40 mm Hg), which were treated promptly but not successfully with volume resuscitation and multiple doses of ephedrine (total 50 mg, IV) in a time course of about 5 minutes. Two doses of atropine (total 0.8 mg IV) were then administered, which resulted in a sinus tachycardia with heart rate of 150 bpm. The patient complained of chest heaviness, and a phenylephrine infusion was initiated to maintain her blood pressure in the normal range. Ten minutes after atropine was administered, the patient complained of blindness, felt anxious, and then developed seizure-like activity, likely convulsive syncope. She was immediately intubated using 150 mg of propofol and 100 mg of succinylcholine. General anesthesia was maintained with 50% nitrous oxide and 1.5% sevoflurane. The surgery was completed in about 60 minutes and she was extubated uneventfully. However, she continued to require a phenylephrine infusion and oxygen supplementation. An anterior-posterior chest radiograph was taken 4 hours after the surgery and showed a normal cardiac silhouette without appreciable global cardiomegaly or isolated chamber enlargement (Figure 1). An ECG obtained 5 hours after the completion of the surgery was notable only for T-wave inversions in leads V1, V2, and aVL (Figure 2) and remained unchanged for the following 4 days. An echocardiogram performed 8 hours after the operation demonstrated moderate left ventricular systolic dysfunction with isolated impairment of the midventricle, preserved basal and apical function, and a left ventricular ejection fraction of 40% (see online-only Data Supplement Movie I). Serum troponin I was slightly elevated with a peak value of 0.25 ng/mL. The patient was diagnosed with SIC and treated with metoprolol 12.5 mg twice a day and lisinopril 2.5 mg once a day with resolution of her symptoms. A repeat echocardiogram on postoperative day 4 revealed complete normalization of left ventricular function. At the fourth week follow up, she remained asymptomatic and all ECG
abnormalities had resolved. An echocardiogram confirmed a left ventricular ejection fraction of 75% with no wall motion abnormalities (online-only Data Supplement Movie II).

SIC is increasingly recognized and reported in the perioperative period, and surgery is a well-recognized stressor. However, it is encountered most often in elderly patients and its occurrence among women undergoing cesarean delivery has not been previously reported. It has been reported that >30% of women undergoing cesarean delivery under regional anesthesia have transient ST-segment depression. This suggests that occurrence of SIC in this population may be more frequent than is thought and that a link may exist between SIC and subclinical peripartum cardiomyopathy. In this particular patient, the treatment of bradycardia and hypotension associated with spinal anesthesia with ephedrine, phenylephrine, and atropine therapy appears to have precipitated SIC. Women in the peripartum period may indeed represent another vulnerable group for SIC.

Acknowledgment
The authors thank Dr Lee H. Schwamm for his insightful comments and constructive suggestions on the analysis of the patient’s neurological presentation.

Disclosures
None.

References

Figure 2. Twelve-lead ECG obtained 5 hours after completion of the cesarean section.
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Circulation. 2008;117:3052-3053
doi: 10.1161/CIRCULATIONAHA.107.744102
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/117/23/3052

Data Supplement (unedited) at:
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