

## Perimortem Cesarean Section with Sudden Maternal Recovery and Intact Maternal and Neonatal Survival

Stephanie R Martin\*, Rebecca A Morelli and Eric Thomas

Southern Colorado Maternal Fetal Medicine, Colorado Springs, CO, USA

\*Corresponding author: Stephanie R Martin, Southern Colorado Maternal Fetal Medicine, 6071 E. Woodmen Rd. Suite 440, Colorado Springs, CO 80923, USA, Tel: 719-622-6442; E-mail: smartin@southerncoloradomfm.com

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### Abstract

We report a case of idiopathic cardiac arrest in a term laboring patient. A perimortem cesarean was performed with return of spontaneous circulation immediately following delivery. The patient and her neonate were discharged following a routine postoperative course without evidence of adverse sequelae.

**Keywords:** Cardiac arrest; Perimortem cesarean section; Pregnancy

### Introduction

Antenatal cardiac arrest is often the result of trauma, thromboembolic disease, cardiac disease, infection or cerebrovascular accidents [1-3]. Perimortem cesarean delivery may be considered following cardiac arrest to improve neonatal outcomes and facilitate maternal resuscitation. Instances of improved maternal circulation and intact survival following perimortem cesarean have been described but are quite limited [1,4,5].

Additional information regarding outcomes is important for clinicians who must decide to proceed with operative delivery in an unstable patient. We report the case of a perimortem cesarean section due to idiopathic cardiac arrest with prompt, sustained maternal recovery and intact neonatal outcome.

### Case Report

This is a 33-year-old, G3 P2, admitted at 38-2/7 weeks gestation with ruptured membranes, dilated 3 cm, 70% effaced and -2 station, following an uncomplicated prenatal course. She received oxytocin augmentation and uneventful epidural placement. A standard test dose of 3 mL of 1.5% lidocaine with epinephrine 1:200 k was used without evidence of intravenous or spinal effects. The epidural catheter was then bolused with 6 mL of 0.25% bupivacaine and fentanyl 100 µg. The patient reported good pain relief and had evidence of sensory dermatome of approximately T10 bilaterally. She developed hypotension after epidural placement with blood pressure to 88/47. This improved following phenylephrine and IV fluids. Approximately 25-30 minutes post-epidural bolusing, the patient became hypoxic and bradycardic in the 60s. Bag-mask ventilation was initiated with 100% oxygen which improved O<sub>2</sub> saturation. During preparations for relocation and intubation, cardiac arrest ensued and chest compressions were initiated. A perimortem cesarean section was performed after approximately 3-1/2 minutes of failed resuscitative efforts. Cardiac rhythm was not obtained prior to recovery of pulse. The male neonate weighed 3280 grams with Apgar scores of 21, 75 and 1010. Cord gases were: arterial pH 6.96/pCO<sub>2</sub> 103/pO<sub>2</sub> 15/Base deficit -15.6/Bicarbonate 21.8/O<sub>2</sub> saturation 12.3%; venous pH 7.0/pCO<sub>2</sub> 90.5/pO<sub>2</sub> 10/Base deficit -14.8/Bicarbonate 21.3/O<sub>2</sub> saturation 10.6%.

Spontaneous return of circulation occurred immediately after delivery. She remained hemodynamically stable and was transferred to the operating room to complete the cesarean section. She self-extubated shortly after arrival to the ICU and remained hemodynamically stable and afebrile. Transthoracic echocardiogram was performed two hours after arrest. The echocardiogram demonstrated mild concentric left ventricular hypertrophy and mild tricuspid regurgitation. The ECG showed sinus bradycardia with a heart rate of 60, rightward axis, and nonspecific ST abnormality. Troponin levels were normal. B-type natriuretic peptide was slightly elevated at 134. CT angiogram of the chest was normal. Postoperatively, hemoglobin was 12.4 g/dL, WBC 15.6, platelet count 181,000, INR 1.2, fibrinogen 457, creatinine 0.5 with normal electrolytes. At discharge on postoperative day 4, both mother and neonate had no identifiable neurologic abnormalities. Subsequent outpatient evaluation included stress echocardiogram, genetic testing for long QT syndrome, and evaluation by cardiac electrophysiologist; all were normal.

### Comment

Perimortem cesarean section performed within 4 minutes of maternal cardiac arrest has been recommended in order to improve maternal resuscitation and neonatal outcomes. A subsequent review of 20 years of publications on the topic following initial recommendation of the "4-minute rule" suggested the possibility of "sudden and profound" improvement in maternal circulation following delivery. However, the number of patients reported in this review remains quite limited, totaling 38, only 25 of which describe maternal physiology post-delivery [1,3].

Complications secondary to lumbar epidural placement have been reported to lead to cardiac arrest. This is most commonly due to inadvertent intravenous injection of local anesthetic or inadvertent subarachnoid injection of an epidural dose of local anesthetic. When injected intravenously, seizure most commonly precedes hypotension and respiratory depression. Our patient was attended throughout the event and seizure did not occur and had a negative test dose. In the event of an excessive, unplanned subarachnoid injection, the block is higher than expected resulting in respiratory depression and cardiac

arrest. In this case, the patient developed hypotension and hypoxemia without evidence of a higher-than-expected block.

Amniotic fluid embolism can lead to sudden onset of hypoxemia, cardiovascular collapse and coagulopathy. However, multiorgan system failure is typical even in patients who ultimately survive [6]. Our patient did not have evidence of coagulopathy or multisystem organ failure following resuscitation, therefore we do not consider this a likely explanation.

Our case contributes to the limited reports on patients with intact maternal and neonatal survival following antepartum cardiac arrest and perimortem cesarean section.

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