

Cardiac Arrest and Resuscitation Unique to Pregnancy



Terri-Ann Bennett, MD^a, Vern L. Katz, MD^{b,c},
Carolyn M. Zelop, MD^{d,e,*}

KEYWORDS

- Maternal cardiac arrest • Maternal cardiopulmonary arrest • Maternal code
- Maternal resuscitation

KEY POINTS

- Physiologic changes in pregnancy require special consideration during resuscitative efforts.
- Cardiopulmonary resuscitation (CPR) should be performed with the mother in the supine position accompanied by manual left lateral uterine displacement.
- If cardiac arrest persists, delivery should be initiated at 4 minutes.
- Multidisciplinary teamwork is key to successful resuscitation.

Maternal cardiopulmonary arrest (MCPA) is a catastrophic event that can cause significant morbidity and mortality. Although maternal mortality is usually considered a developing world problem, it is important to note that the maternal mortality ratio (MMR) for the United States had doubled from 12 to 28 maternal deaths per 100,000 live births from 1990 to 2013, and US MMR in 2015 was 14. Meanwhile, the MMR of the developing world has had a 44% decrease.^{1,2}

There are multiple reasons to explain this trend, including better ascertainment of cases and an increase in comorbidities of the pregnant population, particularly cardiovascular conditions, which rank number 1 among the etiologies.^{3,4} However, it would be remiss not to thoroughly consider and evaluate how practices can be improved to save mothers' lives.

Conflicts of Interest: C.M. Zelop reports that she is a consultant for UpToDate on the same topic.

^a Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, New York University Langone Medical Center, 560 1st Avenue, New York, NY 10016, USA; ^b Department of Obstetrics and Gynecology, Oregon Health and Science University, Portland, OR, USA;

^c Department of Human Physiology, University of Oregon, Eugene, OR, USA; ^d Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, The Valley Hospital, Ridgewood, NJ, USA; ^e Department of Obstetrics and Gynecology, New York University School of Medicine, New York, NY, USA

* Corresponding author. 12 Thistle Hollow, Avon, CT 06001.

E-mail address: cmzelop@comcast.net

Obstet Gynecol Clin N Am 43 (2016) 809–819

<http://dx.doi.org/10.1016/j.ogc.2016.07.011>

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MCPA is an especially challenging clinical scenario for any provider, as it is an overall rare occurrence and involves 2 patients—mother and baby. A prepared, multidisciplinary team is necessary to perform basic and advanced cardiac life support specific to the anatomic and physiologic changes of pregnancy. These procedures should be initiated immediately and maneuvers performed simultaneously rather than sequentially.

PREVALENCE

According to the National Inpatient Sample of 1998 to 2011, approximately 1 in 12,000 (or 8.5 per 100,000) hospitalizations for delivery were complicated by maternal cardiac arrest.⁵ Only 59% of women survived.⁵

ETIOLOGY

The cause of MCPA includes pregnancy-related and nonpregnancy-related etiologies. In the National Inpatient Sample, antepartum and postpartum hemorrhage accounted for the largest percentage of MCPA cases.⁵ Other etiologies were heart failure, amniotic fluid embolism, sepsis, anesthesia complications, aspiration pneumonitis, venous thromboembolism, and eclampsia.⁵ Other common etiologies include out-of-hospital trauma and domestic abuse.

The American Heart Association (AHA) has devised mnemonics to recognize etiologies of MCPA (**Box 1** and **Table 1**).^{6,7}

MANAGEMENT

Imagine there is a 34-year-old African-American Gravida 1 Para 0 (G1P0) at 36 weeks with class B diabetes on insulin who is diagnosed with preeclampsia with severe features. She requires intravenous administration of antihypertensive agents given severe range of blood pressures. She is started on magnesium for maternal seizure prophylaxis, and an induction of labor is initiated with an insulin drip. Cytotec is used for cervical ripening followed by Pitocin for contraction augmentation. Artificial rupture of membranes is performed. She receives an epidural for pain management. The patient suddenly becomes bradycardic, then unresponsive, and asystole is detected. What is the next best step?

Box 1

Reversible causes of cardiac arrest

H

- Hypoxia
- Hypovolemia
- Hydrogen ion (acidosis)
- Hypo-/hyperkalemia
- Hypothermia

T

- Toxins
- Tamponade, cardiac
- Tension pneumothorax
- Thrombosis, pulmonary
- Thrombosis, coronary

From Neumar RW, Otto CW, Link MS, et al. Part 8: adult advanced cardiovascular life support: 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care. *Circulation* 2010;122(18 Suppl 3):S737; with permission.

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