The American Heart Association 2010 Guidelines for the Management of Cardiac Arrest in Pregnancy: Consensus Recommendations on Implementation Strategies

Dini Hui, MD, FRCSC,[1] Laurie J. Morrison, MD, MSc, FRCPC,[2,3] Rory Windrim, MD, FRCSC,[4] Andrea Y. Lausman, MD, FRCSC,[5] Laura Hawryluck, MSc (Bioethics), MD, FRCPC,[6] Paul Dorian, MD, FRCPC,[7] Stephen E. Lapinsky, MB BCh, MSc, FRCPC,[8] Stephen H. Halpern, MD, MSc, FRCPC,[9] Douglas M. Campbell, MD, FRCPC,[10] Paul Hawkins, MD, MCFP(EM), FACEP,[11] Randy S. Wax, MD, MEd, FRCPC, FCCM,[12] Jose C.A. Carvalho, MD, PhD, FANZCA, FRCPC,[13] Katie N. Dainty, PhD,[2] Cynthia Maxwell, MD, FRCSC,[4] Farida M. Jeejeebhoy, MD, FRCPC, FACC[14]

[1]Department of Obstetrics and Gynaecology, Division of Maternal Fetal Medicine, Sunnybrook Health Sciences Centre, University of Toronto, Toronto ON

[2]Rescu, Keenan Research Centre, Li Ka Shing Knowledge Institute, St. Michael's Hospital, University of Toronto, Toronto ON

[3]Department of Medicine, Division of Emergency Medicine, University of Toronto, Toronto ON

[4]Department of Obstetrics and Gynaecology, Division of Maternal Fetal Medicine, Mount Sinai Hospital, University of Toronto, Toronto ON

[5]Department of Obstetrics and Gynaecology, St. Michael's Hospital, University of Toronto, Toronto ON

[6]Critical Care, Toronto General Hospital, University of Toronto, Toronto ON

[7]Department of Medicine, Division of Cardiology, St. Michael's Hospital, University of Toronto, Toronto ON

[8]Interdepartmental Division of Critical Care, University of Toronto, Intensive Care Unit, Mount Sinai Hospital, Toronto ON

[9]Obstetrics and Gynaecology, Anaesthesia, Sunnybrook Health Sciences Centre, University of Toronto, Toronto ON

[10]Department of Paediatrics, Li Ka Shing Knowledge Institute, St. Michael's Hospital, University of Toronto, Toronto ON

[11]Department of Emergency Services, Sunnybrook Health Sciences Centre, University of Toronto, Toronto ON

[12]Departments of Emergency Medicine and Critical Care, Lakeridge Health Corporation and Interdepartmental Division of Critical Care, University of Toronto, Oshawa ON

[13]Departments of Anaesthesia and Pain Management and Obstetrics and Gynaecology, Mount Sinai Hospital, University of Toronto, Toronto ON

[14]Division of Cardiology, William Osler Health Centre, Department of Medicine, University of Toronto, Toronto ON

J Obstet Gynaecol Can 2011;33(8):858–863

Key Words: Cardiac arrest, pregnancy, resuscitation, multidisciplinary care, implementation strategy, management

Competing Interests: None declared.

Received on January 27, 2011

Accepted on April 1, 2011

INTRODUCTION

Cardiac deaths during pregnancy have increased steadily over the past two decades.[1] According to the recently published 2006–2008 Confidential Enquiries into Maternal Deaths in the United Kingdom, the largest population-based data set for this target population, cardiac disease in the United Kingdom represented the most common cause of maternal death overall, exceeding the rates of thromboembolism, sepsis, and hemorrhage.[1] The most common causes of maternal death from cardiac disease were sudden adult death

syndrome, myocardial infarction (mainly related to ischemic heart disease), aortic dissection, and cardiomyopathy (mainly peripartum cardiomyopathy).[1] All the women who died of ischemic heart disease had identifiable risk factors such as older age, obesity, smoking, diabetes, and hypertension.[1] The incidence of cardiac arrest during pregnancy also increased, from 1:30 000 in the 2000–2002 Confidential Enquiries report[2] to 1:20 000 in the 2003–2005 report.[3]

Management of cardiac arrest in pregnant women is more complicated than in non-pregnant patients.[4] Maternal physiologic adaptations to pregnancy present special challenges, and the resuscitation team must consider the needs of both the mother and the fetus. In comparison, cardiac arrest in young athletes is much less common than in pregnant women, with an incidence of 1:200 000.[5] However, there have been many position statements addressing prevention and prediction of sudden death in the young athlete.[6] There is a need for heightened awareness of and education about the management of cardiac arrest during pregnancy, as illustrated in two publications assessing knowledge regarding management of maternal cardiac arrest among health care providers.[7,8] Both studies concluded that knowledge of important basic concepts of cardiac arrest in pregnancy among anaesthesiologists, obstetricians, midwives, and emergency medicine specialists was inadequate.

In October 2010, the American Heart Association (AHA) published new guidelines for cardiopulmonary resuscitation and emergency cardiovascular care for maternal cardiac arrest[9] based on the 2010 consensus on science and treatment recommendations for maternal cardiac arrest, published by the International Liaison Council on Resuscitation.[10–12] As these guidelines represent a significant change in practice, it will be important for knowledge translation programs to disseminate the information, to educate and train caregivers, and to develop strategies that will enable caregivers to adhere to the guidelines at the point of care. The management of maternal cardiac arrest requires a multidisciplinary team and it is important to bring the specialties involved together to ensure that such teams are coordinated and ready to respond.

Several publications have outlined potential strategies to prepare for maternal cardiac arrest in accordance with older guidelines.[13–16] The 2010 guidelines, however, are transformative, and their implementation will require training, preparation, ongoing feedback, and support to ensure that all maternal cardiac arrest victims are treated optimally and consistently.[9] In order to address this objective, a group of physicians from six different hospitals within the Greater Toronto Area representing obstetrics, cardiology, emergency medicine, anaesthesia, critical care, and neonatology, met with a knowledge translation expert to develop an implementation strategy to be used by hospitals, resuscitation teams, and related units for the management of maternal cardiac arrest. The group considered available evidence leading to the new maternal cardiac arrest guidelines.[9–12] We present this strategy, providing a framework for emergency preparedness and management of these devastating events, as a tool for others to consult, adapt, and review to ensure that their institution and their staff are prepared.

IMPLEMENTATION RECOMMENDATIONS

1. There should be a specific manner in which to activate the maternal cardiac arrest team. If a hospital does not have a system in place, consider "Code Blue Obstetrics" as the universal call to action.

2. Suggested composition for the maternal cardiac arrest team:
   (a) Adult resuscitation team
   (b) Obstetrics: one obstetrical nurse, one obstetrician
   (c) Anaesthesia: obstetrical anaesthesiologist if available, or staff anaesthesiologist; anaesthesia assistant if available
   (d) Neonatology team: one nurse, one physician, one neonatal respiratory therapist
   (e) In centres without obstetrics/neonatology services, we suggest that the Code Blue committee and hospital emergency services discuss contingency plans in the event of maternal cardiac arrest.

3. The AHA ACLS (Advanced Cardiac Life Support) maternal cardiac arrest algorithm should be used as a template for management of cardiac arrest in pregnancy (Figure).[9] A laminated card of the algorithm should be available throughout hospitals and outpatient settings in which the potential for maternal cardiac arrest exists. The AHA ACLS maternal cardiac arrest algorithm should be posted in prominent locations as well as on code carts.[9] Dissemination of information in this algorithm should be part of the education program for all obstetrics and anaesthesia residents, obstetric nurses, physicians and nurses working in a critical care setting, and those who deliver care through the Code Blue teams.[9] There should be specific initiatives in education regarding the potential etiologies of maternal arrest. The acronym