Born to Survive: A critical review of out-of-hospital maternal cardiac arrests and pre-hospital perimortem caesarean section (PMCS)/resuscitative hysterotomy (RH)

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Objective: Out of hospital cardiac arrest in pregnancy (OHCAP) is a rare but often fatal occurrence and survivor morbidity is significant. Outcomes may be improved if first emergency responders could perform PMCS/RH followed by temporary analgesia and rapid hospital transfer. We aim to critically evaluate existing literature on OHCAP and PMCS/RH and provide recommendations for improving care.

Design: Literature review and expert opinion.

Methods: PubMed literature search for papers exploring OHCAP and PMCS (n = 63). Titles were screened and 17 papers were included.

Results:

Current Evidence
Our search identified a total of 97 confirmed cases of OHCAP. There were 33 cases of PMCS/RH; 18.2% were performed out of hospital (OOH) (n = 8). 13.4% of mothers (n = 13) and 21.6% of babies (n = 21) survived to discharge. Given the limited evidence base, we remain reliant on retrospective data to guide management as well as extrapolation of inpatient cardiac arrest management principles.

Pre-Hospital Environment
Given the variability in the pre-hospital environment, routine implementation of PMCS/RH is not currently appropriate. If transport to a setting with maternal and neonatal resuscitation facilities can be completed within 5 minutes (e.g. by helicopter) then delaying may be appropriate. Additional guidelines for management of analgesia, post-ROSC (return of spontaneous circulation) sequelae, and also the newborn, need to be in place before further consideration of pre-hospital PMCS/RH becomes a routine recommendation.

Perimortem Caesarean Section/Resuscitative Hysterotomy
Key features of the chain of survival including prompt bystander CPR and rapid decision making, specifically PMCS/RH at 4 minutes if no ROSC versus transfer to hospital. Time from arrest to PMCS/RH varied from 9-110 minutes in the literature, and there were no documented cases of PMCS/RH within 4 minutes.

Changing terminology from PMCS to ‘resuscitative hysterotomy’ is recommended to promote the concept that the procedure is primarily performed in maternal (and not fetal) best interest. Indeed, many case reports documented hospital transfer occurred in preference to PMCS.

Conclusion: The authors believe the only way to resuscitate pregnant women effectively in the out-of-hospital setting is by early recognition of cardiac arrest in a woman with a uterus at the umbilicus or above, and resuscitation with manual displacement of the uterus followed by prompt PMCS/RH by a trained practitioner, if rapid transfer to hospital is not possible. Current evidence supports the role of PMCS/RH in improving maternal outcomes in OHCAP settings where survival rates are extremely poor.