

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.

Word Count: 397/400