

SAVING MOTHERS LIVES-THE GOLDEN FIVE MINUTES

Surekha Patil¹, Sucheta Bhowate², Prasenjit Adhikari³, Varsha Vyas⁴, Sri Ram Gopal⁵, Richa Singh⁶, Rahul Motwani⁷, Siddique Aafreen Mohd. Mobin⁸

¹Professor, Department of Anesthesia, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

²Associate Professor, Department of Anesthesia, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

³Post Graduate Student, Department of Anesthesia, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

⁴Professor, Department of Anesthesia, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

⁵Professor & HOD, Department of Obstetrics & Gynaecology, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

⁶Professor, Department of Obstetrics & Gynaecology, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

⁷Post Graduate Student, Department of Anesthesia, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

⁸Post Graduate Student, Department of Anesthesia, Dr. D. Y. Patil Hospital and Medical College, Mumbai.

ABSTRACT: Maternal and neonatal mortality is a subject of universal concern and saving mother's and foetal life is an obligation to the society. Maternal and neonatal overall health is a prime issue of every nation and hence cannot be jeopardized at any cost. In this context when maternal cardiac arrest occur due to any underlying cause, it endangers both the lives, hence a prompt intervention is needed. For this very reason, Perimortem cesarean section has been reported since ancient times; however, greater awareness regarding this procedure within the medical community has only emerged in the past few decades. Recommendations for maternal resuscitation include performance of the procedure within four minutes. If accomplished in a timely manner, perimortem cesarean section can result in fetal salvage and is also critical for maternal resuscitation. Lack of knowledge and sincere guidelines feasible to the health care available about this procedure is not uncommon. We have reviewed publications on perimortem cesarean section and present the most recent evidences on this topic, as well as recommending our "easy-to-follow protocol" adapted for resuscitation following maternal haemodynamic collapse.

KEYWORDS: CPR in Pregnancy and Perimortem Cesarean Section.

HOW TO CITE THIS ARTICLE: Surekha Patil, Sucheta Bhowate, Prasenjit Adhikari, Varsha Vyas, Sri Ram Gopal, Richa Singh, Rahul Motwani, Siddique Aafreen Mohammed Mobin. "Saving Mothers Lives-The Golden Five Minutes". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 48, November 16, 2015; Page: 8471-8473, DOI: 10.18410/jebmh/2015/1157

INTRODUCTION: Cardiac arrest during pregnancy carries a high maternal and fetal mortality rate although it is rare i.e. approx. 1 in 30000 ongoing pregnancies. Whatever the cause, adequate quick response is essential to optimise the chances of survival for both the mother and the foetus. Perimortem cesarean section (PMCS) is defined as a cesarean delivery initiated after cardiopulmonary resuscitation has been initiated.⁽¹⁾ Emptying the uterus removes aortocaval compression, resulting in a 60-80% increase in cardiac output, thereby increasing the likelihood of a maternal survival.⁽²⁾ As a secondary aim, chances of neonatal survival may also increase with this procedure.

Katz et al studied perimortem cesarean deliveries from 1985 until 2004.⁽³⁾ Citations from bibliographies of identified publications were used and cross-referenced for the other potential articles. Case reports were included for analysis when mother had complete cardiopulmonary

arrest, and cardiopulmonary resuscitation has been initiated before cesarean delivery. There were 38 cases of perimortem cesarean delivery identified; 34 infants survived (3 sets of twin, 1 set of triplets); 4 other infants survived initially, but died several days after the deliveries from complications of prematurity and anoxia. Of the 34 infants eleven infants were delivered within 5 minutes, 4 were delivered from 6 to 10 minutes, 2 were delivered from 11 to 15 minutes, and 7 were delivered more than 15 minutes. Of 20 perimortem cesarean deliveries with potentially resuscitable cause, 13 mothers were resuscitated and discharged from the hospital in good condition. In 12 of 18 reports that documented hemodynamic status, cesarean delivery preceded return of maternal pulse and blood pressure, often in a dramatic fashion. Eight other cases noted improvement in maternal status. Importantly in no case was deterioration of maternal condition with the cesarean delivery.⁽³⁾

HISTORICAL ASPECTS: In 715BC Emperor of Rome made a law called Lex Regis de inferendo mortuus which forbade burial of pregnant woman until the child has been removed from her abdomen, even when there was little chance of its survival. According to Greek mythology and poetry both Aesculapius and Baccus god of physic and god of wine respectively were delivered by this operation. Lord Gautam Buddha is reported to have emerged pure and

Submission 23-10-2015, Peer Review 24-10-2015,

Acceptance 29-10-2015, Published 16-11-2015.

Corresponding Author:

Dr. Varsha Vyas,

D-101, Punit Park, Sec-17,

Nerul East, Navi Mumbai-400706.

E-mail: varsha.vyas011@gmail.com

DOI: 10.18410/jebmh/2015/1157

emmaculate from the right side of his mother. Even in Hindu literature it is mentioned about the Sage Sustra by one of the founder of ancient Hindu medicine who advocated post-mortem abdominal delivery as Sustra Samhita.⁽⁴⁾

RELIGIOUS ASPECTS: Roman Catholic Church council of Cologne in 1280 by virtue of law made mandatory the delivery of dead woman foetus. It laid down severe penalties for any doctor who failed to make an attempt to save the child in this way. In Islamic world the caesarean operations were not only performed on recently dead mothers but also on living wives of muslim sultans, kings and princes to rescue both mother and foetus.⁽¹⁾⁽⁵⁾ The Prophet said, deeds are based on intentions. The intentions of doing PMCS is good and not evil, and therefore it is acceptable. But in brain dead patient, kept on life support for fetal lung maturity, there arises violation of Islamic law. It says honouring a dead person is burial, and delay in burial for such a long time is against the Islamic principles.⁽⁶⁾

MEDICOLEGAL ASPECTS: Theoretically one can be criminally sued for performing PMCS. The offence will be mutilation (wrongful dissection) of corpse. An operation performed to save a foetus cannot be wrongful as there is no criminal intent. An operation without consent may be construed as battery. The unanimous consensus of the literature and of legal authorities is that a civil suit against a physician for performing a perimortem or post-mortem cesarean section regardless of the outcome would not result in judgement against physician.^(1,4) Furthermore documenting fetal heart tones before is not required, partly because it is time consuming and may negatively impact the baby's outcome and partly because maternal indications for the procedure are emergency concerns regardless of fetal status.⁽⁷⁾ Generally, PMCD is deemed an emergency procedure for which consent is not possible. When maternal consent is not an issue, no other opinion should be deemed as legally binding in the emergency setting. Clearly, when the situation involves a ventilator-dependent, brain-dead patient being kept alive solely as a nursery, next-of-kin decisions become relevant, and legal and, possibly, spiritual, counsel should be sought.

ETHICAL ISSUES: The hesitancy of performing PMCS especially when some time is elapsed after maternal death is unwarranted from ethical point of view provided it is performed on the basis of physician best judgment that the neonate will survive and probably will be neurologically intact.⁽⁸⁾ The judgment should not just only based on gestational age and time interval involved but also on maternal health status before death. The prognosis of newborn will be better in acute cause of cardiac arrest in mother, for example a car accident than due to chronic maternal illness like chronic hypertension, diabetes, lupus etc. In the later cases the fetal status probably already compromised by being subjected to poor intrauterine

environment, hypoxmia, medications etc. A significant ethical problem arise if the pregnant woman is declared brain dead before the age of fetal viability. In ethical deliberations of obstetric interventions on behalf of the fetus, one has to consider the risk to the mother. In this case there is no maternal risk, hence continuation of fetal support may improve chance of neonatal survival if continued long enough to achieve fetal lung maturity (32 weeks ideally).⁽⁹⁾ Apart from this cost is also a major concern.⁽¹⁰⁾ All these points to be discussed with family particularly the next of kin who has authority to make decisions. Fully informed consent is mandatory. Conflicts arises if the father request continued somatic support while woman's next of kin objects. In United States, court usually uphold the fathers request. Finally, should an advance directive against continued life support signed by the patient if available be respected? Generally such directives has no force if fetus is not viable.

PHYSIOLOGICAL CONSIDERATIONS: Pregnancy is an altered physiological state leading to pitfalls. There is dilutional anaemia as blood volume increase to approximately 30% causing lower oxygen carrying capacity. Oxygen demand is high and reserve is low causing rapid onset of hypoxia. There is aortocaval compression (occurs at even 20 weeks gestation) causing 30% impedance in cardiac output.⁽¹¹⁾ It can cause complete obstruction in supine position. Increase progesterone causes aspiration risk and mucosal edema. Maternal cardiac arrest in pregnancy is more detrimental. In such scenario CPR may produce only 10% of normal cardiac output Hence Doctrine Of Emptying Of Uterus Is Advocated (KATZ et al) thereby reducing haemodynamic burden of the uterus, haemodynamic status of the mother can be improved. This can increase 25-50% of the circulating blood volume, improve ability to ventilate also the chest compression become more effective.^(11, 12, 13)

Furthermore PMCS emergent delivery may yield a foetus of viable gestational age in the setting of fatal maternal injury or disease. It has to be emphasized that if the maternal spontaneous circulation return with the conventional CPR methods after brief period of resuscitation, withhold the decision of perimortem cesarean section.⁽¹⁴⁾ If maternal circulation does not return in this justifiable small period then rule of intervention within 5 minutes is advocated^(1,12) which means promptly switch over to cesarean delivery because in a span of continuous 5 min hypoxia brain undergo irreversible permanent damage.⁽¹²⁾

ROLE OF SIMULATION STUDY IN PMCS: The hesitancy to perform PMCS can be overcome partly by special training or education. A special training course of MANAGING Obstetric Emergency and Trauma (MOET) was introduced in Netherlands in 2004 which recommends PMCS in the management of cardiac arrest in late pregnancy. Simulation training based on resuscitations guidelines should be tailored and adopted by individual

centres to facilitate rapid decisions for effective resuscitations including the performance of perimortem caesarean section. MOET methods developed in UK provides professionals with the systematic approach. PMCS is now recommended by MOET course.⁽¹⁴⁾

ADMINISTRATIVE ISSUES: For any newer guidelines to get implemented in the medical care it has to go through the proper channel. Initially the guidelines are to be discussed with the concerned department thereafter it is to be discussed with the regional and national medical associations. After finalizing, the approval of medical superintendent is sought to set these new guidelines as a protocol for references.

ROLE OF ANESTHESIOLOGIST: Anesthesiologist act as a Resuscitation Physician Of The Mother for getting access to the airway and circulation and their meticulous maintenance. At the same time a sincere attempt to save the baby per se or as support to paediatrician is advocated

CONCLUSION: The most important step of CPR during pregnancy is the performance of PMCS within 5 minutes. There are many evidences to suggest that PMCS saves mother's lives as well as baby's lives.

REFERENCES:

1. Katz VL, Dotters DJ, Droegemueller W. perimortem cesarean delivery. *Obstet Gynecol* 1986.; 68: 571-6.
2. Hill CC, Pickinpaugh J. Trauma and surgical emergencies in obstetric patients. *Surg. clin North Am* 2008; 88: 421-40. Viii.
3. Katz V, Balderston K, Defreest M. Perimortem cesarean delivery. Were our assumptions correct? *AMJ Obstet Gynecol* 2005 june, 192(6); 1916-20. Discussion review-1.
4. Warraich Q, Esen U. Perimortem cesarean section. *JObstet Gynecol* 2009; 29: 690-3.
5. Boley JP. The History of Caesarean Section. *Can Med Assoc J.* 1991; 145: 319–22. PubMedCentral.
6. Kamali MH. Principles of Islamic jurisprudence. 3rd ed. Cambridge, UK: The Islamic Texts Society; 2008.
7. E Jedd Roe, Deborah Lyon, Janyce Marie Sanford. Perimortem cesarean delivery. medscape updated march 28 2014.
8. Whitten M, Irvine LM. Postmortem and perimortem Caesarean section: what are the indications? *J R Soc Med.* 2000; 93: 6–9.
9. Dijkman A, Huisman CMA, Smit M, et al. Cardiac arrest in pregnancy: increasing use of perimortem Caesarean section due to emergency skills training? *BJOG.* 2010; 117: 282–7.
10. Field DR, Gates EA, Creasy RK, et al. Maternal brain death during pregnancy. *JAMA.* 1988; 260: 816–22.
11. McCauley D. Trauma in pregnancy: anatomical and physiological considerations. *Trauma* 2004; 6: 293-30
12. Marx GF. Cardiopulmonary resuscitation of late pregnant women. *Anesthesiology* 1982; 56: 156
13. Vaizy CJ, Jacobson MJ, Cross FW. Trauma in pregnancy. *Br J Surg.* 1994; 81: 1406-15.
14. Johanson R, Cox C. MOET course manual London RCOG Press, 2003.