Perimortem Cesarean Delivery Following Severe Maternal Penetrating Injury

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The case of a severely traumatized pregnant patient, in whom a perimortem cesarean section, in the emergency department, led to the birth of a viable baby, with long-term survivor, is described. A postmortem cesarean section, resulting in fetal survival, performed after 45 minutes of maternal cardiopulmonary resuscitation, is reported in a patient with multiple penetrating injuries. A 27-year-old primigravida suffered cardiopulmonary arrest at the 34th week of gestation following multiple knife injuries. Although extensive advanced cardiopulmonary resuscitation was performed for 45 minutes, her vital signs did not return to normal levels. A low segment cesarean delivery was performed, and a female baby was delivered.

The time interval between cardiopulmonary arrest and delivery, prior maternal health status, and continued cardiopulmonary resuscitation are important determinants of fetal survival. A perimortem cesarean section is advised in case of multiple penetrating injuries, even after 45 minutes of cardiopulmonary resuscitation, since it may result in fetal salvage.

Key Words: Perimortem cesarean section, cardiopulmonary resuscitation, penetrating injury

INTRODUCTION

The origin of the term ‘cesarean section’ is probably related to an ancient Roman law, the Lex Cesar (715 BC), requiring postmortem sections for separate burial of mother and infant,¹ that means this operation has been practiced since antiquity.² An injured pregnant woman presents two patients, simultaneously requiring timely and effective evaluation, stabilization, and definitive care. As with other aspects of trauma care, injuries in pregnancy require a thoughtful and consistent approach for diagnosis and treatment.³

A review of the past centuries’ cases, and of fetal physiology suggest that to obtain optimum infant survival, cesarean delivery should be initiated within a few minutes of maternal cardiac arrest.² Here, case of an infant survival, after a perimortem cesarean delivery, following severe maternal penetrating injuries, and 45 minutes of cardiopulmonary resuscitation (CPR), is reported. The aim this report was to discuss the problems of perimortem and postmortem caesarean sections in an emergency room, and the indications for this approach in resuscitated pregnant women.

CASE REPORT

A 27-year-old primigravida (75 kg, and 1.64 m), of 34 weeks’ gestation was attacked by her mother and suffered cardiopulmonary arrest following multiple knife injuries. She had knife injuries in her head, neck, thorax, abdomen and extremities, making up about 25 penetrating injuries. The patient was pulse less and her blood pressure was unobtainable on arrival at the emergency department, and could not breathe spontaneously. CPR was initiated immediately, and the obstetrician informed due to the pregnancy. Colloid infusion was started, via an intravenous line, followed by 2 a unit red cell transfusion. Endotracheal intuba tion was performed within 2 minutes, and 100%

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oxygen delivered. An ECG revealed ventricular fibrillation, and DC (Direct Current) shock was administered four times. Adrenaline (2mg) and lidocaine (100mg), were simultaneously intravenously administered to the patient. Although extensive advanced cardiopulmonary resuscitation was performed for 45 minutes, no cardiac activity was regained. Finally, the patient was assumed dead and it was thought she could no longer be resuscitated. During this period an abdominal ultrasonography was performed in the emergency room, which revealed a 34 week gestational age, a 86 mm biparietal diameter and a fetal heart rate of 50 beat/min. Permission was obtained from her relatives for a perimortem caesarean section, and a low segment caesarean section was performed by the obstetrician in the emergency room. A female baby, weighing 2200 gm, was delivered within 2 minutes of the skin incision. The Apgar scores were 2, 4 and 6 at the first, fifth and tenth minutes, respectively, with subsequent normal postpartum vital signs, requiring no resuscitation or assisted ventilation. The baby was transferred to the newborn intensive care unit. The infant was normal 6 months after the event.

DISCUSSION

Perimortem or postmortem caesareans were performed long before classical caesareans. In previous centuries, the low infant survival rates led to negative opinions regarding the operation’s usefulness. Furthermore, a heated debate appeared in the obstetric literature of the late 19th century regarding the value of postmortem and perimortem sections, as infant survival was so rare. However, there is a need to emphasize clear policies on the performance of perimortem and postmortem caesarean section, and to make these known to all staff, including those working in accident and emergency departments.

It has been consistently estimated that significant trauma complicates 6 to 7% of all pregnancies. Trauma during pregnancy is associated with an increased risk of preterm labor, placental abruption, fetal maternal hemorrhage, and pregnancy loss. Most traumas during pregnancy are blunt abdominal traumas, with the common cause being motor vehicle crashes, accounting for up 70% of cases. Penetrating injuries are less common during pregnancy. Our case was one of multiple penetrating injuries, with severe blood loss. Although, she had abdominal trauma and intraabdominal bleeding, there was no intrauterine or placental injury.

The shorter the interval between the onset of maternal cardiac arrest and the commencement of cardiopulmonary resuscitation, the more likely any surviving fetus will be neurologically intact. However the success rate of cardiopulmonary resuscitation in pregnancy is unknown. CPR should be adequate for providing a cardiac output. The difficulty in performing CPR in a pregnant woman in the third trimester is that the uterus is in the supine position and occludes the vena cava. Conversely, the American Heart Association manual on Basic Life Support states; 'the patient must always be in the supine position when external chest compression is performed.' Several authors have commented on the difficulties of performing successful cardiopulmonary resuscitation in pregnant women. In our case, although cardiopulmonary resuscitation was initiated immediately, it was unsuccessful due to the massive blood loss prior to hospital arrival.

A postmortem caesarean section is advised in the event of fatal maternal trauma, as it may result in fetal salvage. According to some authors, there is little or no place for a perimortem caesarean section in the context of maternal arrest due to hemorrhagic hypovolemia. Contradictory to this, some authors have reported much better fetal survival figures for a perimortem than for a postmortem caesarean section. If the operation is performed at the right time, it may not only save the infant, but the mother as well. Many postmortem and perimortem caesarean sections are performed in casualty departments: wherever the location, caesarean section packs and neonatal resuscitation equipment need to be immediately available, with experienced obstetricians, paediatricians and anaesthetists readily to hand. In our case, the procedure was performed in the emergency room, and cardiopulmonary resuscitation continued for 45 minutes, in order to save both the mother and baby. Unfortunately the mothers’ blood loss was so severe, she suffered hypovo-
lemic shock and cardiac arrest after her arrival at the emergency room. The survival of the baby following the postmortem cesarean section may be an indication of the success of the CPR providing sufficient maternal blood pressure for the baby.

The time interval between cardiopulmonary arrest and delivery, prior maternal health status and continued cardiopulmonary resuscitation are important determinants of fetal survival. Page-Rodriguez, et al. reported emergency cesarean section in a woman with twin pregnancy presented in full cardiopulmonary arrest. Unfortunately neither babies nor mother were survived. However, DePace, et al. described successful resuscitation of both mother and baby after 25 minutes of advanced cardiopulmonary resuscitation, which was initiated immediately following maternal cardiac arrest. Awad JT, et al. also reported a postmortem cesarean section that resulted in fetal survival, performed 25 minutes following maternal blast injury. Lopez-Zeno, et al. reported an intact fetal survival following delivery 47 minutes after a fatal maternal injury due to a gunshot wound, with the mother having received no resuscitation for the first 25 minutes following the injury. The evidence is overwhelming; the sooner an infant is delivered following arrest (preferably within five minutes), the better the prognosis. This report is the first relating to a fetal survival following 45 minutes of maternal CPR in a patient with hypovolemic shock.

In summary, various anatomical and physiological changes may alter the manifestations of given injuries, and the treatment required to reestablish maternal-fetal hemostasis. Nevertheless, because of the potential for survival of a normal infant, obstetricians must consider a cesarean delivery in any woman that suffers a cardiopulmonary arrest in the third trimester. In case of maternal death, including cardiac arrest, every attempt should be made to perform a cesarean delivery, even following 45 minutes of cardiopulmonary resuscitation.

REFERENCES