Caesarean delivery during maternal cardiopulmonary resuscitation for status asthmaticus

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A patient who sustained a recurrent cardiopulmonary resuscitation due to status asthmaticus during one pregnancy followed by a birth of an apparently normal infant is described. Promptly performed caesarean delivery might have saved the mother and her infant. Cardiopulmonary resuscitation is less effective in a near term pregnant woman.

Although most of the ancient cultures contain legends of postmortem caesarean delivery, there were the Roman kings who formally established postmortem caesarean by the law. Later, when the ancient Rome became Roman Empire, the “Lex Regia” became “Lex Cesarea”. In fact, one of the commonest explanations for the origin of the term “cesarean section” comes from this law. The ancients permitted a postmortem caesarean section as it could sometimes save fetal life after the mother’s death. Still, infant survival was rare. The term “perimortem” cesarean section is applied to cases where the mother was on cardiopulmonary resuscitation before the cesarean section and showed no signs of recovery afterwards. Today, the most common cause for perimortem or postmortem cesarean section is a road accident. Maternal survival after cesarean section performed during cardiopulmonary resuscitation is extremely rare. We describe a case of maternal and infant’s survival after cesarean section performed during cardiopulmonary resuscitation due to status asthmaticus, an infrequent cause for cardiac arrest during pregnancy.

CASE REPORT
A 37 year old woman, gravida 2 para 1, was brought by her husband to our emergency room unconscious and suffering respiratory arrest at 36 weeks’ gestation. The patient has been an asthmatic since adolescence intermittently treated with salbutamol inhalers. Her current pregnancy was uneventful until 24 weeks’ gestation. At that time, she suffered respiratory arrest and a loss of consciousness after exacerbation of asthma. Cardiopulmonary resuscitative measures including intubation were successful and the patient was fully stabilised after a short time in intensive care unit of another hospital. She was extubated within 24 hours and discharged three days later receiving oral prednisone, which was tapered off over a week, salbutamol two puffs every four to six hours and was provided with epinephrine auto-injector (0.3 mg/0.3 ml). Since discharge until presentation she did well, and prenatal care was uneventful.

About an hour before arrival, the patient became acutely anxious and short of breath and did not respond to salbutamol inhaler. As she did not improve, the patient left home for hospital in their car, her husband driving. About three minutes before arrival, the patients’ husband injected her with the epinephrine auto-injector after he realised that she was unconscious. At arrival, cardiopulmonary resuscitation was promptly started after a complete cardiopulmonary arrest was recorded. The patient was stabilised after 5-10 minutes of extensive advanced cardiopulmonary resuscitative measures including intubation and defibrillation. At that time the fetus was evaluated and noted to have a heart rate of about 60 beat/minute. An emergency caesarean was accomplished and a male newborn weighing 2780 g with Apgar score of 0 at one minute was delivered. A successful cardiopulmonary resuscitation was promptly started with initial pH of 6.98 and Apgar score of 8 at five minutes. The newborn subsequently did well. The mother was extubated 36 hours after presentation and was provided with epinephrine auto-injector (0.3 mg/0.3 ml). Since discharge until presentation she did well, and postnatal care was uneventful.

DISCUSSION
Cardiac arrest occurs rarely in pregnancy. Only few cases of pregnancy outcome after life threatening status asthmatics have been described. Only three maternal deaths attributed to asthma are described in a review of the 188 reported cases of postmortem caesarean with surviving infants. A case of life threatening status asthmatics at 12.5 weeks’ gestation with birth of a normal full term infant after a successful resuscitation was reported. An improvement of uncontrollable cases of life threatening status asthmatics after termination of pregnancy by caesarean was also reported.
It is important to recognise that cardiopulmonary resuscitation is less effective in a near term pregnant woman. To diminish the effects of right lateral uterine displacement, a pregnant woman needs to be placed in a left lateral tilt during cardiopulmonary resuscitation. Relieving vena cava occlusion allows chest compression to provide sufficient cardiac output to facilitate cardiopulmonary resuscitation. In recently described case reports, advanced cardiopulmonary resuscitative measures were unresponsive until caesarean delivery was instituted. This implies that caesarean section might be necessary to accomplish a successful resuscitation even in case of a dead fetus. Perimortem caesarean started within four minutes of maternal cardiac arrest will yield the highest rates of maternal survival regardless of its cause.

Electric cardioversion during pregnancy has been described in the literature and seems safe for the fetus. The physiological changes in pregnancy do not change defibrillation energy requirements for adult defibrillation.

The outcome in our case was successful because of left lateral tilt position of the mother during cardiopulmonary resuscitation and rapid decision to perform a caesarean section.

We report this case because it calls attention to an acute condition that may be seen only once over the course of a busy career of practicing physician. The critical period in management of a pregnant patient with cardiopulmonary arrest attributable to status asthmaticus is within the first several minutes of the event. It is important to recognise that promptly performed caesarean delivery may save the mother and her infant. The case of this patient is unique in view of the fact that she sustained a recurrent cardiopulmonary resuscitation attributable to status asthmaticus during one pregnancy followed by a birth of an apparently normal infant.

Contributors
Samuel Lurie performed the caesarean section during the cardiopulmonary resuscitation, reviewed the literature, participated in discussion of core ideas and writing the paper, and acts as guarantor of the paper. Yaakov Mamet participated in discussion of core ideas, edited the paper, and also acts as guarantor of the paper.

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REFERENCES

Three women in a car
S Satchithananda

Isolated sternal fractures have been increasing in number since the advent of seat belt legislation in 1983. The management of these patients has been a matter of debate for some time. These cases demonstrate that other coexistent pathology may be difficult to identify at the time of presentation and that a high level of suspicion for other injuries is necessary. Three women presented to the emergency department after a collision between their car travelling at 45 miles per hour and a stationary van.

CASE 1
The 71 year old restrained driver of the car presented complaining of chest pain and tenderness. Previous medical history included osteoporosis and long term corticosteroid use for asthma. Initial observations, examination, chest radiograph and electrocardiogram were normal. A fractured sternum was confirmed on radiography. The patient required intravenous opioids as analgesia and as she lived alone she was admitted to the emergency department observation ward overnight.

Over the next 16 hours she developed an ileus. After a normal CT scan of her abdomen she was managed conservatively and discharged home after three days. Her CT scan demonstrated a small right sided pleural effusion not evident on initial chest radiograph or clinical examination.

CASE 2
The 77 year old restrained front seat passenger also presented with chest pain and tenderness. Initial observations, chest radiograph and electrocardiogram were also normal. A fractured sternum was confirmed on radiography. The patient required intravenous opioids as analgesia and as she lived alone she was admitted to the emergency department observation ward overnight.

Box 1 ECG abnormalities of myocardial contusion

Unexplained sinus tachycardia
Arrhythmias and conduction abnormalities
ST segment changes
  – non-specific in myocardial injury
  – concave ST segment classical of pericarditis (may be associated with low voltage complexes)

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