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## CASE REPORT

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# Severe Traumatic Maternal Brain Injury during Pregnancy: A Case Report

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### ABSTRACT

Severe maternal brain injury during pregnancy by traffic accident is rare event. An unconscious mother whose pregnancy was going on from 10 to 35 weeks' gestation and achieved deliver of a healthy viable male infant. She was cared by team approach; neurological surgeon, obstetrician, pediatrician, and the nurses for the goal of life saving both mother and infant.

Keywords: traumatic brain injury, pregnancy

### Introduction

The management of the traumatized pregnant patient is complicated in the case of cerebral hemorrhage. The team approach is requiring for successful outcome both mother and infant. The emergency physician should involve the neurological surgeon and obstetrician early in the care of these patients.<sup>(1)</sup> Because the most common cause of fetal death is maternal death, so the mother must be resuscitate firstly. On the other hand, fetal health may be the most accurate indicator of the maternal health. Fetal heart tones could be used as part of the vital signs.<sup>(1, 2)</sup>

Feldman DM et al<sup>(3)</sup> reviewed several reports of successful pregnancy outcomes after maternal brain injury. Of the 11 cases that the attempt were made to prolong the pregnancy, the average time from the injury to the time of delivery was 79.5 days (range 1-189 days), and the average gestational age at the time of delivery was 30.5 weeks (range 26-35 weeks). All but one was delivered by cesarean; the other one was delivered by forceps extraction. All deliveries were pre-

term. Various indications for delivery were included fetal distress, intrauterine growth retardation, preterm labor, documented fetal lung maturity, and severe maternal hypotension.<sup>(3)</sup>

### Case Report

A 40 years old pregnant, woman G2P1, was presented, with unknown last menstrual period, and suffered motor vehicle crash during one night. She had traumatic wound on her head. On admission, her consciousness was confused and agitated but stable vital signs. The patient's neurological examination by neurological surgeon was responded with deep pain, and dyspnea. The patient was resuscitated, and was endotracheal intubated. Brain computerized tomography(CT) was done and revealed subdural hemorrhage at left frontal brain. Her gestational age was 10 week and positive fetal heart sound was detected by doppler sonography just before moving to the operating room. Clinical signs of abortion, such as vaginal bleeding were absent.

Craniotomy was performed, and blood clot

was evacuated from subdura left frontal brain, on the next day after admission, due to deteriorated neurological signs. The patient remained endotracheal intubations, and transferred to the intensive care unit (ICU). Her vital signs and neurological status were stable except respiration which was supported by mechanical ventilator. The patient was admitted at ICU for the total duration of her 197 days admission due to respiratory failure, and she was admitted at medical ward just a short period after she could ventilate by her effort. During her admission, she was returned to operation twice, tracheostomy for long time air way supported on day 9<sup>th</sup>, and Burr-hole operation for cerebral hygroma on day 27<sup>th</sup> because her neurological signs were deteriorated again and collection in brain closed space was found by CT scanning.

During the hospitalization multiple courses of antibiotics were used to treated recurrent episodes of pneumonia, and phenobarbital to treated seizures. A grand mal seizure was diagnosed by exclude eclampsia in pregnancy. Alimentation was initiated with parenteral nutrients and proteins, and followed by feeding via nasogastric tube because the nutritionist evaluated and found the patient was malnutrition. When the patient was stabilized, the rehabilitation therapist was also an integral member of the team to promote and prevent musculoskeletal contracture and decubitus ulcer.

The patient's obstetric status was periodically examined throughout her hospitalization by obstetrician, internist, and the nurse. Fetal heart sound and uterine fundal- height measurde were performed daily. Bedside ultrasounds were performed at 15, 28, and 32 weeks' gestation. All laboratories values for transmitted diseases were negative. Ferrous and mineral vitamins were supplement via nasogastric tube. After 32 weeks of gestation non-stress continuous fetal heart rate monitoring was achieved weekly. The results of all tests were with in normal limit. For the reason, these gestational ages were appropriate for our neonatal facilities to care. At 34 weeks gestation, obstetricians, pediatricians, neurological surgeon, and the patient's family were combined meeting and discussion to establish the permission to deliver by cesarean at 36 weeks

gestation because the fetus was matured. On the day 186<sup>th</sup> of hospitalization, 35 weeks' gestation, amniotic fluid leakage and uterine contraction were found by the nurse of surgery ward. The pregnant was transferred to delivery room. On examination by obstetrician the cervix was fully dilated and fetal head was descended at +3 stations, and continuous fetal monitoring was performed during labor. The obstetrician was decided to deliver by vacuum extraction due to waiting for 1 hour and a half in second stage of labor was not further progression to spontaneous deliver. It might be only involuntary uterine contraction itself was inadequate for delivering the fetus. She was unconscious, so she was lack of voluntary effort to reinforce labor like normal pregnant. The male infant was born with Apgar scores of 9 and 10 at 1 and 5 minutes, respectively. The fetal body weight was 2,890 grams, normal male appearance and healthy. The infant had hyperbilirubinemia, improved by phototherapy, and discharged 14 days later. After delivery she was stable, spontaneous respiration, but still unconscious. Day 11<sup>th</sup> of puerperium, the unconsciousness mother was discharged back home. Before this time, we had trained her families, how to care patient' hygiene. In summary the patient was stayed in hospital for 197 days.

## Discussion

Severe maternal head injury, with intracerebral hemorrhage during pregnancy is rare. This was the first experience in Pranungklao Hospital. As in the nonpregnant population, head injury is a major cause of maternal morbidity and mortality in trauma. An intensive multidisciplinary approach in the neurology, critical care, maternal- fetal medicine, neonatology, and rehabilitation are co-operation for survival in the mother and infant.

Aggressive management and critical care have been used to support maternal life firstly. Assessment of vitals signs, airway, breathing, and circulation were established. Also fetal heart sound and vaginal bleeding were assessed.

In obstetric consideration has many dilemmas associated with the decisions on pregnancy. Because the unconsciousness mother is unable to make decisions her-self. The patient's family was assigned

for making decisions about health care. Her family was stress and worry about fetal outcome, beside maternal health. The question was the fetus abnormality, arisen by her family. This patient was a high risk pregnancy. They were, firstly, chromosomal abnormality, due to elderly gravida and secondly, high response to the fetus from exposed to radiation in early pregnancy. The most sensitive time for the fetus to be exposed to significant radiation is from 2 to 7 weeks' gestation. Exposures of 15 cGy (rad) carry 15% chance of microcephaly.<sup>(1)</sup> This case was exposed head CT scanning 2 times at 10 and 12 weeks' gestation, with 5 to 10 cGy per exposure, but the uterus was shielding so it is safer.<sup>(1)</sup> And the last one, many antibiotics and anticonvulsants were used. These environments made difficult answer to the question on fetal normality. Serial ultrasounds were made and no abnormality was found. Amniocentesis was withheld due to legal responsibility for decision-making was unclear, the patient's families or the court to allow doing this procedure. If fetus had chromosomal abnormality, who could permit to terminate pregnancy? and was therapeutic abortion at this time made addition harmful to maternal life?

As previous mention, her families were worry on fetal anomaly risk. And after our team work discussed thoroughly on ethic and legal issue with senior staff and assistance hospital director. We agreed together that the right to terminate pregnancy was responsibility by the court. Then we were counseled with her families on legal issue, if they wanted to terminate pregnancy, they would bring their claim to the court. At last her families understood on these limitations and gave patient's opportunity to continue pregnancy without jurisdiction by the court.

There were several reported cases of successful pregnancy outcomes after severe brain injury during pregnancy. Such as, Sampson and Peterson<sup>(4)</sup> reported a comatose pregnancy at 6 weeks' gestation with successful live born infant at 34 weeks' gestation. Bernstein, Watson et al<sup>5</sup>, reported the longest life supported the maternal brain dead for 107 days to

successful live born infant. In Pranungklao Hospital, this case was stay on admission for 197 days, but 186 days for pregnancy. All 11 reported cases except one were performed cesarean.<sup>(3)</sup> One case was delivered by forceps extraction. This case was performed vacuum extraction due to poor maternal effort and prolonged second stage of labor. The fetus is normal appearance; body weight is 2,890 grams, heaviest in 11 reported cases that Feldman et al<sup>(3)</sup> had been review. The newborn was admitted for 14 days and discharged with healthy. Only complication was hyperbilirubinemia. The newborn was lost follow up 1 month later.

The outcomes of this case were satisfied. Every personnel resources, physicians, internists, nurses, and paramedical team work, such as nutritionist, rehabilitation therapists were combined to work with the best nursing care. Because establishment of nutritional intake, good pulmonary toilet, and limbs exercise were important, multidisciplinary team approach was necessary<sup>5</sup>.

## Conclusion

Successful management maternal brain injury during pregnancy is achieving by team approach. Advances in medicine and critical care enhance the chances for maternal brain injury and her fetus to survive.

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## ภาวะบาดเจ็บทางสมองอย่างรุนแรงในขณะหญิงมีการตั้งครรภ์

คำนำร จิตรมณีวรรณ

### บทคัดย่อ

แม่ที่ตั้งครรภ์แล้วได้รับอุบัติเหตุทางถนนอย่างรุนแรงและเกิดอันตรายต่อสมองจนไม่รู้สึกรู้ตัวเป็นเหตุการณที่พบน้อยมาก ในกรณีนี้พบแม่ที่สามารถตั้งครรภ์ในภาวะที่ไม่รู้สึกรู้ตัวจากอุบัติเหตุทางสมองตั้งแต่อายุครรภ์ 10 สัปดาห์ไปจนกระทั่งถึง 35 สัปดาห์และคลอดได้เด็กทารกที่สมบูรณ์แข็งแรง โดยที่มารดาได้รับการดูแลของทีมงานการแพทย์หลายส่วน เช่น ประสาทศัลยแพทย์ สูติแพทย์ กุมารแพทย์ พยาบาลหลายกลุ่มงาน เพื่อให้ทั้งแม่และทารก มีชีวิตรอด

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