

Normal Vaginal Delivery in a Persistent Vegetative State: Suggestive Management, a Case Report and Literature Review

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Article Info

doi: [10.30699/jogcr.7.5.462](https://doi.org/10.30699/jogcr.7.5.462)

Received: 2021/04/06;

Accepted: 2021/10/13;

Published Online: 07 July 2022;

Use your device to scan and read the article online



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ABSTRACT

Severe injury to the nervous system in pregnancy needs advanced critical care support to the mother and consideration of fetal effects. Managing persistent vegetative state (PSV) cases in pregnant patients is complex due to the lack of clear guidelines for medical and ethical reasons. This reports a gravida 4, maternal persistent vegetative state case due to a car accident for a 25-year-old woman at 20 pregnancy weeks. Aggressive support enabled the continuation of pregnancy toward 3th trimester without any impediment to the infant's development. A fetal scan for growth monitoring showed an estimated fetal weight near the 75th centile. Intervention in the pregnancy of a patient suffering PSV is not required if both mother and fetus are stable. Maternal malnutrition may adversely affect the fetus and neonate. In this case, high caloric nutrition with partial parenteral nutrition was employed. We monitored both the mother and her child in an attempt to gather data pertinent to the appropriate care of pregnancy in a persistent vegetative state and the potential sequel for offspring.

Keywords: Fetal growth, Neonatal outcome, Persistent vegetative state, Pregnancy

Introduction

Varying degrees of permanent unconsciousness are known, including persistent vegetative state (PVS), coma, and brain death (1). Although the patients have poor cerebral function in a vegetative state, they have sufficient thalamic, hypothalamic, and brainstem autonomic functions for survival. Patients may seem conscious, have sleep-wake cycles, swallow, and even breath normally, but no targeted interactions exist (2).

In such cases, the provision of advanced critical care support and a multidisciplinary approach is essential for the pregnant victim to increase the chance of an acceptable neonatal outcome. Probable biochemical effects of drugs and imaging on the fetus are also a major worry. The lack of clear guidelines for medical and ethical reasons leads to complex management in this rare situation (3-6). The successful care of mother and fetus during PVS requires teamwork collaboration of perinatologist, neurosurgeon, neurologist, nutritionist, nephrologist, internist, physiotherapist, ethics committee, legal counsel, and others (7).

There are few cases reported in which a mother in a vegetative state has delivered a healthy newborn. The present research reports a pregnant woman with persistent vegetative state who delivered a healthy newborn at 32 weeks of gestation subsequent to

hospitalization and intensive care support for 95 days at Beheshti Hospital, Kashan University of Medical Sciences, Kashan, Iran. This is the first such case reported in Iran.

Information and Methods

A 25-year-old Persian woman, gravida 4, para 2, death 1 (23 weeks preterm birth), abortus 1 was admitted to Beheshti Hospital, Kashan University of Medical Sciences, Kashan, Iran, in the 20th week of pregnancy. She had a closed head injury as the result of a car-truck accident that caused a right frontotemporal and parietal subdural hematoma (Figure 1 & 2).

On admission, the woman's Glasgow coma scale (GCS) was 4/15. After intubation, the patient was placed on an assisted mechanical ventilator. She underwent decompressive craniotomy and hematoma drainage and was transferred to the neuro-intensive care unit (ICU). During diagnostic workup, sonography revealed a 20-week live fetus with a normal amniotic fluid index (AFI) and an estimated fetal weight (EFW) of 316 grams.

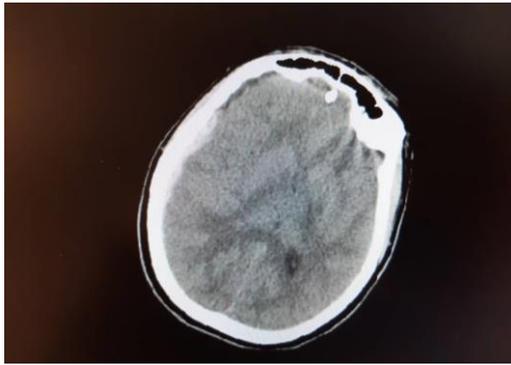


Figure 1. Axial CT scan: right subdural hematoma and midline shift to left

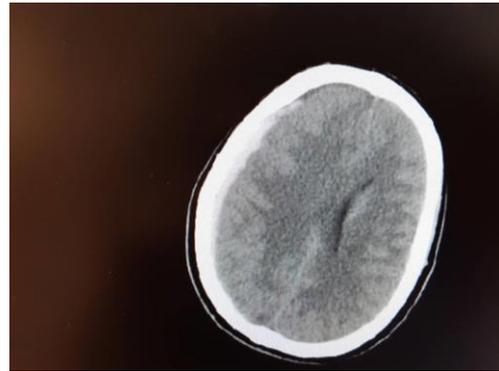


Figure 2. Right subdural hematoma leads to compressed left ventricle

Findings

Three days after the operation, the woman developed a fever (38°C axillary). Sepsis workup was performed, including CBC, chest X-ray, urine analysis, and blood, urine, CSF, and sputum cultures. Also, tests for chorioamnionitis were performed (a speculum exam was done with no observable amniotic fluid leakage, Fern and Nitrazine tests were negative, and the AFI was measured by sonography was normal). In the blood culture, *Enterobacteriaceae* and the sputum culture, *Acinetobacter baumannii* and *Pseudomonas aeruginosa* were identified. According to culture results and suspected meningitis, we administered colistin, vancomycin, cefepime, meropenem, and rifampin after consulting with a specialist in infectious diseases. The fever continued for seven days. Meningitis was highly suspected; therefore, intrathecal vancomycin and colistin were added to intravenous antibiotics.

The patient underwent a tracheostomy on the thirteenth day of her hospital stay. Febrile episodes complicated her condition. On hospital day 13 (HD 13), oligohydramnios was reported by a sonologist from ultrasound testing, which was repeated, and a perinatologist confirmed the diagnosis on two different days. The patient's medical and ethical issues condition was presented to a committee that included all the specialists involved in patient management, and the decision was made to continue the pregnancy. Also, according to the opinion of the neurosurgeon, pregnancy termination, in this case, would not improve maternal outcomes. Due to the presence of fever and oligohydramnios (amniotic fluid index: 30 mm), an AmniSure test, which produced a negative result, was recommended by the perinatologist on HD 21. At the same time, urine output increased (fluid intake 4400 cc, urine output 6200 cc). A nephrology consult was performed, diabetes insipidus was indicated, and increased fluid intake. After three days, urine output decreased to the normal range. Liver enzymes increased (AST: 122 ALT: 55) by HD 22. After a consult with a gastroenterologist, all antibiotics were discontinued, and ursodeoxycholic acid was started. Spiking fever continued, and the supposition of

neurogenic fever (NF) related to a hypothalamic injury became a consideration. The patient was receiving Entra Meal 300 cc/h gavage by NG tube. Because of maternal weight loss and oligohydramnios, after consulting a dietitian, partial parenteral nutrition (PPN) was started with aminoacid 10% (500 cc daily intravenous), intralipid 20% (200cc daily intravenous), and Soluvit (1 vial daily intravenous) and electrolytes and serum creatinine were checked daily. The patient also received omega 3, ferrous sulfate, folic acid 1mg, vitamin E 400U, and vitamin D3 1000U daily by NG tube. After two weeks, the AFI increased to 160 mm, and the EFW was 981 gr on a fetal scan between the 75th and 90th centiles for gestational age (26 weeks). A glucose tolerance test was carried out on the 26th week of pregnancy, which was normal.

Two weeks later, the fetal scan was repeated to evaluate fetal biometry, which revealed the EFW was 1132 gr and the AFI was 12 cm (approximately 75th centile). Aminoacid 10% was continued at 500 cc daily; however, intralipid 20% was changed to 250 cc twice weekly.

Recurrent blood sampling was performed (every other day) in the ICU to check CBC, BUN, Cr and ALT, AST, ESR, CRP, Ca, P, and Alb. Due to recurrent blood sampling, the patient became anemic, so she was given four units of packed cells: two units on HD 35 (Hb: 7) and two units on HD 54 (Hb: 7.7).

The patient was treated twice daily with unfractionated heparin at a prophylactic dose of 5000u subcutaneous and graduated compression stockings to prevent thromboembolism.

Daily visits by a physiotherapist were performed. Repositioning and extremity massage were conducted frequently. An Air mattress was used to prevent bedsores. Because of repeated and intense generalized spasms, the patient's temporomandibular joint was dislocated on HD 33 and was reduced by a maxillofacial surgeon.

After 50 days, her Glasgow coma outcome scale (GCOS) improved, and she developed normal

respiratory function. She was then transferred to the neurosurgery ward and examined daily by an OB/GYN service supervised by a perinatologist.

The patient received two doses of betamethasone for fetal lung maturity on the 28th week of pregnancy.

The fetal heart rate was checked every day. The fetal growth rate was monitored with ultrasonography every two weeks, and fetal growth curves were within the normal range.

Fetal well-being tests were performed from 28 weeks of gestational age using cardiotocography (CTG) twice a week and weekly biophysical profiles.

There was a concern for the fetus due to the probable effects of trauma and the biochemical effects of drugs and imaging.

By HD 95 in week 32 of pregnancy, the patient gave birth to a healthy male neonate by spontaneous natural vaginal delivery with Apgar scores of 7 in the first minute and 8 in the fifth minute. The infant's birth weight was 2000 gm, head circumference was 30 cm, height was 46 cm, and umbilical artery PH was 7.29. The newborn was admitted to NICU because of prematurity. He was not intubated, but he did undergo continuous positive airway pressure (CPAP); however, his general condition was fair, and he was discharged after 12 days. One year follow-up showed that the baby is growing appropriately, and no developmental or neurologic complications were observed.

Discussion

Trauma affects 6 to 8 percent of pregnancies (8). A systematic review of studies in 2013 on trauma during pregnancy reported that motor vehicle accidents were associated with 8,307 of 100,000 live births (9).

The patient in the present research was in a deep coma on admission, and after craniotomy and ICU care, her condition improved to a vegetative state. She maintained adequate autonomic nervous system activity other than the need for assisted ventilation. Based on the culture result, antibiotics were given for meningitis and sepsis, which were treated. However, the patient still had a prolonged fever attributed to the central nervous system damage, not to infection. Individuals immobilized for prolonged periods may develop a negative nitrogen balance due to progressive catabolism (10). Maternal malnutrition may adversely affect the fetus and the neonate, with deleterious effects on birth weight and brain development (11). Caloric requirements for comatose pregnant patients are estimated to be 2500 kcal/day (12). For this patient, we employed high-calorie nutrition with PPN.

Conclusion

A multidisciplinary approach is required to achieve positive neonatal results in complex scenarios such as

pregnancy during a persistent vegetative state. In this instance, the integrative and collaborative methodology employed may serve as a framework for analogous circumstances. There seems to be no formulated plan for prenatal care in a persistent vegetative state; however, teamwork in such cases can lead to great success, as shown by our cooperative complex of specialists, including a perinatologist, neurosurgeon, nutritionist, nephrologist, internist, physiotherapist, and others.

We feel that, according to the present case, the intervention of pregnancy is not required in PSV if both mother and fetus remain stable and a successful fetal outcome is obtainable.

According to our experience, there is a need for a comprehensive guideline to manage such patients. In summary, we recommend consideration of the following items:

- Attention should be paid to maternal status through regular and accurate records of vital signs, intake and output, and any changes in maternal habitus.
- To make decisions for a comatose mother, fetal status should be considered a useful vital sign. Any changes in fetal health (such as AFI) can result from an underlying maternal imbalance.
- Maternal nutritional status is a substantial item in managing patients who cannot communicate (it is necessary to know when and how to start TPN or PPN).
- Prophylactic measures should be taken for thromboembolism using prophylactic heparin, graduated compression stockings, and bedsores by repositioning and airbed.
- Obstetrical nursing care should include daily monitoring of fetal heart rate, contractions, and leakage of amniotic fluid and frequent checks for vaginal bleeding.
- If the maternal and fetal status is stable, fetal growth monitoring should be performed by ultrasonography every two weeks.
- Fetal well-being tests are recommended after 28 weeks of pregnancy, including CTG twice per week and a weekly biophysical profile.
- Intrauterine MRI study of the baby's brain, if possible, could be helpful for further prediction of the outcome of the baby since biomechanical loads resulting in severe brain damage of a mother may affect her fetus.

In this research, we monitored both the mother and her child to gather data pertinent to the appropriate care in a persistent vegetative state and the probable sequel for offspring. We believe the above recommendations

could help develop a comprehensive guideline to manage such patients.

Acknowledgments

None Declared by Authors.

Ethical Permission

This article has been licensed by the Ethics Committee IR.KAUMS.MEDNT.REC.1399.165.

Authors Contribution

All authors contributed to the data collection and writing the article.

Conflict of Interest

The authors declared no conflict of interest.

Funding/ Supports

None Declared by Authors

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How to Cite This Article:

Talebian M, Mehri N Mousavi Shirazi M. Normal Vaginal Delivery in a Persistent Vegetative State: Suggestive Management, a Case Report and Literature Review. *J Obstet Gynecol Cancer Res*. 2022; 7(5):462-5.

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