

CASE REPORT

Maternal car accidents during pregnancy and their impact on newborns

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Introduction: Car accidents are among the most common causes of fetal trauma during pregnancy. The most frequent maternal complications include placental abruption, uterine rupture, and hypovolemic shock, while fetal complications include premature birth, cranial injuries, skull fractures, and even death.

Objective: To examine how car accidents affect pregnant women and their newborns.

Methods: Three cases of newborns delivered by mothers involved in car accidents during pregnancy were analyzed. The data were collected from the medical records of the neonatology department.

Results: These three clinical cases demonstrate the significant impact of maternal trauma from car accidents on perinatal outcomes and neonatal development, with a wide range of clinical manifestations, from transient neonatal complications to neonatal death. Properly using seatbelts during pregnancy is essential to prevent injuries to both the mother and the fetus.

Conclusions: Maternal motor vehicle accidents can have severe and diverse consequences for newborns, ranging from transient complications to congenital malformations and neonatal death. Proper and correct use of seatbelts during pregnancy is a critical preventive measure to reduce maternal and fetal injuries. Immediate neonatal resuscitation and thorough post-trauma evaluation, are essential for improving outcomes. Long-term pediatric monitoring is recommended due to the risk of delayed complications. Further research is needed to develop standardized protocols for trauma management in pregnancy and to better understand the effects of intrauterine trauma on fetal development.

Keywords: pregnancy, car accident, newborn, trauma

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Introduction

Car accidents involving pregnant women occur frequently and are a significant source of trauma during pregnancy [1,2]. Unfortunately, in Romania, there is a lack of clear statistics regarding the number of accidents involving pregnant women, as many do not seek medical attention immediately after the car accident. The most common maternal complications include placental abruption, uterine rupture, and hypovolemic shock. Fetal complications may involve premature birth, cranial injuries, and skull fractures, often resulting from the infant's position in the mother's pelvis [1]. It is recommended that pregnant women wear seatbelts to help prevent serious fetal and maternal complications in the event of an accident. We present three cases of newborns born to mothers who were involved in car accidents during their pregnancies. The publication required prior approval from the hospital's ethics committee, as the patients had already been discharged.

Case 1

A premature male newborn was delivered at 36 weeks of gestation on December 5, 2019. He is the second child of a 27-year-old mother. The preterm infant was born via emer-

gency cesarean section due to a maternal indication arising from a car accident that occurred approximately two hours before birth. The mother had incorrectly used her seat belt during the accident. At birth, the late preterm newborn weighed 2,430 grams and measured 49 cm in length with a head circumference of 33 cm. The membranes had ruptured during the procedure, and the Apgar score was nine at 1 and 5 minutes. The newborn was generally in good condition but showed slightly decreased subcutaneous fat, acrocyanosis, mild polypnea, and a slight expiratory groan, with peripheral saturation (SpO₂) in room air at 90% and the heart rate was balanced. The osteo-articular system appeared intact. The newborn showed good tone and reactivity, with normal archaic and osteotendinous reflexes, and was crying vigorously.

Based on the clinical signs and the appearance of the chest X-ray (Figure 1), the case was diagnosed as respiratory distress syndrome due to surfactant deficiency. A targeted treatment with exogenous surfactant was administered non-invasively, resulting in a positive outcome. The newborn was discharged on Day 11 of life in good overall condition, with stable cardiopulmonary and metabolic functions, and weighed 2,520 grams.

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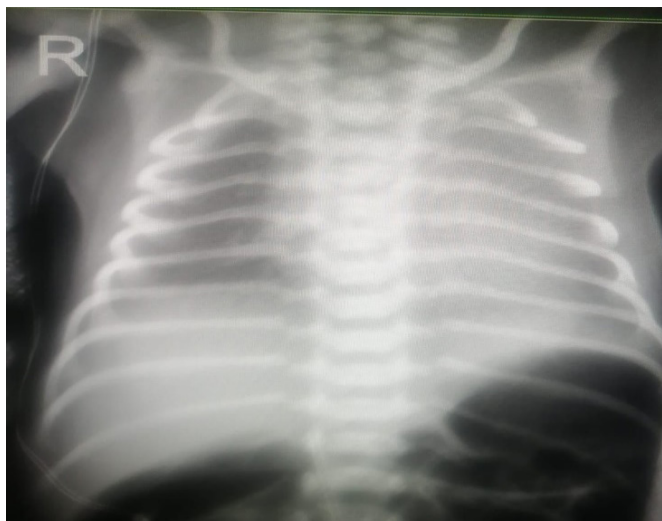


Fig. 1. Typical X-ray appearance of neonatal respiratory distress syndrome (NRDS).

Case 2

A female late preterm newborn was delivered at 36 weeks of gestation on January 17, 2020. She was born via an emergency cesarean section due to maternal indications following a serious car accident. The mother, a 35-year-old multiparous woman with seven previous births, was found unconscious outside the vehicle after a prolonged period, without a seat belt. The newborn's birth weight was 3000 grams. The Apgar scores were recorded as follows: 0 at 1 minute, 0 at 5 minutes, 0 at 10 minutes, 1 at 15 minutes, 1 at 20 minutes, and 1 at 30 minutes. At birth, the absence of a heartbeat, no spontaneous breathing, generalized hypotonia, and cyanosis were noted. Extensive resuscitation maneuvers were initiated and maintained for approximately 30 minutes, but since there was no sustained cardiac activity, death was declared. The mother delivered a healthy child one year later. The autopsy report establishes a direct causal relationship between the motor vehicle accident and the neonate's death.

Case 3

A full-term male newborn was born at 40 weeks' gestation to a 30-year-old, multiparous mother with 10 previous births. She reports that during the fifth month of pregnancy, she had a minor car accident where the seat belt was used incorrectly, but she did not seek medical attention. During a check-up in the sixth month of pregnancy, there was suspicion of Dandy-Walker syndrome, which was not confirmed after birth. At birth, the newborn presented the following characteristics: weight of 2700 g, length of 49 cm, and head circumference of 32 cm. The Apgar score was 9 at 1 and 5 minutes. The membranes spontaneously ruptured before expulsion, and the newborn appeared to be in good general condition, though exhibiting acrocyanosis and cutis marmorata (Figure 2). The subcutaneous tissue appeared normal, but there was a significant hemorrhagic skin lesion on the scalp, devoid of hair, measuring approximately 10x10 cm, which was identified as bleeding



Fig. 2. Cutis marmorata

cutaneous aplasia (Figures 3A and 3B) with apparent lack of bone tissue under the skin lesion on palpation. Anterior and posterior fontanelles could not be correctly assessed

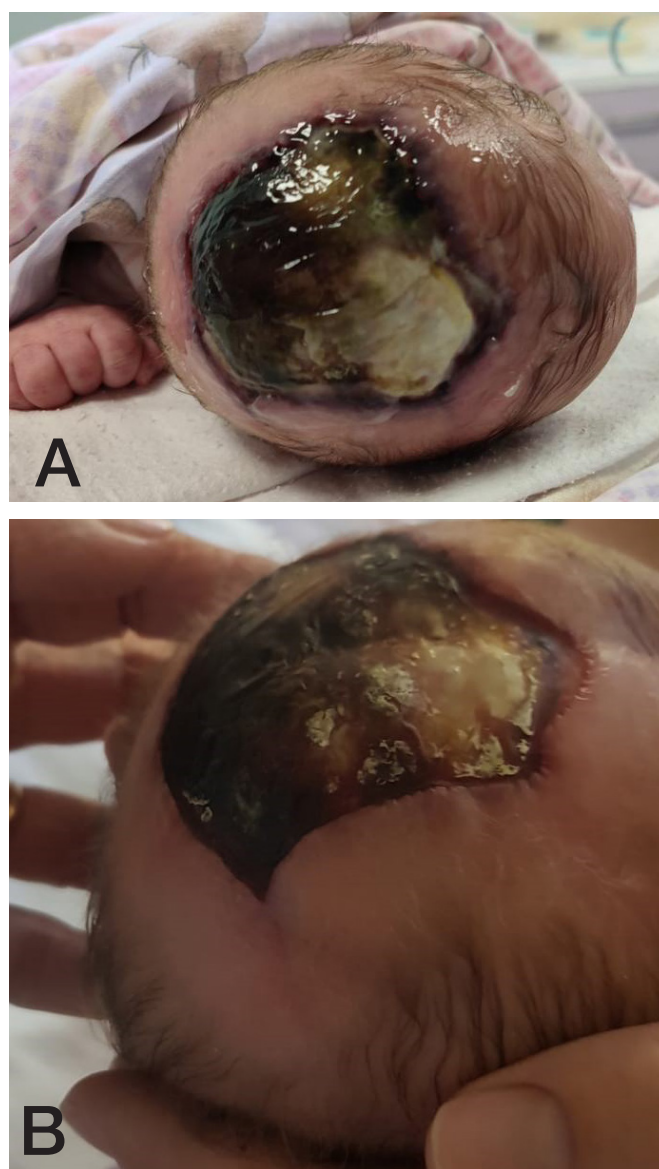


Fig. 3. A: scalp injury at birth; B: scalp injury at day 10

in this situation; otherwise, the osteo-articular system was apparently intact, all fingers present, toes with bilateral brachydactyly appearance (Figure 4), normal tone, reactivity, reflexes, and vigorous crying.

Imaging studies, including MRI and CT (Figure 5), showed extensive cranial bone aplasia, suggestive signs of in utero fractures, and venous sinus thrombosis. The CT scan revealed an old bifocal fracture with occlusion, likely occurring in utero, which was symmetrical at the level of the occipital bone. The bilateral parietal bones were absent, and multiple areas were missing in the bilateral temporal bones. The ventricular system appeared normal. Signal alterations were noted in the sagittal sinus, possibly indicating partial thrombosis with reperfusion, as well as in the falx cerebri, which could be related to an old trauma. Ad-



Fig. 4. brachydactyly



Fig. 5. CT: skull bone defect

ditionally, there were signal changes in the bilateral parietal lobes, characterized by an inhomogeneous structure that suggested an apparent absence of the integument over an area of approximately 4.5 to 5 cm, without a distinct cleavage plane separating it from the meninges.

Based on the clinical signs, there is suspicion of Adams Oliver syndrome, but the parents refuse investigations in this regard.

The treatment consisted of topical antibiotic and antiseptic therapy, along with systemic antibiotics, specifically ampicillin and ceftazidime. During the treatment, the lesion showed favorable progress (Figure 3B). On day 30, the baby was transferred to the plastic surgery department for flap reconstruction. Hair regrowth occurred in the affected area (Figure 6).

The infant wore a cranial orthosis and exhibited normal neurological development and weight gain (Figure 7).

Based on the clinical features, Adams–Oliver syndrome was suspected [5]. However, the parents declined genetic testing, which limits the certainty of the diagnosis without genetic confirmation. Congenital cutaneous aplasia is a condition present at birth that involves the partial or complete absence of skin [6]. The etiology of this syndrome is not yet well understood [7]. Several potential factors have been considered, including genetics (whether autosomal dominant, autosomal recessive, or sporadic cases) [8,9],

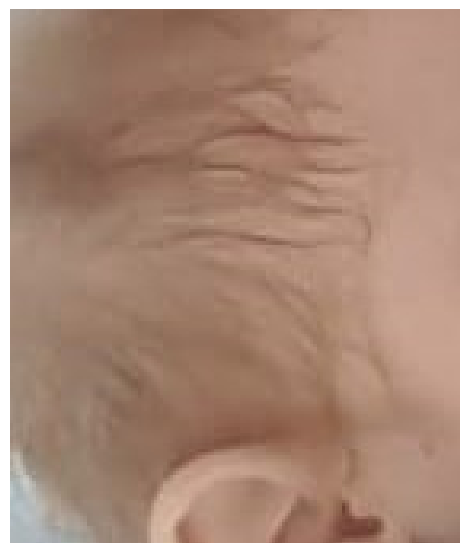


Fig. 6. Hair regrew

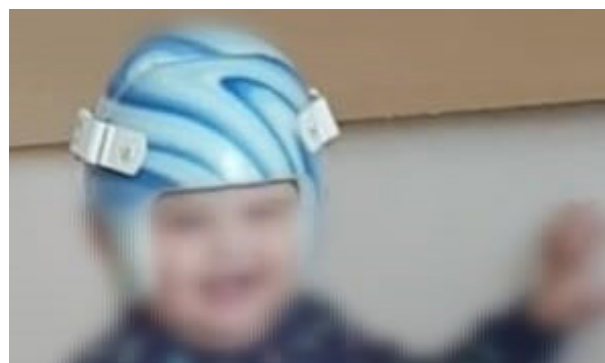


Fig. 7. Cranial Orthosis

consanguinity [5], and fetal trauma that disrupts blood circulation in various developing regions [10].

Discussion

These three clinical cases demonstrate the significant impact of maternal trauma from car accidents on perinatal outcomes and neonatal development, with a wide range of clinical manifestations, from transient neonatal complications to severe congenital malformations, and even neonatal death. All cases emphasize the importance of using seatbelts correctly during pregnancy. Incorrect use or lack of seatbelt use is associated with severe injuries to the mother and adverse outcomes for the fetus. It is essential to educate pregnant women on the proper way to wear seatbelts to minimize risks for both mothers and their newborns.

Prematurity at 36 weeks of gestation in Cases 1 and 2 resulted in different clinical outcomes. In the first case, the newborn experienced mild respiratory distress, which was successfully treated. In contrast, the second case ended in neonatal death [3] due to severe asphyxia and a delay in the initiation of resuscitation. This difference highlights the critical importance of prompt and effective neonatal resuscitation [4].

Case 3 suggests the possibility of intrauterine trauma or vascular disruptions that could have teratogenic effects. These effects may be presented as cranial aplasia, skin defects (such as aplasia cutis congenita), digital malformations, and associated neurological issues. Fetal trauma may explain the cranial injuries observed in the last case presented. Intrauterine trauma most often impacts the fetal head [11].

Immediate and effective neonatal resuscitation is critical for ensuring newborn survival and improving prognosis, especially in preterm births resulting from trauma. Comprehensive post-trauma assessment is crucial for accurately determining the newborn's condition, identifying any congenital anomalies, and formulating an effective treatment plan. It is recommended to conduct a multidisciplinary assessment, including a genetic evaluation, when malformations are identified. Long-term outcomes for infants exposed to in-utero trauma are uncertain, even with favorable early neonatal results. Late complications, like infections and neurodevelopmental disorders, highlight the need for ongoing pediatric monitoring and care [12]. Using seatbelts correctly during pregnancy is essential to prevent injuries to both the mother and the fetus [14]. Incorrect or lack of seatbelt use has been associated with severe complications, including neonatal death, risk of cerebral palsy, and birth defects [13].

Conclusion

Maternal motor vehicle accidents are a significant cause of complications in newborns. The most common effects on the fetus include premature birth, respiratory distress syndrome, head injuries, and, in severe cases, intrauterine fetal death. Properly using seatbelts during pregnancy is

essential to prevent injuries to both the mother and the fetus. Further research is necessary to understand better the ways in which trauma affects fetal development and to establish standardized protocols for the acute management of trauma during pregnancy, as well as for ongoing care.

Authors' contributions

CK - Conceptualization, Data curation, Writing – original draft;

MCC - Supervision, Validation, Visualization, Writing – review & editing

Conflict of interest

None to declare.

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Ethical statement

Ethical Committee approval number 12674/2 from 13.08.2025.

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