



G37 *In Utero* Traumatic Head Injuries During a Motor Vehicle Collision: Case-Report and Review of the Literature

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After attending this presentation, attendees will understand the importance of fetal brain injury in utero after a motor vehicle collision which can lead to hypoxia, direct impact and acceleration-deceleration injuries. A discussion of maternal restraint will also be presented.

This presentation will impact the forensic community by highlighting the possible neurologic complications associated with motor vehicle collision and the fetal brain in utero, especially in relation to acceleration-deceleration forces

Fetal brains differ from neonatal and infantile brains in development and the environment surrounding them, namely the protection offered by the amniotic fluid, uterus, and maternal abdominal wall. Head injuries inflicted during motor vehicle collision result from both direct impact and from acceleration-deceleration forces. The effects of these forces on the fetal brain and eyes are poorly described in the literature. The American College of Obstetrician and Gynecologists and the National Highway Traffic Safety Administration recommend that pregnant women use a 3-point restraint system with the lap belt positioned under the uterus based on the hypothesis that the amount of fetal head acceleration and abdominal force is significantly reduced.

A 32-week pregnant, 31-year-old Hispanic woman was the restrained front seat passenger in a mini van that was rear-ended by a full sized tractor-trailer. Following the collision she was alive but in a deep coma, tachycardiac and with a blood pressure of 119/62. She was intubated in the field and transported to the hospital. Fetal heart monitoring revealed 40 beats per minute. An emergency C-section was performed slightly more than one hour following the impact, and a 1,580 gram baby girl with Apgar scores of 0, 0 and 0 was retrieved. Examination of the uterus revealed placental abruption. Maternal injuries detected by CT included a complete torso passenger-site shoulder and lap seat-belt contusion with the lap section located on the pelvis, C4-C5 fractures with bilateral internal carotid injuries, fractured ribs, pneumo and hemothoraces, liver lacerations, fractured T3 and L1 through L5 vertebrae, retroperitoneal hematoma and acetabular fractures. The mother was pronounced dead two and a half hours after the collision. A complete postmortem examination of the stillborn female was performed including neuropathologic and ophthalmic pathologic assessment. The findings obtained at the autopsy of the stillborn, which will be presented, included the external and internal traumatic injuries, head and spinal injuries, including direct impact and acceleration- deceleration injuries to the brain, spinal cord, and eyes, grossly and microscopically. These findings will be discussed in relation to previous literature reports and the seat-belt recommendations for pregnant women.

Hypoxia, direct impact, and acceleration-deceleration forces are the usual components producing complex neuropathologic injuries. The resulting lesions depend on the age of the victim; the susceptibility of the immature brain to trauma and the resulting pattern of injuries differ between fetal, childhood and adult brains. There are few reports in the literature of traumatic fetal brain injuries resulting from motor vehicle collision, rare reports including autopsy or eye pathology findings. In addition, findings are correlated with the use of a 3-point restraint system with the lap belt positioned under the uterus as recommended.

Fetus, Brain, Traumatic