G136 Traumatic Injuries in Fatal Tire Explosions

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After attending this presentation, attendees will appreciate the patterns of injuries from tire explosions and the circumstances where fatal tire explosions can cause danger.

The presentation will impact the forensic science community by illustrating the nature and extent of explosion injuries that may result from burst tires.

Tire explosions during servicing may cause severe trauma. The severity of injury depends on the tire size, air pressure, and distance from the blast. The blast injury has been compared to that of a grenade or land mine, but without the chemical or thermal effects. Overall mortality is significant (19-29%), mostly attributed to head injuries. Two cases of truck tire blasts in which fatal injuries were sustained are reported.

Case 1: A 29-year-old male was inflating a large truck tire which was lying flat on the ground. He was leaning over the tire when it ruptured under his chest. He was projected against a garage wall four feet away with his shoulder striking the wall nine feet from the ground. He was pronounced dead at the scene.

At autopsy, there were multiple stippled abrasions and bruises on the face, trunk, and upper and lower extremities, typical of blast injury. The right arm was almost amputated. The rib cage and sternum were extensively fractured. Contusions were seen on the lungs and the left diaphragm was ruptured. The 3rd and 4th cervical vertebrae were dislocated. At the base of the skull, there was a hinge fracture with cerebellum protruding through the fracture site. The brain stem was transected in two places.

Case 2: A 28-year-old male was testing a large truck that had reports of a faulty speedometer. A jack was placed under the third axle of the vehicle and the engine was accelerated. At 40 mph, one of the rear tires exploded. The victim's proximity to the tire blast was not witnessed but he was ambulatory briefly before collapsing. In hospital, a lacerated spleen with hemoperitoneum was managed surgically. After hemodynamic stabilization, the patient suffered cardiovascular collapse. Resuscitation was not successful.

The autopsy revealed primarily left sided trauma with left elbow, left hip, and rib cage fractures. Bilateral hemothoraces were documented. The left lower lobe of the lung was contused and the left hemidiaphragm was bruised. The left ventricle epicardial surface was bruised and traumatic rupture of the anterior papillary muscle had occurred. Subsequent examination of the spleen post-splenectomy confirmed the presence of lacerations. Lacerations were seen in the left kidney with bleeding into the perinephric fat.

Conclusion: The cause of death in both cases was attributed to multiple injuries. In case one, the brain stem transection would have been immediately fatal. In case two, acute papillary muscle rupture led to cardiovascular collapse. Tire explosions show similar injuries to bomb blasts with typical blast injuries seen. Fatalities are common; however, postmortem findings are infrequently reported in the literature.

Tire, Explosion, Fatal

 ** Presenting Author*