Injury Models

Prevention of Blast-Related Injuries

This CDMRP-sponsored research project is designed to determine the cause of mTBI due to blast overpressure and, if possible, the human tolerance to blast overpressure. It consists of an experimental portion in which swine and post-mortem human subjects are exposed to blast. The experimental effort is supplemented by a computer modeling section that can extend the results of the tests to blast scenarios not easily achievable experimentally. The investigators at Wayne State University have discovered that: The porcine brain is susceptible to blast overpressure and sustains both axonal and neuronal cell body injury when the pressure is high enough (above 400 kilopascal). The measured intracranial pressure (ICP) in the swine brain is generally lower than the incident overpressure with the parietal pressures being the highest and almost equal to the incident overpressure. Preliminary data from cadaver testing revealed that the ICP is also lower than the incident overpressure, even with pressurization of the brain with artificial CSF. Computer models of the swine and human brain in response to blast have been developed. They predict an ICP larger than the incident overpressure and they are looking for mechanisms that can lower the predicted ICP to match experimental observations. This study will result in a deeper understanding of the mechanisms of blast-related TBI and potentially identify human tolerance to blast, including the peak blast overpressure as a function of standoff distance for open field blasts, important in the prevention of blast-related injuries.