Primary blast lung injury prevalence and fatal injuries from explosions: insights from postmortem computed tomographic analysis of 121 improvised explosive device fatalities.

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BACKGROUND: Primary blast lung injury (PBLI) is an acknowledged cause of death in explosive blast casualties. In contrast to vehicle occupants following an in-vehicle explosion, the injury profile, including PBLI incidence, for mounted personnel following an external explosion has yet to be as well defined.

METHODS: This retrospective study identified 146 cases of UK military personnel killed by improvised explosive devices (IEDs) between November 2007 and July 2010. With the permission of Her Majesty's Coroners, relevant postmortem computed tomography imaging was analyzed. PBLI was diagnosed by postmortem computed tomography. Injury, demographic, and relevant incident data were collected via the UK Joint Theatre Trauma Registry.

RESULTS: Autopsy results were not available for 1 of 146 cases. Of the remaining 145 IED fatalities, 24 had catastrophic injuries (disruptions), making further study impossible, leaving 121 cases; 79 were dismounted (DM), and 42 were mounted (M). PBLI was noted in 58 cases, 33 (79%) of 42 M fatalities and 25 (32%) of 79 DM fatalities ($p < 0.0001$). Rates of associated thoracic trauma were also significantly greater in the M group ($p < 0.006$ for all). Fatal head (53% vs. 23%) and thoracic trauma (23% vs. 8%) were both more common in the M group, while fatal lower extremity trauma (7% vs. 48%) was more commonly seen in DM casualties ($p < 0.0001$ for all).

CONCLUSION: Following IED strikes, mounted fatalities are primarily caused by head and chest injuries. Lower extremity trauma is the leading cause of death in dismounted fatalities. Mounted fatalities have a high incidence of PBLI, suggesting significant exposure to primary blast. This has not been reported previously. Further work is required to determine the incidence and clinical significance of this severe lung injury in explosive blast survivors. In addition, specific characteristics of the vehicles should be considered.