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Marathon bombing victims aided by rapid response, imaging of injuries

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The Boston Marathon bombing brought international attention back to the devastating effects of terrorism. There were numerous victims with severe injuries that needed immediate attention. A novel study in *Arthritis Care & Research*, a journal published by Wiley on behalf of the American College of Rheumatology (ACR), presents cases from Boston-area hospitals where victims were treated, examining the medical response and imaging technologies used to save lives and limbs.

On April 15, 2013, at approximately 2:49 p.m. two pressure-cooker bombs exploded one after the other at the Boston Marathon finish line. As a result of the bombings, there were three fatalities and 264 casualties, with the most severe injuries involving lower extremities of those located closest to the blasts. Shrapnel disbursed by the bombs included pieces of metal, nails and ball bearings. Injuries resulting from the Marathon bombing are relevant to the fields of rheumatology, rehabilitation, orthopedics and musculoskeletal imaging.

"In an era of terrorism, even clinicians serving non-military patients need to understand the spectrum of injuries caused by bomb explosions," explains lead author Dr. Ali Guermazi, Professor of Radiology at Boston University School of Medicine and one of the many specialists treating bombing victims at Boston Medical Center. "Critically ill bomb-blast patients needed quick assessments of their injuries, which had the most devastating effects to the lower limbs."

According to the Centers for Disease Control and Prevention (CDC),

bombing survivors have the highest incidence of injury to soft tissue and musculoskeletal systems with the most extreme injury being traumatic amputation, which is reported in up to 3% of cases. The CDC defines primary blast injuries as those caused by the blast wave—extremely compressed air moving away from the explosion—that can damage the lungs, bowel and ears. As the wave moves from the site of the explosion it creates a vacuum, which pulls materials and debris back toward the source of the bomb blast—the refilling of this void is known as the blast wind.

Victims from the Boston Marathon bombing were subject to blast waves and blast wind resulting in soft tissue damage (1), limb fractures (1), and amputations. The study demonstrates the systematic need to exam each extremity for musculoskeletal, neurological and vascular damage. In accordance with previous evidence, radiography (X-ray) and computed tomography (CT-scan) should be used liberally to detect foreign objects, to define basic penetration patterns, and assess bony and soft tissue injuries.

Dr. Guermazi concludes, "While blast injuries within civilian populations are rare in the U.S., when they do occur it challenges the medical community to rapidly respond to concurrent evaluation and treatment of many victims. We suggest that in urgent situations, like the Boston Marathon bombing, radiology resources be used liberally to save the lives and limbs of patients."

More information: "Imaging of Blast Injuries to the Lower Extremities Sustained in The Boston Marathon Bombing." Ali Guermazi, Daichi Hayashi, Stacy E. Smith, William Palmer and Jeffrey N. Katz. *Arthritis Care and Research*; Published Online: August 19, 2013 DOI: 10.1002/acr.22113