Paediatric blast injury: challenges and priorities

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"Every war", as the founder of Save the Children said in 1919, "is a war against children."[1] Now, as then, cities are battlefields, civilians are targets or collateral damage, and children are disproportionately killed or injured by explosive weapons.[2] During the Iraq conflict, most child casualties were caused by bombs or shells.[3] In Afghanistan, children were (and continue to be) injured in large numbers by unexploded ordnance.[4] Two-thirds of the child casualties recorded in Gaza in January, 2009, were caused by explosive weapons.[5] Currently, in Syria, a quarter of the casualties from shelling, airstrikes, and unexploded ordnance in non-state-controlled areas are children.[6] Paediatric blast injury is a huge challenge for everyone who deals with such patients—from first responders, surgeons, and physiotherapists, to medical researchers, humanitarians, and policy makers.

Data on the quality and scale of this challenge are scarce. The field lies at the intersection of three complicated disciplines: blast injury physiology, paediatric polytrauma, and humanitarian medical aid in resource-limited environments.[7–10] We know that children differ from adults in their physical and psychological response to blast injury and treatment. Evidence from a small subset of children who were treated in a well resourced facility suggests that head and facial trauma is more common in children than in adults (because they pick up unexploded ordnance rather than treading on landmines as adults do[11]), that adult protocols for transfusion do not translate into survival advantage when used in children, and that children with blast injuries are more likely than adults to die.[12] But the causative weapon, injury patterns, treatment, and fate of the vast majority of such children remain unknown, and there is no coherence around questions of blast dose response, haemorrhage control, or treatment futility.

It is a similar picture beyond the emergency room and operating theatre. We do not understand enough about pain in children with blast injuries, at point of wounding, post-operatively, and during rehabilitation. In most resource-limited environments, orthopaedic technologies remain severely underdeveloped, with no capability for the bespoke solutions required by such trauma that can also be adapted as their wearers grow. There are psychological challenges for children who, in addition to losing limbs, have lost families, homes, and prospects for education and marriage. Children with blast injuries will need to rediscover their place in their community, finding new ways to live as survivors. Good blast injury care incorporates psychosocial support as part of the casualty treatment continuum.

An injury surveillance registry, suited to the responder at whichever point they work in the resource-limited setting, would furnish much better understanding of what happens to these children. Hypothesis generation about therapeutic best practice would follow, setting the scene for prospective interventional studies. Intelligent matching of resource to need, with trend analysis, would permit better understanding of the impact of conflict and organised relief. The task will require focused, determined international cooperation, and it will be some time before blast injury researchers have access to adequate field data, although the systematic review of paediatric blast injury currently underway at Imperial College's Centre for Blast Injury Studies (London, UK) is a good start, helping to delineate more clearly gaps in knowledge and frame vital new research questions underpinning improved humanitarian response.

Of equal importance is the need to acknowledge the practical things that can and should be done right now. Much of the expertise needed for this is already available, but it needs to be channelled and focused—eg, by the creation of a commonly adopted field manual on responding to paediatric blast injury—to ensure it reaches the right patients at the right moment. We

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cannot create a new generation of paediatricians in many resource-limited environments, but we can train, equip, and empower people on the ground, from first responder to rehabilitation clinician, to better and more effectively look after children.

Above all, we already know one very important thing. At the heart of the complicated disciplinary intersections of paediatric blast injury is a child. Children are resilient. They have extraordinary potential and energy that can be channelled into activating their own recovery. Children with blast injuries need champions to help them to overcome the challenge of their injuries, to protect them, and to help them to secure their own futures.

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