Improving Decontamination Procedures: A Priority for Chemical Incident Management

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The management of the release, either accidental or deliberate, of toxic chemicals continues to be a matter of concern and debate. The HAZMAT model[1] of hot, warm, and cold zones operated by most fire and rescue services around the world assumes that the released chemical is persistent, and therefore, likely to give rise to contamination that increases the dose to those directly exposed to the release as well as increasing the risk of secondary harm from transmission of the hazard to emergency responders and those further away, such as hospital emergency department personnel.

Decontamination of those exposed to a persistent chemical agent is a fundamental stage in the management of any chemical incident. However, since decontamination is a time-consuming process, there are immediate problems both in terms of the capabilities available and the potential delays that the decontamination process causes to providing emergency medical care. The latter problem has been addressed by putting protected medical teams into the warm zone to provide essential life support before and during decontamination.[2,3] However the potential delays in decontamination for a large number of persons remain. Given that this increases the potential exposure dose from a toxic agent, efforts are required to reduce the time of decontamination and to increase its effectiveness.

In their article in the current issue, Amlôt and colleagues[4] have demonstrated in an elegant scientific study that substantial improvements to a standard decontamination procedure can be achieved using simple measures. Employing modern whole-body fluorescence imaging, the authors have shown that the effectiveness of a simple showering decontamination technique can be significantly improved by the use of a washcloth. As expected, any procedure involving showering of an individual will result in significant removal of a fluorescent tracer from the skin surface. However, apparently logical modifications such as providing pictorial washing instructions or increasing shower duration did not result in a measurable improvement in decontamination efficiency. Since doubling of the showering duration demonstrated no significant improvement, it is conceivable that there actually may be scope for decreasing shower duration during decontamination. This is an important observation, since reducing showering time could enhance the throughput for mass-casualty decontamination units

Concerning their technique, the authors note that it can be stated with some confidence that the use of fluorescent tracers can facilitate an objective and quantitative evaluation of generic improvements to current decontamination procedures. However, further laboratory studies are required to confirm the use of fluorophore and other simulants as effective models for chemical, biological, and radiological hazards.

Amlot and colleagues have illustrated well the effectiveness of apparently simple gestures in improving decontamination, together with the value of performing well-designed, controlled, volunteer studies and a modern assessment technique to optimize existing decontamination procedures. Until recently, decontamination procedures have been largely empirical with little scientific backing. There is a further need to review the position of decontamination in

standard HAZMAT protocols and how these affect patient care. In the absence of clear identification of the released risk, the only safe pathway is to assume that the chemical released is both highly toxic and persistent. However, given that a large number of toxic industrial chemicals are not persistent, there may be a risk of automatically providing decontamination where it is not required. Along with this uncertainty is the question of the level of personal protective equipment worn by medical responders, which is appropriate to the release that allows freedom to provide essential medical care. This has been the subject of previous comment.[5] These issues illustrate the need to refine our current stance on the management of chemical releases using measures that are appropriate to the degree of risk. This will involve considerable development of detection, identification, and monitoring procedures used in conjunction with the provision of appropriate life support and other therapy.

The problem of decontamination has been highlighted in the emergency departments that may have to receive casualties who have been incompletely decontaminated at the release site or who have escaped through the cordon without being decontaminated.[6] In a mass-exposure incident, there is a possibility that hospitals may be overwhelmed. Thus, any procedures that can improve decontamination and the time it takes to be effective are welcome.

It is to be hoped that further studies of the type reported by Amlot and colleagues, will investigate all aspects of decontamination further to confirm the validity of current protocols and to evaluate new procedures, particularly in the use of active rather than passive gestures.

References

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