

May 17, 2011

Demystifying radiation disaster preparedness

A hospital can prepare for a radiation disaster with relative ease. It doesn't take an immense effort or scads of cash for fancy machines, just common sense and a good plan. Yet, according to disaster preparedness experts, few Canadian hospitals have made this modest effort (www.cmaj.ca/cgi/doi/10.1503/cmaj.109-3890).

"There is nothing mysterious about radiation illness," says Dr. Albert Wiley, director of the Radiation Emergency Assistance Center/Training Site (REAC/TS), funded by the US Department of Energy and located in Oak Ridge, Tennessee.

"You diagnose and treat the organ system. The medicines we use are the same medicines we always use, and we use the same diagnostic tools. Yes, there may be a few exotic tests and drugs, but mostly they're what we normally use. The biggest confounder with emergency department staff is that they don't know how to keep their priorities in the presence of radiation."

Many emergency department staff feel unprepared to handle anything involving radiation, says Wiley. But it only takes a few days to ease the worries of people who receive training from REAC/TS (which include many Canadian doctors and nurses because of a lack of ongoing training in Canada).

It is important to demystify radiation, says Wiley. "We take the mystery out of radiation and teach them to practise the same good medicine they would for any other type of event."

Medical staff who receive training sometimes expect radiation experts to pull out exotic devices or medicines. But many emergency departments already have all the materials they need. For instance, the materials needed to decontaminate a patient consist of little more than water, soap and shampoo. The steps needed to decontaminate a patient are also quite basic, though sometimes medical professionals are unaware of them.

"In emergency rooms, patients might be cut out of their clothes but left lying on top of them," says Steve Sugarman, health physics project manager for REAC/TS. "If you get rid of the clothes, you get rid of 90% of the contamination."

One common concern among medical providers is that they will suffer harm themselves from treating patients contaminated by radiation. But with some rudimentary knowledge, including knowing the difference between radiation exposure and contamination (radioactive materials still on body), and basic precautions, such as wearing personal protective equipment if necessary, medical staff can treat radiated patients without worry of personal harm. Even if they become contaminated, medical staff can be decontaminated in the same manner as patients: by discarding their clothing and showering.

"We haven't seen it documented that a caregiver has received a medically significant dose of radiation from treating a patient," Sugarman says, adding that "radiation is very easy to detect. If you can see it, you can control it and protect yourself from it."

In the event of a large-scale radiation emergency, hospitals will need a plan to handle the surge of patients without contaminating staff and facilities. That plan should consist of a few basic steps, says Dr. Carl Jarvis, an emergency physician and director of disaster planning at the Queen Elizabeth II Health Sciences Centre in Halifax, Nova Scotia.

First, a hospital must control access to its emergency department, limiting it to one or two entry points so that contaminated patients aren't admitted in an uncontrolled manner. Before entering the hospital, the people involved in a radiation incident should be screened using a Geiger counter to determine who is contaminated. Those found to be contaminated must then be decontaminated. Ideally, this would take place outside, such as in showers located in the ambulance bay.

If patients are stable, they should be decontaminated before being admitted to receive medical care. If unstable and requiring immediate, life-saving care, a patient should be brought into an emergency department in a controlled fashion and isolated from other patients. Once stabilized, the patient should immediately be decontaminated.

"If you don't have basic knowledge you might not bring that patient into the emergency department, or the other suboptimal response would be to bring the casualty in and allow staff to be contaminated," says Jarvis. "With some basic knowledge and training, you can handle these patients safely in a way that doesn't cause delay."

One particularly scary scenario that a plan could do little to address would be if a large number of people were exposed to radiation from an unknown source rather than an acute event. "Say there was an open source of radiation on a subway car. A lot of people might get sick, but you can't see the radiation or taste it or see the effects of it," says Dr. Nelson Chao, professor of medicine and immunology at Duke University in Durham, North Carolina, and a founding member of the Radiation Injury Treatment Network. "A lot of people would end up being radiated before anyone figured out what was happening."

Knowing what to do in a disaster scenario, however, is no mystery. There are plenty of educational materials available to hospitals to prepare them for radiation emergencies and other types of disasters, says Dr. Daniel Kollek, executive director of the Dundas, Ontario-based Centre for Excellence in Emergency Preparedness, which has developed information in this area. The problem is lack of support from government to spread that information.

"We don't have the ability to disseminate this information," says Kollek. "We are doing this from our desks in our free time." — Roger Collier, *CMAJ*

DOI:10.1503/cmaj.109-3891