EXPERIENCES WITH RADIATION INJURIES REQUIRING MEDICAL MANAGEMENT IN JAPAN

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We who provide medical care in Japan have encountered three types of radiation injuries: occupational radiation injuries; injuries from radiation therapy; injuries caused by nuclear weapons or tests.

Large nuclear energy facilities, such as power stations, have full-time medical staff trained in the medical management of exposed and injured individuals. However, there are few opportunities for the staff to use their training. The Chernobyl experience was an extreme and special case. On the other hand, radiographic gamma sources, analytical x-ray equipment, and other radiation generators are often used in medium-sized or small facilities, and overexposure requiring medical management may be more likely. In treating injuries from such facilities, a general practitioner may have the responsibility for early management. However, these physicians usually have not had prior contact with the management of the facility. In Japan, distribution of large nuclear power stations is geographically limited, but many medium and small facilities that use radiation equipment are located all over the country.

Early medical management of accidental overexposure of the skin is essential. Based on experience, I believe that a knowledge of medical management of the early stage of radiation skin injury is the minimum requirement for general practitioners.

GUIDELINES

Guidelines on treatment in the early stage of radiation skin injuries are as follows: (1) absolute immobilization of irradiated part; (2) protection against all types of stimuli ie, chemical, physical, mechanical, biological; (3) application of mild ointment such as simple oleaginous ointment; (4) frequent and careful clinical observation; and (5) detailed instruction for the patient and family.

Two problems in treating accidental radiation skin injury are the difficulty of knowing the precise dose of radiation, especially that caused by analytical x-ray equipment, and in some cases the longer-than-expected latent period. The quality of medical management during the latent period greatly influences the prognosis. I will show the stages of injury and recovery in two patients who suffered inadvertent radiation skin injuries due to overexposure to analytical x-ray

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equipment. The first patient (Figure 1) received 15 Gy (1,500 rad) of x-ray. The latent period was unexpectedly long in this patient. The second patient (Figure 2) received 300 Gy (30,000 rad) of x-ray.

The first step in the medical management of injuries due to overexposure is to understand that although such injuries may be infrequent, they will occur. The second step is to select the most probable and the most serious types of injuries. In the third step, we prepare instructions concerning remedial action for these types of injuries. The fourth step is to provide education and training on the basis of the prepared instructions. We also provide instructions for other types of injuries and educate and train personnel treating this type of patient. All of these steps should be accomplished with cooperation between medical personnel and those in other professions, such as general or radiation safety. This process can be effective in preparing for radiation injuries.

Radiation emergency experts also should have contact with general emergency personnel who treat other types of injuries, that is, traumatic injuries and injuries from chemicals or fire. Because radiation injuries are rare, there are few opportunities to carry out radiation emergency protocols. Therefore, close contact with the personnel treating conventional injuries is indispensable to prevent atrophy and disuse of the radiation emergency program.

The last point of my presentation is that information obtained in routine health examinations and medical service is the basis for emergency procedures. Information about health before injury is essential for medical management of the injured. In fact, we believe it is impossible to carry out medical management of those injured by radiation without having a baseline acquired by routine health examinations and services, which makes possible accurate evaluation of recovery after injury.