

## Panel Discussion

### Some Problems on the Safe Handling of Radiation in Hospitals and Clinics

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According to our inspectoral results, it was often found that the procedures in handling, storing and disposing of radioactive materials were inadequate in hospitals and clinics, when compared with other organizations.

Especially radiation control systems should be established, in order to ensure that its respon-

sibility is definitely, between a person in charge of radiation handling and other staff concerned. Furthermore, it is necessary that effective instruction and training should be given to all members of radiation works for safe handling of the radiation.

#### Regulation and Safe Handling of Radiopharmaceuticals from the Standpoint of Users

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It is very important to have an adequate national regulation for safe handling of radioactive isotopes in hospitals. However, if this regulation is not suitable for the present status, it brings us a tremendous amount of trouble, and otherwise nothing. Indeed, currently enforced regulation does not seem to be feasible from the practical standpoint in some aspects. I, even as one of the users, can understand the necessity of ventilation system for the laboratory air and of reservoir for the radioactive liquid waste.

According to Administrative Instruction, however, 1/100 of the amount of radioactive materials used is said to be the factor of evaporation.

In case of in vivo test, radiopharmaceuticals are usually withdrawn from air-tight vials by the syringes, resulting in a minimum exposure time. Patients are usually out of the controlled room while they are waiting for the test. My experiment shows that 15 % of the dose injected is left in the syringes at most. Furthermore, evaporation test for the solutions of  $^{131}\text{I}$ -hippuran and  $^{67}\text{Ga}$ -citrate in test tubes and also for the syringe used for injection

showed the factor to be less than 4/1000. Assuming that 10 % of the injected dose is left in the syringe, now evaporation factor as a total becomes 4/10000 ( $= 4/1,000 \times 1/10$ ) of the dose used.

According to the current regulation, the value of concentration for  $^{131}\text{I}$  permissible to be drained to the public sewer seems to be rather strict. Based on the data answered from each hospital to the questionnaire sent by us (Dr. Machida and I), the total dose of  $^{131}\text{I}$  used for a period of one month was divided by the total volume of the water used in each hospital. Subsequently, it was found that the concentration of  $^{131}\text{I}$  after dilution with the total volume of the water became one figure less in comparison with the value of the above-mentioned regulation in 27 out of 29 hospitals. In view of the fact that  $^{99\text{m}}\text{Tc}$  is the nuclide being used most frequently in many hospitals, it is easily imagined that even small-scale reservoir system (including dilution system) will be satisfactory for the sake of safe handling of radiopharmaceuticals in most of the hospitals.

In Japan, there are tremendous confusions for