Letter to the Editor

Steam Leak Accident at Nuclear Power Plant in Japan

To the Editor;

On 9th August 2004, the fifty-ninth memorial day of the atomic bombing of Nagasaki, four workers were killed and seven others injured in Mihama, Fukui Prefecture, when high-temperature steam leaked from the No. 3 Reactor at the nuclear plant there. This was Japan's first nuclear plant accident and the first time that an emergency reactor core cooling system had to be activated in this country. Although no radiation leaked outside the facility in the course of this accident, we have now reconfirmed the importance of the preparation for unexpected radiation emergencies, not only for nuclear workers but also for the general population.

After the experience of the nuclear fission accident in the uranium processing facility at the Tokaimura Nuclear Complex in 2000 [1], intense discussion regarding effective prevention of nuclear accidents has taken place in Japan. Further, discussion has included what should be done in case an accident takes place regardless of those preventive measures. Besides prompt action to treat acute radiation syndrome in nuclear workers, the need for iodine prophylaxis in the general population, especially for young children, based on the results of the Chernobyl epidemiological study, is emphasized [2, 3]. According to the efforts of a special commission of the Nuclear Safe Research Association (under the supervision of the Japanese Government) on iodine prophylaxis, a protocol for radiation emergency treatment in Japan has now been established [4]. Under this protocol, 76 mg of iodide should be given to individuals up to forty years old, and pharmaceutical potassium iodine bulk material (powder) can be dissolved in water and the appropriate amount of syrup added at the time of administration to safeguard newborns and infants from the effects of radioactive iodine fallout immediately after an accident.

However, we should assume unexpected or unwise actions of the population during iodine prophylaxis, e.g. overdosing on iodine. Radiophobia may influence such inappropriate intentional intakes of high doses of

iodine. In order to alleviate this problem, we reviewed the thyroid function of patients with skin diseases (erythema nodosum, livedo racemosa and erythema exudativum multiforme), who have been treated with large amounts of potassium iodide (200–900 mg/day). We found that although they excrete quite a large amount of iodine in their urine, their thyroid functions are almost normal. This suggests a single overdosed administration of potassium iodide does not have an adverse effect on thyroid function, at least in adults.

Further evaluation, such as the development of new drug designs for potassium iodine, especially for newborns/infants and young children, is needed for more prompt and effective protection during the release of radioactive iodine. The recent accident in Mihama, although no radiation accident, clearly demonstrates that the Japanese Government should take leadership in preparation for such radiation emergencies. This is not only for maintaining the mechanical safety of the nuclear power plants themselves but for the practical protection of public health in case of a nuclear accident, especially that of the most susceptible population: newborns to young children.

References

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