Title: **Organ dose reconstruction for the Fukushima emergency workers in J-EPISODE**

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BACKGROUND: As a project of J-EPISODE, a cohort of about 80,000 Japanese nuclear workers, we have been tracking their deaths and cancer incidence. Most of the nuclear workers in J-EPISODE have worked at nuclear power plants, and about 4,000 nuclear workers were also engaged in the emergency work at the Fukushima Daiichi nuclear power plant (FDNPP). As a part of J-EPIDODE, we will analyze radiation risks in terms of organ dose, and therefore, it is necessary to develop a method to reconstruct organ dose properly from emergency work dose.

MATERIALS AND METHODS: A literature review of previous studies was conducted, and a questionnaire was sent to Tokyo Electric Power Company Holdings. The annual emergency work doses assessed by the employers were divided into external and internal doses using the personal radiation control records. ^{131}I, ^{134}Cs and ^{137}Cs were considered for internal exposure. Here, we assumed that the intake of radionuclides was proportional to the air concentration of radionuclides on the day the work started.

RESULTS: We developed the method to reconstruct organ dose from emergency work dose, and found that the average committed equivalent dose to the thyroid was high at 304.4 mSv in March 2011. In contrast, the committed equivalent doses to the colon, lungs, and red bone marrow were below 1 mSv, which were almost negligible.

DISCUSSION: There was a large uncertainty in the organ doses evaluated with the method developed in this study, due to difficulties in dosimetry for emergency work, such as, 1) the shortage of personal dosimeters due to the tsunami caused by the Great East Japan Earthquake, 2) the unavailability of the personal dose for those staying in the seismically isolated building, and 3) the delays in WBC measurements. In this context, we made several assumptions and there were several limitations for evaluation. For instance, the use of acute intake scenario led overestimation of the committed effective dose and the unavailability of ^{132}Te data led underestimation. An organ dose reconstruction method has been developed, however, various uncertainties associated with the lack of information need to be further investigated for an accurate risk assessment.

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