

Summary

Influence of the Radioactive Strontium (^{89}Sr) Using for Nuclear Medical Radiation Therapy Upon Radioactive Draining-Water System

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Purpose Strontium-89 chloride (^{89}Sr) is a new radiopharmaceutical that provides effective pain relief for metastatic bone lesions, and is expected to be available soon in the palliative management for metastatic bone pain in Japan. Because of relatively long physical half life (50.5 days), ^{89}Sr may affect to the radioactive draining-water system by exceeding the limits of activity concentration for radioactive drain. In this article, the influence of ^{89}Sr use on the radioactive drainage system was simulated.

Methods The standard tank capacity of drainage and draining frequency was determined from the results of questionnaire carried out for the nationwide medical and research institutes where radioisotope treatment are performed. On the assumption that ^{89}Sr of 148 MBq for one therapy was used twice a week and several common radionuclides were used as the same activity as used at Chiba Cancer Center, the influence of ^{89}Sr was estimated. The calculation was performed

using the activity contamination ratio into the draining-water system of each radionuclide of 0.01, which was legally determined.

Results The simulation revealed that the sum of the contamination ratios of individual radionuclides exceeded a legal value of 1.0 in standard drainage with the capacity of 5 m³ and 10 m³ and draining frequency of 7 times per year. The actual contamination ratios of common radiopharmaceuticals measured at Chiba Cancer Center ranged from 1/100 to 1/1000 of the legal values.

Conclusion It is necessary that the legal value of activity contamination ratios into the draining-water system should be reassessed before starting ^{89}Sr therapy.

Key words: $^{89}\text{SrCl}_2$, Bone metastases, Radioactive drainage, Controlled limitation of activity concentration for radioactive drain, Contamination ratio into draining-water system.