

Radiation levels of patients with metastatic castration-resistant prostate cancer treated with ^{177}Lu -PSMA-617



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BACKGROUND

^{177}Lu -PSMA-617 has been demonstrated to be an effective radiopharmaceutical for the treatment of metastatic castration-resistant prostate cancer (mCRPC). This study aimed to investigate the levels of external radiation and urine activity of patients undergoing ^{177}Lu -PSMA-617 therapy, and to provide reference data for developing guidelines of radiation protection and patient release in the future in China.

METHOD

An average of 7.34 ± 0.36 GBq of ^{177}Lu -PSMA-617 was administered. The ambient dose equivalent rates of 14 patients were monitored with gamma dose rate survey meter (AT 1123, ATOMEX®). Six points from the body surfaces at 1 m distance were selected at time points of 0 h, 1 h, 2 h, 4 h, 6 h, and 24 h after the administration.



Fig.2 Urine activity measurement

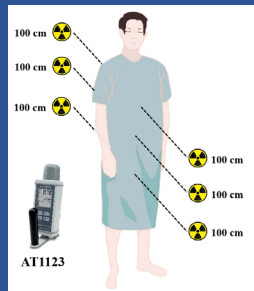


Fig.1 Illustration of dose rate survey points

The activity of ^{177}Lu in urine of administrated patients was measured with a calibrated activity meter (CRC®-25R, CAPINTEC) after each time of urine excretion.

RESULTS

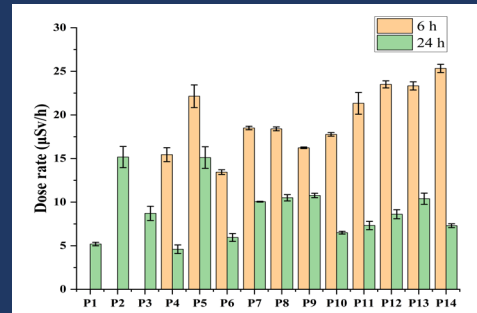


Fig.3 Averaged dose rates at 1 m from the body surface

In 6h after the administration, the administrated activity of ^{177}Lu excreted through the urine ranged from 10.5% to 48.7%, with a median value of 25% among the 14 patients. Nevertheless, the excretion fraction was found to be only 0.4% in the 2 monitored patients after 48 h of administration.

CONCLUSION

Our preliminary measurements indicated that the averaged dose rates at 1 m are generally lower than 20 $\mu\text{Sv/h}$ and 10 $\mu\text{Sv/h}$ after 6 h and 24 h of administration. The activity of ^{177}Lu in the urine and the dose rates are high after 24 h and varies greatly among patients. More data are desired for developing the measures of radiation protection and discharge guidelines in the future.

The averaged dose rates ranged from 13.4 $\mu\text{Sv/h}$ to 25.3 $\mu\text{Sv/h}$, with an average of (19.6 ± 3.8) $\mu\text{Sv/h}$ after 6 h of administration, and the averaged dose rates decreased and ranged from 4.6 $\mu\text{Sv/h}$ to 15.2 $\mu\text{Sv/h}$, with an average of (8.8 ± 3.3) $\mu\text{Sv/h}$ after 24 h.

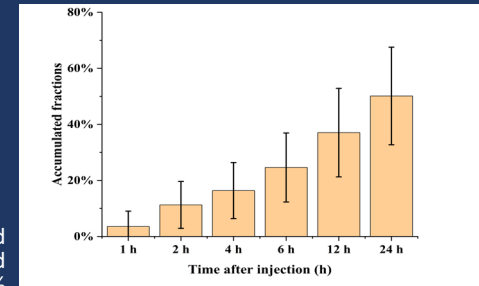


Fig.4 Accumulated fractions of ^{177}Lu activity excreted through the urine in different time after injection

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