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Radioactivity in drained body cavity fluid following peptide receptor radionuclide therapy with 177Lu DOTATATE in patients with advanced neuroendocrine tumors

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BACKGROUND

Peptide receptor radionuclide therapy (PRRT) is an established therapy option for patients with advanced and metastatic neuroendocrine tumors (NETs) with proven efficacy both early and later in the course of the malignancy. The only FDA approved PRRT currently is ^{177}Lu DOTATATE (Lutathera). Body cavity fluid collections, especially ascites, frequently occur in patients with advanced NETs and drainage is often required. Little is known about radioactivity in drained body cavity fluid collections following PRRT.

METHODS

Patients with NETs undergoing therapeutic or diagnostic drainage procedures for symptomatic body cavity fluid collections in the days immediately following PRRT were identified using the institution's electronic medical record. The radioactivity in the drained body cavity fluid was measured using a Capintec dose calibrator.

RESULTS

Four patients, all with small bowel NETs, were included in the analysis. In three cases peritoneal fluid/ascites was tested and in one patient, pleural effusion. Three patients had fluid cytology assessment, and one had positive cytology with malignant cells present. The median time from PRRT administration to fluid drainage was 1 day (range: 0-3). The radioactivity detected in the fluid is detailed in the table.

Table

Patient (fluid type)	Total volume drained/ volume sampled (mL)	Activity in sample (µCi)	Total calculated activity (µCi)
1 (ascites)	4200/88	31.2	1489
2 (ascites)	4500/50	5.5	495
3 (pleural)	500/40	11.2	140
4 (ascites)	7400/58	74.6	9517

CONCLUSIONS

Body cavity fluid collections are common among patients with advanced NETs. The detected radioactivity in drained body cavity fluid following PRRT does not represent a significant exposure hazard, but radiation protection practices should be followed when handling radioactive bodily fluids. When handling radioactive bodily fluids, standard precautions are sufficient to protect yourself from contamination. To protect yourself from external radiation exposure radiation protection practices such as minimize your time around, increase your distance from, and potentially shield the radioactive material.

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