Characterization of peripheral blood lymphocyte subsets in patients receiving radionuclide therapy [Abstract]

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P1143

Characterization of peripheral blood lymphocyte subsets in patients receiving radionuclide therapy

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Introduction: Internal radionuclide therapy (RNT) has been established as treatment option for several tumor entities such as prostate or thyroid carcinoma. Its mode of action consists of a direct radiation effect but also seems to comprise an indirect, immune-stimulatory effect. The latter, however, has mostly been investigated in patients receiving percutaneous radiotherapy or in animal models. Particularly regarding an upcoming increase in combinatory therapies using RNT

with immunotherapies such as checkpoint-inhibitors (CPI) a deeper understanding of immunological aspects of RNT is highly relevant. The aim of the presented small case series was to generate preliminary data regarding alterations of peripheral blood lymphocyte and a variety of subsets before and after RNT.
Methods: Blood of four patients (two with thyroid cancer and two with prostate cancer) who were scheduled for RNT at the Department of Nuclear Medicine at University Medical Center Augsburg was drawn prior to and 24h, 48h and 3-7 days after RNT. Samples were analyzed within 24h using extensive flow cytometry for detection of total lymphocytes, B cells, CD4+ T cells, CD8+ T cells, NK cells and about 40 subsets as previously described.
Results: Thyroid cancer patients consisted of one 58-year-old woman and one 84-year-old man who were treated with radioiodine therapy (3.7 and 5.6 GBq iodine-131 respectively) after thyroidectomy. Patients with prostate cancer were 71 and 82 years old and received PSMA-targeted radioligand therapy after several previous treatment lines (7.5 and 7.4 GBq Lu-177). Analyses of peripheral blood lymphocytes revealed stable values of cytotoxic (CD8+) T cells and T helper (CD4+) cells. B cells tended to decrease 48h after RNT. For NK cells, no trend could be observed.
Conclusion: Our preliminary data suggest that RNT has no impact on circulating T cells, while B cells might decline after this kind of therapy. This would be concordant with prior findings of our study group, reporting a decline of B cells but not T cells nor NK cells after chemotherapy. Additionally, these results suggest that cytotoxic T cells as crucial effectors of CPI therapy are not affected by RNT. To further address these questions, we are planning to extend these analyses to a lager cohort of patients and correlation with dose, especially if RNT is repeated.

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