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Intra-arterial Administration of PRRT in Patients with Advanced Meningioma

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Aim/Introduction: Peptide Receptor Radionuclide Therapy (PRRT) is a treatment option in advanced WHO CNS grade 1 and 2 meningioma. Recently, intra-arterial application of the radiolabelled somatostatin receptor agonist has been introduced as an alternative to standard intravenous procedures. In this study, we evaluated the safety, achievable tumor doses as well as efficacy of intra-arterial PRRT in patients with progressive

meningioma. **Materials and Methods:** Eight patients (5 female, mean age, 70 ± 13 years) with advanced progressive meningioma underwent intra-arterial PRRT (median, 3 cycles; range, 1-4) using [^{177}Lu]Lu-DOTA-TATE (mean activity per cycle, 7436 ± 77 MBq). Safety of PRRT was assessed according to Common Terminology Criteria for Adverse Events (CTCAE) v5.0. During the first treatment cycle, dosimetry including whole-body scans (0.5, 4, 24, 46-48 and 90-120 h p.i.) and single photon emission computed tomography/computed tomography (SPECT/CT; 4 and 46-48 h p.i.) was performed to estimate achieved tumor doses. Four to twelve weeks after the second treatment cycle, early treatment response was evaluated using somatostatin receptor-directed positron emission tomography/CT and magnetic resonance imaging. **Results:** Treatment was well tolerated by all individuals with no acute adverse events. One patient died of treatment-unrelated complications four weeks after the first treatment cycle before follow-up imaging. In the remaining seven patients, no grade 3 or higher toxicity according to CTCAE v5.0 was observed. Mean achievable meningioma doses were 2.05 (range, 0.25-12.6) Gy/GBq administered activity, resulting in a maximum per cycle tumor dose of 91.2 Gy. At first follow-up, all subjects presented with disease stabilization. **Conclusion:** Intra-arterial PRRT of meningioma is feasible and safe. It might result in favorable tumor doses as compared to standard intravenous therapy. Further research to corroborate these initial findings as well as to investigate long-term treatment outcome is highly warranted.