The use of PRRT in neuroendocrine tumours

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In the past two decades a new approach to neuroendocrine tumors based on specific receptor targeting was introduced in the clinical practice. Peptide receptor radionuclide therapy (PRRT) consists in the systemic administration of a synthetic analogue, radiolabelled with a suitable beta-emitting radionuclide. These compounds are able to irradiate tumors and their metastases via the internalization through a specific receptor subtype, generally over-expressed on the cell membrane. Pre-clinical studies have indicated many potential receptor candidates for PRRT. To date, the mostly exploited system is the somatostatin-somatostatin receptor. PRRT can deliver radiation doses to tumors, which are adequate to achieve significant volume reduction.

Treatment with radiolabelled somatostatin analogues, such as [^{90}Y-DOTA^{0},Tyr^{3}]-octreotide and [^{177}Lu-DOTA^{0},Tyr^{3}]-octreotate, is an efficient new tool in the management of patients with inoperable or metastasized gastro-entero-pancreatic (GEP) neuroendocrine tumors. Clinical trials performed in several countries, despite different phase I-II protocols, thus not specifically addressing efficacy, showed complete and partial responses in 10 to 30% of patients for [^{90}Y-DOTA^{0},Tyr^{3}]-octreotide. In the clinical trial with [^{177}Lu-DOTA^{0},Tyr^{3}]-octreotate, 47% overall response rate was observed, with a median time to progression of >36 months and a significant impact on survival. Significant biochemical and symptomatic responses in functioning tumors were encountered for both radiopeptides. Toxicity, requiring renal-protective agents, is generally mild and may involve kidneys and bone marrow. These data indicate that PRRT is a convincing alternative in the treatment scenario of GEP tumors.

Newer strategies to increase the therapeutic potential of PRRT, such as the combination with radiosensitizing chemotherapy or biomolecular targeted agents, are presently under investigation.

Further Reading

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