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Opinion

Radioiodine-Valuable Addition to Therapy of Glioblastoma Muliforme

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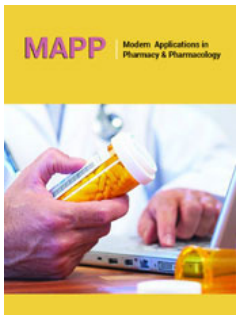

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Opinion

I would like to present a new hypothetical method of treating Glioblastoma Multiforme (GM), which has hitherto been used as a standard in neurosurgery, chemotherapy and radiotherapy. Is it possible to treat GM with Radioiodine Thyroid (RIT) alone without using the sodium iodide symporter (NIS) gene? After all, the NIS has been detected not only in the thyroid but also in various cancers [1-8].

The administration of RIT is completely harmless and hypothyroidism may, depending on the dose, be the only complication. Indeed, it has recently been shown that, in the case of thyroid cancer, for example, the maximum dose of RIT is 37,000MBq (1,000mCi) [9,10]. Is it worth using the ablative dose of 740MBq (20mCi) of RIT to treat GM in outpatient conditions, with the possibility of repeating it? What advantages can this have? After all, GM patients live a very short time. Yet the NIS gene expression has been observed in GM, albeit only in animals. Thus, it may be better to start applying RIT now. As early as 1955, Amyes et al. [11] localised brain tumours using radioactive iodine and phosphorus. In this procedure, a needle probe was used for the first time, which proved to be very useful in quickly locating and defining the affected area. Radioactive isotopes of various elements are increasingly used in nuclear medicine. Radioisotopes of various elements are increasingly used in nuclear particles. This is where beta rays can be effective, in addition to imaging. Currently, an experimental NIS gene is used, but I have very little time and maybe RIT should be used to treat GM as soon as possible, but in a dose ranging from 740MBq (2mCi) to as much as 5,550MBq (150mCi), for example. However, it has been proven that thyroid tumours accumulate up to 37,000MBq (1,000mCi) of RIT [12,13]. This further proves that the use of RIT does not have adverse effects and may only lead to hypothyroidism. It is also worth remembering that the activity of radioiodine used in the treatment of a hyperactive multinodular goitre is 150-200μCi/g of thyroid tissue, calculated based on the following formula: (thyroid weight (g)x150-200μCix1/T24 iodine intake after 24 hours). RIT can be used in higher doses ranging from 370MBq (10mCi) to 740MBq (20mCi) in outpatient conditions, for example, in Grave's disease and hyperfunctioning nodular goitre [14,15].

It is not always possible to remove a general grade IV GM. Therefore, in accordance with the current state of knowledge, standard therapy is applied including neurosurgery [16], classical radiotherapy [17,18], modulated electrohyperthermia (mEHT) [19], chemotherapy (e.g., temozolomide) [20] and humanised monoclonal antibody (e.g., pembrolizumab) [21-23]. Perhaps it is worth trying RIT? Attention has also been paid to targeted therapy that uses tyrosine kinase inhibitors (imatinib, sunitinib and sorafenib) [24-28], as well as the latest drugs, such as crizotinib, entrectinib or larotrectinib [29,30]. NanoTherm® therapy is also used in GM patients who have exhausted conventional treatment methods [31]. Recently,

Individualised Multimodal Immunotherapy (IMI) has been developed based on cancer vaccines [32-42] and oncolytic viruses [14,43,44]. It may be worth applying non-virological therapy in the form of RIT, even without genetic aspects, as was the case before. Over 60 years ago, Amyeset et al. [11] determined the location of brain tumours (in rats) using radioactive iodine and phosphorus. It may be worth revolutionising the current therapy and using RIT to treat GM. Very importantly, this therapy can be completely free, and even if there is a charge, it does not have to be very high. Hypothyroidism is the only side effect. Patients, however, may gain a new life having been freed from GM.

Similarly, Hermida et al. [45] and Gursoy et al. [46] write that RIT has been used in patients with amiodarone-induced thyrotoxicosis (AIT) with very low uptake (RAIU) [47,48]. However, the authors used very high radioiodine activities {up to 2960MBq (80mCi 131I)}, which are not routinely used in the treatment of hyperthyroidism. None of the patients after RIT therapy had any adverse effects during AIT; only hypothyroidism occurred [47,48].In the case of AIT, Antithyroid Drugs (ATDs), including thiouracill thionamide derivatives {PTU, propylthiouracil (Thyrosan [Sun-Farm])} and imidazole [MMI, thiamazole, Metizol (INC Polfa-Rzeszów)], were followed by angranulocytosis, hepatitis or vasculitis and lupus-like syndrome [49-51]. At that time, it was necessary to use RIT as the authors believed that the use of RIT in individual GM therapy might successfully complement other therapies [47,48,50]. This therapy can play a very important role in the case of GM relapse. Although there are no current human experiments, positive results have been obtained in Wistar rats [52] and mice [5] (for a combination of the NIS gene and RIT).The authors believe that administering RIT as soon as possible to GM patients who have had another relapse will provide a completely different perspective in non-genetically modified therap.

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