Opinion
Volume 13:12, 2022

Journal of
Nuclear Medicine & Radiation Therapy

ISSN: 2155-9619 Open Access

Treatment Advances in Radioactive Iodine-Resistant Thyroid Cancer

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Introduction

Until recently, there were few treatment options for iodine-resistant cancers, which cause the majority of thyroid-related deaths. However, the development of numerous novel therapeutics has been driven by our comprehension of the molecular foundation of thyroid function and carcinogenesis over the past ten years. These include tyrosine kinase inhibitors that have been approved by the FDA as well as small molecular inhibitors of VEGFR, BRAF, MEK, NTRK and RET, all of which have significantly altered the outlook for this patient population's prognosis. De-differentiated cancers can be re-sensitized to iodine by some treatments, allowing for radioactive iodine treatment and improved disease control. Amazingly, there is now a treatment that has been approved by the FDA for BRAF-mutated patients with anaplastic thyroid cancer, which was once thought to be unavoidable and fatal. Numerous new targets, therapies, clinical trials and approved treatments are rapidly altering the treatment landscape for iodine-resistant thyroid cancer. In the treatment of iodine-resistant thyroid cancer, we present an up-to-date overview of the most recent therapeutic options [1].

On March 31, 1941, Dr. Saul Hertz made the first use of radioactive iodine to treat thyroid disease. This year marks the eightieth anniversary of targeted radionuclide therapy. In the early 20th century, rapid advancements in physics and medicine made it possible for Dr. Hertz and his collaborator, physicist Arthur Roberts, to make a breakthrough. The role of iodine in thyroid physiology was only discovered in the previous few decades, despite the fact that diseases of the thyroid gland had been described for centuries. In the decades that followed Henri Becquerel's discovery of radioactivity in 1897, rapid advancements in the field were made, including the artificial production of radioactive isotopes. Finally, George de Hevesy's tracer principle served as the foundation for the diagnostic and therapeutic applications of radioactive iodine. Hertz was able to envision the use of radioactive iodine to treat thyroid diseases in the context of these advancements. He obtained the experimental data and used it in the clinical setting with Dr. Roberts' help. Thyroid cancer and hyperthyroidism continue to benefit greatly from radioiodine therapy. However, Hertz struggled to maintain his work and gain recognition for his accomplishments and his early death in 1950 meant that his contributions were frequently overlooked until recently. The development of the concept of theranostics and the introduction of additional radionuclide therapies were based on the findings of Hertz and others [2].

Description

Radioactive iodine therapy is a treatment method used to treat a wide range of thyroid conditions. It involves the use of radioactive iodine, which is taken orally and absorbed by the thyroid gland. The radioactive iodine then emits radiation, which destroys thyroid cells and reduces the size of the thyroid gland. The thyroid gland is a small gland located in the neck that produces hormones that help regulate the body's metabolism. Thyroid conditions occur when the thyroid gland produces too much or too little thyroid hormone, which can cause a range of symptoms and health problems [3].

Radioactive iodine therapy is most commonly used to treat an overactive thyroid gland, a condition known as hyperthyroidism. Hyperthyroidism can cause symptoms such as weight loss, anxiety, tremors and an irregular heartbeat. In severe cases, it can lead to a condition known as thyroid storm, which can be life-threatening. The use of radioactive iodine therapy for hyperthyroidism involves taking a dose of radioactive iodine in liquid or capsule form. The radioactive iodine is absorbed by the thyroid gland, where it emits radiation that destroys thyroid cells. This reduces the size of the thyroid gland and lowers the production of thyroid hormone [4].

Radioactive iodine therapy is also used to treat thyroid cancer. In this case, the radioactive iodine is taken up by any remaining cancer cells in the body, which are then destroyed by the radiation. This can help prevent the cancer from spreading and can reduce the risk of the cancer recurring. Radioactive iodine therapy is a safe and effective treatment for thyroid conditions. It has been used for more than 60 years and has a success rate of more than 95% in treating hyperthyroidism. The treatment is generally well-tolerated, with few side effects. However, there are some risks associated with radioactive iodine therapy. The most common side effect is a temporary worsening of hyperthyroid symptoms, which can occur in the first few days after treatment. This is known as a thyroid flare and is usually treated with medication to control the symptoms [5].

Conclusion

There is also a small risk of damage to other organs, such as the salivary glands or the eyes, due to the radiation emitted by the radioactive iodine. This risk is minimized by using a low dose of radioactive iodine and taking steps to protect other organs, such as drinking plenty of water to flush the radioactive iodine out of the body and avoiding close contact with others for a short period of time after treatment. Patients who undergo radioactive iodine therapy are usually advised to avoid close contact with pregnant women and young children for a short period of time after treatment, as the radiation can pose a risk to developing foetuses and young children. Patients who are undergoing radioactive iodine therapy should also avoid iodine-containing foods and supplements, such as seaweed, seafood and iodine supplements, as these can interfere with the absorption of the radioactive iodine and reduce the effectiveness of the treatment. Overall, radioactive iodine therapy is a safe and effective treatment for thyroid conditions.

Acknowledgement

None.

Conflict of Interest

None.

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Received: 01 December, 2022, Manuscript No. jnmrt-23-90746; **Editor Assigned:** 03 December, 2022, PreQC No. P-90746; **Reviewed:** 15 December, 2022, QC No. Q-90746; **Revised:** 20 December, 2022, Manuscript No. R-90746; **Published:** 27 December, 2022, DOI: 10.37421/2155-9619.2022.13.523

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How to cite this article: Fullmer, Tanner. “Treatment Advances in Radioactive Iodine-Resistant Thyroid Cancer.” J Nucl Med Radiat Ther 13 (2022): 523.