The Endocrinologist’s Perspective of Thyroid Disease

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Radioactive iodine has been used extensively for treatment of hyperthyroidism for more than 60 years, alongside with the other possible treatment modalities: antithyroid drug therapy and surgery. The choice among these therapies is usually made with respect to the differential diagnosis of the hyperthyroidism, age and gender, size and location of goitre and patient wish. The treatment is sometimes given after pre-treatment with antithyroid drugs.

There is no ideal treatment for benign multinodular goitre (MNG). Besides surgery, which is recommended in large goitres, or when malignancy cannot be excluded, the non-surgical treatment options are levothyroxine and radiiodine ($^{131}$I) therapy. Thyroxine treatment for diffuse non-toxic goitre is a well-established modality in some countries, especially in iodine-deficient regions where the disease often affects more than 10% of the population. A reduction in thyroid volume of some 20–30% within 3 months can be achieved but requires a thyroxine dose that can lead to suppression of serum thyrotropin, tissue thyrotoxicosis, and risk of osteoporosis. Life-long treatment is necessary yet most patients will develop nodular thyroid disease for which thyroxine is much less effective.

Conventional $^{131}$I therapy (without rhTSH) has been used for more than a decade in symptomatic non-toxic MNG resulting in significant thyroid volume reduction, but with the need for relatively high activities of radiiodine, due to a frequent finding of a low thyroid RAIU. The recent advent of rhTSH, even using very small doses in combination with $^{131}$I therapy, enhances the thyroid volume reduction with lower $^{131}$I activities by doubling the thyroid RAIU. However, before rhTSH stimulation is routinely used by clinicians to optimise the $^{131}$I therapy in MNG, there are aspects of this treatment modality that have not yet been sufficiently clarified.

Among the safety aspects has been a fear of increasing the thyroid gland through radiation induced thyroiditis, but the inspiratory flow curve was not negatively affected after the treatment, rather on the contrary there was a beneficial effect. Another aspect has been the occurrence of thyroid autoimmunity with a Graves’ like reaction after radiiodine therapy, in some cases accompanied by thyroid associated ophthalmopathy. Finally, the possibility of a thyroid cancer harboured in a nodular goitre, though rarely, must be kept in mind.

The introduction of radiiodine as a treatment modality has in my view advanced management of these patients on the one hand, but has posed some problems, on the other hand, since many of the populations who were initially low in iodine have now started iodine salt addition programmes, which notoriously lowers the uptake of radiiodine. The treatment success is thereby limited, and requires higher amounts of radiiodine to overcome this problem, thus creating a potential environmental problem due to surplus radiiodine excreted in the urine.

Although some surgeons still advocate mainly for surgery as the treatment of choice in non-toxic goitres, it seems clearer to most endocrinologists that radioactive iodine therapy is an attractive alternative with few side effects and easy for the patient as it does not require hospitalisation in most countries. It is more rational considering the pathophysiology as mainly the hot nodules in MNG will be treated, leaving the remaining gland normally functioning. The limitation of the therapy of either having to use very high or repeated doses of radiiodine due to many large goitres with low iodine uptake may be overcome by pre-treatment with rhTSH. Although this treatment as it now stands is not approved, it appears that much smaller doses of the drug have sufficient efficacy, and the price should therefore be adjusted by production of appropriate ampoule sizes. In order to further document a more widespread use of rhTSH as pre-treatment more randomised clinical trials are needed comparing doses of rhTSH and comparing radiiodine therapy with surgery in terms of outcome measures such as efficacy of goitre control, thyroid function, health care costs and health related quality of life. Only then can the treatment continue based on solid evidence, which is very likely to change treatment algorithms for non-toxic goitre in the future.

References


