Recombinant human TSH (rhTSH) is used in patients who have had surgery for thyroid cancer but are at low risk of recurrence. The rhTSH is used for the preparation of postoperative administration of 3.7 GBq (100 milli-Ci) of radiiodine for thyroid-remnant ablation and for the determination of serum thyroglobulin levels during follow-up. In these two conditions, the efficiencies of l-T4 withdrawal and rhTSH administration are similar. However, rhTSH can be administered during l-T4 treatment, and its use avoids the hypothyroid period induced by l-T4 withdrawal, reduces whole body exposure after RI$^{131}$ administration, avoids potential morbidity and maintains a better quality of life compared with hormone withdrawal.

COMMENT

**Tolerability of rhTSH:** The use of rhTSH avoids the consequences of prolonged l-T4 withdrawal, mainly the signs & symptoms of hypothyroidism, with impaired ability to work and difficulties operating motor vehicles. As a result of rhTSH administration, the patient’s quality of life is maintained. The use of rhTSH has a high cost, but analysis of societal costs shows that the reduction of overall cost largely compensates for the cost of the product.

**Efficacy of rhTSH during follow-up of patients with thyroid cancer:** A number of studies have confirmed that rhTSH administration in conjunction with serum Tg determination enables the detection of recurrent disease.

**New follow-up procedures using rhTSH:** After total thyroidectomy for thyroid cancer followed by RI$^{131}$ administration, the current strategy is to assess successful ablation & absence of residual disease by demonstrating, 6-12 months later, that serum Tg is <1 ng/ml following rhTSH administration in the presence of a normal neck ultrasonography. When these criteria are met, the recurrence risk during the subsequent decade is 0.5%. Thus, patients can be reassured and yearly monitoring of serum TSH & Tg undertaken, while patients remain on thyroxine replacement. This protocol is suitable only for low-risk patients (i.e. adequate surgery and no interfering antibodies against Tg). In the patients who maintain detectable Tg levels when assessed within one year of thyroid ablation and without other evidence of disease, a stepwise protocol must be followed to diagnose those patients with residual disease who will eventually require RI$^{131}$ readministration.

**The importance of the sensitivity of Tg assays:** The functional sensitivity of modern Tg assays is currently below 0.2-
0.3 ng/ml. In the absence of interfering Tg antibodies, a serum Tg level below 0.1 ng/ml during l-T4 treatment corresponds in general to a Tg level below 2 ng/ml following stimulation with rhTSH.

**Using rhTSH for thyroid-remnant ablation:** RhTSH is a promising alternative to prolonged l-T4 withdrawal for the ablation of residual thyroid tissue. Recent guidelines support the use of rhTSH in low-risk patients as preparation for postoperative administration of 3.7 GBq (100 milli-Ci) of RI$^{131}$ for remnant ablation. However, further studies are still needed to confirm the efficacy of rhTSH for this indication, evaluate potential side effects, and finally determine the minimal activity of RI$^{131}$ to be administered.

**Using rhTSH for persistent or recurrent disease:** Compassionate use programs have shown that it was possible to deliver RI$^{131}$ therapy following rhTSH-mediated stimulation for metastatic thyroid cancer. However, it is not yet clear whether the radioactive activity delivered to those foci of tumor is similar with rhTSH stimulation, compared with l-T4 withdrawal.

**Conclusions:** The data available on rhTSH support its safety and unequivocal ability to maintain the patient’s quality of life and spare morbidity through the avoidance of hypothyroidism at the time of Tg testing and I$^{131}$-whole body scan. Numerous clinical trials have demonstrated the efficacy of rhTSH in stimulating I$^{131}$ uptake for I$^{131}$-whole body scan and for Tg production. In low-risk patients, rhTSH is used at 6-12 month evaluation with stimulated Tg levels and neck ultrasonography, and for preparation for radioiodine remnant ablation. In patients with known neoplastic disease, there is a need for further dosimetric studies before considering its routine use.

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See Figure below