

EFFECT OF TSH STIMULATION ON CIRCULATING TSHR MRNA LEVELS AND ITS ROLE IN DETECTION OF METASTASES IN DIFFERENTIATED THYROID CARCINOMA PATIENTS

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Background/Purpose: TSHR mRNA is a marker for circulating thyroid cancer (TC) cells. Effects of TSH stimulation either by recombinant TSH [Thyrogen[®]] or T4-withdrawal on TSHR mRNA levels are unknown.

Methods: Post-surgical TSH stimulation was performed in 34 TC patients [Thyrogen[®]=24; T4-withdrawal=10]. TSH and thyroglobulin [Tg] levels were measured before and after TSH stimulation and whole body scan [WBS] obtained at time of second sample draw.

Results: Pre-operatively, 17/20 (85%) patients had elevated TSHR mRNA [>1.0 ng/ μ g RNA], consistent with prior performance of this assay to detect TC. Post-operatively, there was no correlation between non-stimulated Tg and TSHR mRNA. Before and after Thyrogen[®], 21/24 patients had undetectable TSHR mRNA and negative WBS. 3/24 had suspicious focal neck WBS uptake; 2 of 3 had elevated TSHR mRNA before Thyrogen[®] [3.8 and 1.5 ng/ μ g RNA, Tg <0.2 and 1.4 ng/mL respectively] that decreased post-stimulation. Before T4-withdrawal, TSHR mRNA was undetectable in 9/10 patients; 1/10 had distant metastasis and high TSHR mRNA. However, after T4-withdrawal, TSHR mRNA levels increased in 3/9 patients, and WBS confirmed regional/neck (2) and distant (1) metastases. In the T4-withdrawal group, the 2nd measurement of TSHR mRNA had 100% concordance with WBS but only 30% with stimulated Tg.

Discussion & Conclusion: TSHR mRNA levels appear to decrease during Thyrogen[®] stimulation [acute exposure to high TSH] but increase with T4 withdrawal [gradual increase in TSH]. The withdrawal method may enhance diagnostic sensitivity of TSHR mRNA to detect metastases. Further studies are necessary to confirm these interesting initial findings.