

The usefulness of serum thyroglobulin levels and Tl-201 scintigraphy in differentiating between benign and malignant thyroid follicular lesions

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Objective: To compare the diagnostic capabilities of various serum thyroglobulin levels (Tg) and Tl-201 scintigraphy with regard to thyroid follicular lesions. **Methods:** We examined 80 thyroid follicular lesions (benign: 55, malignant: 25) in patients with nodular goiter for whom a pathological diagnosis was made based on surgical findings. Tg was measured by an I-125 (radioimmunoassay) method. In Tl-201 scintigraphy, 74 MBq of Tl-201 chloride was intravenously injected and imaged after 10 minutes (early image) and after 120 minutes (delayed image), and the scintigrams were evaluated both visually and quantitatively, with special attention paid to the part of the nodule with the highest accumulation of Tl-201 chloride. The cutoff levels of Tg for categorizing the lesions as malignant were set at 40, 100, 300, 500, 1,000 and 2,500 $\mu\text{g/l}$. In Tl-201 scintigraphy, method 1 involved high uptake on both early and delayed images, method 2 involved high uptake on only the early image, and method 3 involved high uptake on only the early image or the same accumulation in comparison with the normal region on the early image, with no washout being quantitatively judged as indicative of malignancy. A summary index of overall test performance can be calculated as the area under the receiver operating characteristic (ROC) curve (Area (Az)). Likelihood ratios for several cutoff levels were also calculated. **Results:** In the diagnosis, Az of Tl-201 (0.95) was larger than that of Tg (0.65). The sensitivity and accuracy of Tg at each cutoff level (sensitivity: 4.0% to 76.0%, accuracy: 50.0% to 72.5%) were lower than with Tl-201 scintigraphy (methods 1–3, sensitivity: 76.0–100%, accuracy: 77.5–88.8%). The likelihood ratio for the positive results of method 1 for Tl-201 scintigraphy, were greatest in the present study (13.9), and the likelihood ratio for the negative results of method 3 for Tl-201 scintigraphy, (0) was smallest in the present study. **Conclusion:** Diagnosis based on Tl-201 washout patterns in which quantitative evaluation is combined with visual evaluation appears to be more useful for the differentiation of malignant thyroid follicular lesions than diagnosis by Tg.

Key words: serum thyroglobulin, Tl-201 scintigraphy, thyroid follicular lesion, ROC curve, likelihood ratio