



Clinical application of carbon nanoparticle lymph node tracer in the VI region lymph node dissection of differentiated thyroid cancer

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Genet. Mol. Res. 13 (2): 3432-3437 (2014)

Received February 7, 2013

Accepted July 29, 2013

Published April 30, 2014

DOI <http://dx.doi.org/10.4238/2014.April.30.4>

ABSTRACT. The application and clinical significance of carbon nanoparticle lymph tracer in the VI region (central region) lymph node dissection of differentiated thyroid cancer was investigated. Eighty patients with differentiated thyroid cancer were equally divided into the carbon nanoparticle-marked group (ipsilateral thyroid injection) and the control group (no injection). All patients underwent standard primary tumor treatment and VI lymph node dissection. The number of lymph nodes retrieved in the carbon nanoparticle group (mean = 6.725 pieces, range = 1-13) was significantly higher than those retrieved in the control group (mean = 3.6, range = 1-7; $P < 0.05$). The black staining lymph node rate was 69.89%. A significantly higher number of lymph nodes less than 2 mm were detected in the carbon nanoparticle group ($P = 0.0023$). The transfer rates and lymph node metastasis rates did not differ significantly between the two groups. The black-staining lymph node metastasis rate was 20.74% (39/188) and the non-staining lymph node metastasis rate was 22.22% (18/81), which were not significantly different ($P =$

0.7856). No parathyroid accidental resection was observed in the carbon nanoparticle group, whereas three cases occurred in the control group ($P = 0.2405$). In conclusion, carbon nanoparticles show good lymphatic tracer effects, easy identification, increased number of lymph nodes retrieved, more accurate reflection of the VI region lymph node status, and increased accuracy of the clinical stage. These results should help develop reasonable surgery programs and follow-up comprehensive treatments, and can help to reduce the risk of accident parathyroid resection.

Key words: Differentiated thyroid cancer; Carbon nanoparticles; VI region lymph node dissection