Evaluation of the clinical value of carbon nanoparticle lymph tracer in the surgical reoperation of differentiated thyroid carcinoma

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Objective: To investigate the clinical value of carbon nanoparticles (CN) as tracers for lymph nodes to guide cervical lymph node dissection and protect the parathyroid in the surgical reoperation of differentiated thyroid carcinoma (DTC).

Methods: The study recruited 116 patients with DTCs who previously underwent thyroidectomy and later received the remedial surgical treatment at the Department of Breast and Thyroid Surgery, Hunan Provincial People’s Hospital, China, between February 2011 and February 2014. Those patients were randomly divided into the experimental group (the CN group) with 64 cases and the control group with 52 cases. Carbon nanoparticles suspension (CNS) of 0.1 mL to 0.3 mL was intraoperatively injected into the residual thyroid, and/or enlarged lymph nodes in the CN group, and CNS was not intraoperatively applied in the control group. The number of parathyroid identified intraoperatively and its identification accuracy, the number of lymph nodes resected intraoperatively as well as the incidence of common complications after thyroidectomy in both groups was recorded and their differences were studied.

Results: The identification accuracy of the parathyroid in the CN group and control group were 92.2% and 28.8%, respectively, and the identification rate of the three glands or above in both groups were 75% and 36.5%, respectively. There was significant difference in those figures between the two groups (P<0.05). And there was also significant difference between the two groups in the number of the removed lymph nodes in the central and lateral cervical compartments (P<0.05). There was no increase in the common complications after the second surgery compared with the previous surgery; in addition, there was a decline in the incidence of transient hypoparathyroidism (HPT) (P<0.05).

Conclusions: By black-staining of the thyroid and cervical regional lymph nodes with carbon nanoparticles, parathyroid glands can easily be identified and protected to reduce complications of transient hypoparathyroidism in the reoperation for residual and/or missed DTC; carbon nanoparticle tracers also facilitate radical resection of lymph nodes at central and lateral compartments of neck.

Biography
Zhang Chaojie was graduated from Hebei Medical University in 1996 and worked in General Surgery from 1997 to 1999. He began to specialize in breast diseases from 2000 and received his Master degree in Surgery in 2006 in Central South University. Since then, he has been working in breast and thyroid surgery in Hunan Provincial People’s Hospital in China. He is a Chief Doctor, Professor, Tutor of post-graduates in surgery, Medical Director of thyroid surgery. He is the Committee Member of Thyroid Diseases Branch of Chinese Research Hospital Association, Youth Committee Member of Thyroid Surgeon Branch of Chinese Physician Association, Committee Member of Breast Diseases Branch of Chinese Medicine and Pharmacology Education Association, Committee Member of Breast Branch of Cancer Society of Hunan Province. His research direction is clinical and basic study of diseases of breast and thyroid.

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