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The study of influence factors on ^{131}I treatment of differentiated thyroid carcinoma with lymph node metastases

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Abstract

Objective: Thyroid carcinoma is the most common malignant endocrine tumor, which comprises 1% in all human tumors. As for differentiated thyroid carcinoma (DTC), lymph nodes are the most common metastatic site for which the major treatment is ^{131}I therapy. This retrospective study aimed to investigate the therapeutic effect and analyze the influence factors on ^{131}I treatment of DTC with lymph node metastases. **Methods:** Collecting clinical data of 66 DTC patients with lymph node metastases at the Department of Nuclear Medicine, Xin Hua Hospital from January 1996 to January 2006. Investigating the therapeutic effect firstly and then dividing 66 patients into an eliminated group and an uneliminated group according to the evaluation criteria of the therapeutic effect. Finally, observing the differences between the two groups. The significant differences in the following 10 influence factors were determined: gender, age, pathological type, the periods from the thyroidectomy to the first ^{131}I therapy, when the metastases were found, the history of resection of the lymph node metastases, the uptake of ^{18}F-FDG in the lymph node metastases, remnant thyroid, multiple metastases, and the cumulative dose of ^{131}I. This retrospective study was analyzed by Student *t* test, χ^2 test, and Fisher's exact test. **Results:** Of all 66 patients with lymph node metastatic DTC treated by ^{131}I therapy, 31 patients (46.97%) had complete elimination. Twenty-seven patients were improved or controlled, and the overall effective rate reached 87.88%. The elimination rate of lymph node metastases in patients with resection was significantly higher than in those without resection (χ^2=5.561, P=.018<0.05). The elimination rate of lymph node metastases in patients with ^{18}F-FDG uptake was significantly higher than in those without ^{18}F-FDG uptake (χ^2=4.014, P=.045<.05). There was no significant difference in the elimination rate among the patients with various values in the other eight factors. **Conclusions:** ^{131}I Therapy is an effective treatment of lymph node metastatic DTC. The history of resection of the lymph node metastases and the uptake of ^{18}F-FDG in the lymph node metastases were the influence factors on the therapeutic effect, whereas the other eight factors were probably not.

Keywords: Differentiated thyroid carcinoma; Iodine radioisotopes; Radiotherapy; Efficacy assessment; Influence factors

1. Introduction

Thyroid carcinoma is the most common malignant endocrine tumor, the incidence of which is about 10 times higher than the other endocrine tumors. In the past decade, the incidence of thyroid carcinoma has tended to increase in various regions of the world [1]. Approximately 90% of thyroid malignancies are classified as well-differentiated thyroid carcinomas (papillary or follicular) and the overall prognosis is favorable. Differentiated thyroid carcinoma (DTC) is a slow growing tumor that can be cured mostly by the combined effects of surgery, radioiodine therapy, and thyroid stimulating hormone (TSH) suppression [2,3].

Papillary thyroid carcinoma (PTC) is the most common type of thyroid malignancy, accounting for 65–80% of all thyroid cancers. Lymph node metastases are common which may appear at an early stage. Forty percent to 51% of patients with PTC are proved to have cervical lymph node

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metastases. Now besides surgery, radioiodine therapy is the main treatment of lymph node metastases. The aim of this retrospective research was to investigate the effect of radioiodine therapy on lymph node metastases in DTC and analyze its influence factors.

2. Material and methods

2.1. Patients

Sixty-six patients with DTC (20 males, 46 females; age range: 22–88 years; mean age: 44 years) after undergoing thyroidectomy and ^{131}I ablation of remnant tissue were recruited from January 1996 to January 2006 in the Department of Nuclear Medicine, Xin Hua Hospital. Sixty had papillary carcinoma and six had follicular carcinoma. Forty-four were proved clinically or pathologically to have lymph node metastases only, and the others had lymph node metastases with pulmonary and/or bone metastases as well. The histological results were obtained by biopsy or surgery in some of the metastatic lesions. The Xinhua Hospital Review Board approved this study and all study patients gave written informed consent.

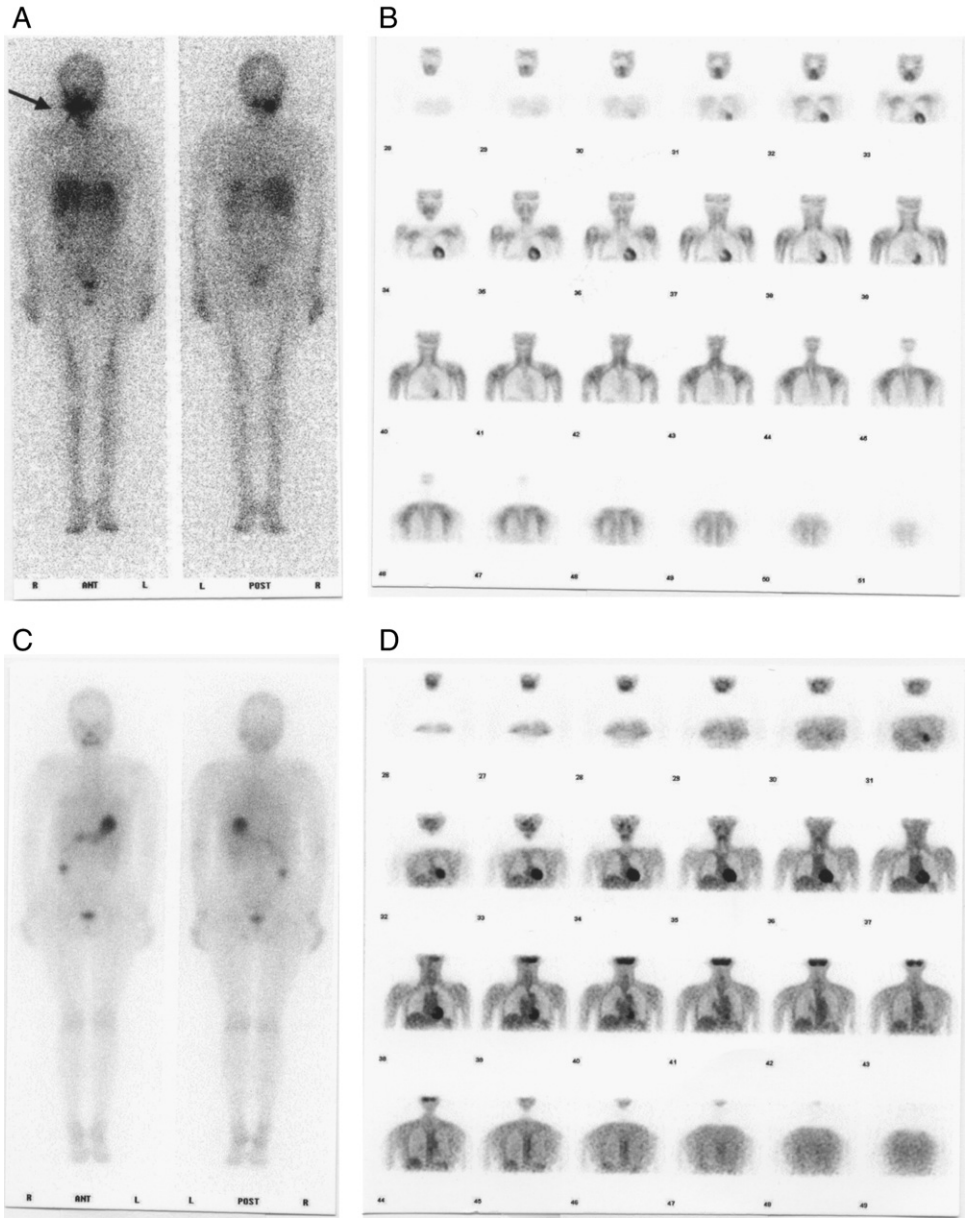

Fig. 1. ^{131}I whole-body scan and ^{18}F-FDG SPECT imaging before and after ^{131}I therapy of a 52-year-old female who underwent thyroidectomy for papillary thyroid cancer. After the second treatment, ^{131}I whole-body scan showed one focus of ^{131}I uptake in the right submandibular lymph node (A). ^{18}F-FDG SPECT imaging revealed the normal uptake of ^{18}F-FDG (B). After the fourth treatment, ^{131}I whole body scan and ^{18}F-FDG SPECT imaging demonstrated normality (C and D). It is indicated that this lymph node was eliminated.