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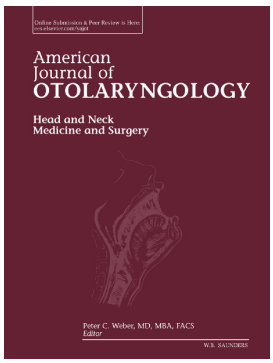

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Combined Use of a Nanocarbon Suspension and ^{99m}Tc-MIBI for the Intra-operative Localization of the Parathyroid Glands

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Abstract

Objective: To investigate the combined use of a nanocarbon (NC) suspension and low-dose ^{99m}Tc-MIBI for parathyroid localization during surgery in patients with secondary hyperparathyroidism (sHPT).

Methods: Between March 2010 and September 2015, 40 patients with sHPT were enrolled in this study and were randomized to receive either low-dose ^{99m}Tc-MIBI + NC (group I) or low-dose ^{99m}Tc-MIBI (group II). Pre- and post-operative serum levels of intact PTH (iPTH), calcium and phosphorus between groups were compared and the intra-operative radioactive counts of the parathyroid glands were measured.

Results: The post-operative iPTH level was significantly lower in patients of group I (24.2 ± 31 ng/L) than in those of group II (106 ± 155 ng/L) (P = 0.03) while there were no significant differences in intra-operative parathyroid gland radioactive counts between the groups. The duration of the surgical procedure was shorter for patients of group I than patients of group II. There were no serious intra-operative or post-operative complications.

Conclusion: The combined use of an NC suspension and ^{99m}Tc-MIBI for patients with sHPT is strongly recommended for the localization of parathyroid glands during surgery and is likely to improve clinical outcomes for patients.

Keywords: Chronic renal failure; Hyperparathyroidism; Nanocarbon suspension; Radioguided parathyroidectomy

Introduction

Hyperparathyroidism (HPT) is a common endocrine disease including primary HPT, secondary HPT (sHPT) and tertiary hyperthyroidism while Chronic kidney failure (CRF) is the most common cause of secondary hyperparathyroidism [1]. Due to recent technological advances and the widespread availability of hemodialysis, patients with CRF are living longer. Unforunately, the morbidity of patients with secondary hyperparathyroidsim (sHPT) undergoing long-term dialysis is gradually increasing.

Compared to CRF, little attention has been paid to relieving the clinical symptoms of sHPT which markedly affects the quality of life and reduces patient survival. Furthermore, no satisfied pharmaceutical therapy has been established for those with resistant sHPT. Patients with sHPT