The Relationship Between the Number of Preserved Parathyroid Glands and Clinical Aspects After Total Thyroidectomy and Central Lymph Node Dissection in Papillary Thyroid Carcinoma

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ABSTRACT

Purpose
To identify the relation between the preservation status of the parathyroid glands and risk of hypoparathyroidism after total thyroidectomy and central lymph node dissection in papillary thyroid carcinoma.

Materials and Methods
Of the 63 patients with papillary thyroid carcinoma(PTC) treated at the Department of Otolaryngology-Head and Neck Surgery, Hospital from May 2010 to December 2011, the medical records of 63 patients who satisfied our inclusion criteria were reviewed retrospectively. Patients with PTC who underwent total thyroidectomy with central lymph node dissection(CLND) were included. Patients were grouped according to the number of intact preserved parathyroid glands into Group 1(four), Group 2(three), Group 3(under two). The total and ionized serum calcium, intact PTH levels of each group were monitored after the surgery. Patients with postoperative symptomatic hypocalcemia were considered to have postoperative hypoparathyroidism and received calcium/vitamin D therapy. The hypoparathyroidism was considered to be permanent when calcium/vitamin D therapy was still required six months after surgery.

Results
Out of 63 cases of total thyroidectomy with CLND groups, 31 cases (49.2%) showed postoperative hypoparathyroidism as demonstrated by laboratory findings. Permanent hypoparathyroidism however did not occur in this case. The development of hypoparathyroidism was not significantly related with the number of preserved parathyroid glands.

Conclusions
To prevent postoperative hypoparathyroidism following total thyroidectomy and CLND, at least two parathyroid glands should be preserved in situ with an intact blood supply, in order to prevent permanent hypoparathyroidism after the surgery.

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INTRODUCTION

To identify the relation between the preservation status of the parathyroid glands and risk of hypoparathyroidism after total thyroidectomy and central lymph node dissection in papillary thyroid carcinoma.

METHODS AND MATERIALS

Of the 63 patients with papillary thyroid carcinoma(PTC) treated at the Department of Otolaryngology-Head and Neck Surgery, Hospital from May 2010 to December 2011, the medical records of 63 patients who satisfied our inclusion criteria were reviewed retrospectively. Patients with PTC who underwent total thyroidectomy with central lymph node dissection(CLND) were included. Patients were grouped according to the number of intact preserved parathyroid glands into Group 1(four), Group 2(three), Group 3(under two). The total and ionized serum calcium, intact PTH levels of each group were monitored after the surgery. Patients with postoperative symptomatic hypocalcemia were considered to have postoperative hypoparathyroidism and received calcium/vitamin D therapy. The hypoparathyroidism was considered to be permanent when calcium/vitamin D therapy was still required six months after surgery.

RESULTS

No. of preserved parathyroid glands	Postoperative Ca level			Postoperative Ionized Ca level		
	1day	3days	6months	1day	3days	6months
2	8.4 ± 0.5	8.0 ± 0.5	9.0 ± 0.5	1.1 ± 0.1	1.2 ± 0.1	1.2 ± 0.1
3	8.5 ± 0.5	8.0 ± 0.7	9.0 ± 0.5	1.1 ± 0.1	1.1 ± 0.1	1.2 ± 0.1
4	8.5 ± 0.4	8.0 ± 0.9	9.1 ± 0.4	1.2 ± 0.1	1.1 ± 0.1	1.3 ± 0.1

Table 1. Postoperative total calcium and ionized serum calcium levels obtained after thyroid surgery

No. of preserved parathyroid glands	Postoperative iPTH level		Patient with hypoparathyroidism	
	3days	6months	temporary cases (%)	permanent cases (%)
2	16.1 ± 10.7	34.3 ± 45.7	7 / 16 (43.7)	0 (0.0)
3	11.2 ± 10.3	27.3 ± 16.8	21 / 38 (55.2)	0 (0.0)
4	17.5 ± 13.3	27.7 ± 8.6	3 / 9 (33.3)	0 (0.0)

Table 2. Postoperative intact parathyroid hormone (iPTH) levels and patient with hypoparathyroidism obtained after thyroid surgery
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Variables	Group	No. of preserved parathyroid glands			*p*
		2 (n=16)	3 (n=38)	4 (n=9)	
Mass size	≤1cm	10	20	5	.026
	1< ≤2cm	1	15	4	
	2< ≤4cm	5	3	0	
Central lymph node metastasis	No	2	11	5	.074
	Yes	14	27	4	
Extrathyroid extension	No	3	11	4	.393
	Yes	13	27	5	
Positive resection margin	No	15	35	9	1.000
	Yes	1	3	0	
Hashimoto's thyroiditis	No	16	35	9	.715
	Yes	0	3	0	

Table 3. Correlation between the number of preserved parathyroid glands and mass size, central lymph node metastasis, extrathyroid extension, positive resection margin, hashimoto's thyroiditis

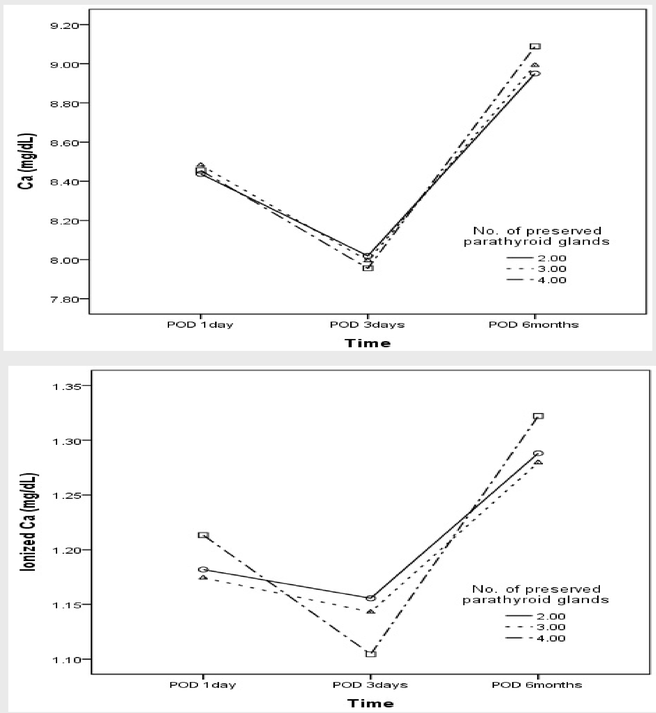

Figure 1. Correlation between the number of preserved parathyroid glands and postoperative change of total calcium and ionized serum calcium level

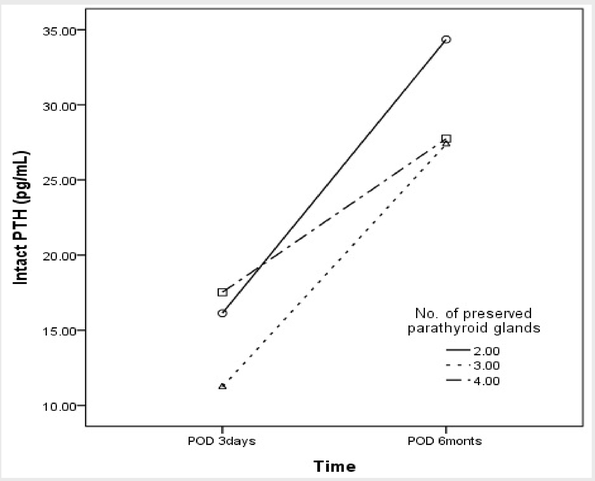

Figure 2. Correlation between the number of preserved parathyroid glands and postoperative change of intact PTH level

DISCUSSION

Out of 63 cases of total thyroidectomy with CLND groups,
31 cases (49.2%) showed postoperative hypoparathyroidism as
demonstrated by laboratory findings. Permanent hypoparathyroidism
however did not occur in this case. The development of
hypoparathyroidism was not significantly related with the number of
preserved parathyroid glands.

CONCLUSIONS

To prevent postoperative hypoparathyroidism following
total thyroidectomy and CLND, at least two parathyroid glands
should be preserved in situ with an intact blood supply, in order to
prevent permanent hypoparathyroidism after the surgery.

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