

Intraoperative blood loss in total thyroidectomy for Graves' disease

Keito Yokoi; Yusuke Koshima; Kimio Ogawa; Yumi Tomiie; Yutaka Mizuno; Tsuneo Imai; Yatsuka Hibi

Fujita Health University School of Medicine Endocrine Surgery

Introduction

Thyroidectomy for Graves' disease can be highly challenging because of the risk of massive bleeding. Although the risk is particularly high in cases of high thyroid gland weight, massive bleeding can still occur even in cases of low thyroid weight. We investigated factors associated with intraoperative massive bleeding other than the weight of the thyroid gland.

Materials and methods

Among patients who underwent total thyroidectomy for Graves' disease at Fujita Health University Hospital from November 2015 to December 2023, 137 patients underwent measurement of the peak systolic velocity of the superior thyroid artery (STA-PSV) before surgery. Linear regression analysis was performed to determine whether age, sex, disease duration, free T3 value, thyrotropin receptor antibody (TRAb) value, thyroid weight, or STA-PSV (using the mean of left and right STA-PSV) were associated with the amount of intraoperative bleeding. Predictors of massive bleeding (defined as ≥ 800 mL) were analyzed by binomial logistic regression analysis, and cutoff values were obtained by receiver operating characteristic analysis.

Results

Among the 137 patients

	The mean (range)
Sex (female : male)	110 : 27
Age (years)	40.3 \pm 15.5 (8 - 77)
Disease duration (months)	111.1 \pm 123.9 (1 - 684)
Free T3 value (pg/mL)	3.93 \pm 2.00 (1.38 - 18.19)
TRAb value (IU/L)	28.2 \pm 46.5 (0.7 - 355.8)
Thyroid weight (g)	102.0 \pm 98.2 (10.0 - 565.0)
STA-PSV (cm/s)	92.7 \pm 47.9 (24.9 - 300.0)
Intraoperative bleeding (mL)	197.2 \pm 292.8 (2 - 1991)

Multiple regression analysis

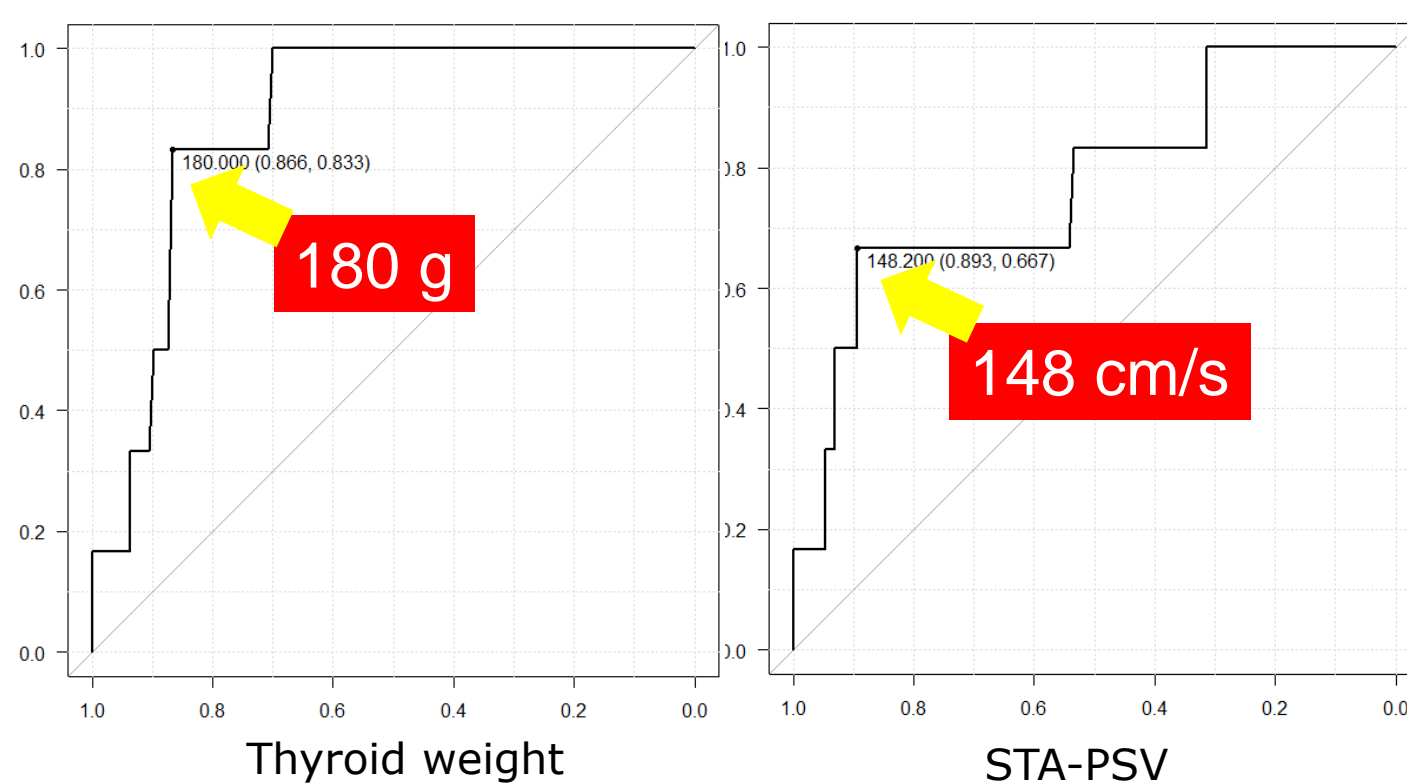
(Excluded age and free T3 value that were not associated.)

	p - value	95% confidence interval
Sex	0.706	-97.437 - 143.525
Disease duration	0.373	-0.199 - 0.527
TRAb value	0.651	-1.368 - 0.858
Thyroid weight	<0.001	0.611 - 1.830
STA-PSV	0.010	0.325 - 2.362

Binomial logistic regression analysis

	p - value	95% confidence interval
Sex	0.823	0.091 - 20.402
Age	0.299	0.898 - 1.034
Disease duration	0.478	0.993 - 1.016
Free T3 value	0.151	0.085 - 1.464
TRAb value	0.342	0.989 - 1.032
Thyroid weight	0.026	1.001 - 1.015
STA-PSV	0.041	1.001 - 1.031

Receiver operating characteristic analysis



Discussion / Conclusion

- The blood flow rate of the superior thyroid artery was significantly correlated with thyroid microvessel density.

Huang SM et al. The value of color flow Doppler ultrasonography of the superior thyroid artery in the surgical management of Graves disease. Arch Surg. 2003 Feb



In addition to thyroid weight, STA-PSV was associated with intraoperative massive bleeding in thyroidectomy for Graves' disease. Our findings suggest that the STA-PSV of more than 148 cm/s or thyroid the weight of more than 180g predicts intraoperative blood loss exceeding 800 mL, indicating the need for preparation for autologous blood transfusion.