Original Article

The predictive value of postoperative intact parathyroid hormone for symptomatic hypocalcemia in older patients with thyroid cancer

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Background: Due to the unique characteristics of older patients, they are more susceptible to develop symptomatic hypocalcemia (SH). This study aimed to analyze the potential relationship between the occurrence of SH and various indicators in older patients after thyroid cancer surgery, and to further discuss the predictive value of postoperative intact parathyroid hormone (iPTH) for SH, which can provide reference for clinical prevention and treatment of hypocalcemia in older patients.

Methods: A total of 137 older patients with thyroid cancer (≥60 years old) admitted to the Department of Thyroid Surgery, Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School from January 2020 to December 2022 were selected. They were divided into the SH group and the asymptomatic group according to whether they developed SH. Relevant clinical data were collected and retrospectively analyzed. The measurement data of normal distribution were expressed by mean ± standard deviation (SD). Univariate and multivariate analyses were used to determine the risk factors for SH in older patients after thyroid cancer surgery. Statistical significance was set as $P<0.05$. Receiver operating characteristic (ROC) curve was constructed to study the predictive value of postoperative iPTH for SH occurrence in older patients with thyroid cancer.

Results: Among 137 older patients, 48 cases (35.04%) developed SH and 89 cases (64.96%) were asymptomatic. There were significant differences in preoperative iPTH (SH group: 7.00±5.25 pmol/L; asymptomatic group: 5.52±1.80 pmol/L; $P=0.004$) and postoperative iPTH (SH group: 0.69±0.95 pmol/L; asymptomatic group: 3.30±2.28 pmol/L; $P<0.001$) between the SH group and the asymptomatic group, with statistical significance ($P<0.05$). The area under the curve (AUC) of postoperative iPTH predicting SH occurrence in older patients with thyroid cancer was 0.855, cut-off was 0.5941 [95% confidence interval (CI): 0.794–0.917; sensitivity, 87.5%; specificity, 71.9%].

Conclusions: Postoperative iPTH is an independent risk factor for predicting symptomatic hypocalcemia (SH) in older patients with thyroid cancer. In order to avoid the occurrence of postoperative SH and reduce hospitalization costs and length, calcium supplementation should be given as soon as possible according to the level of postoperative iPTH.

Keywords: Symptomatic hypocalcemia (SH); older; thyroid cancer; postoperative intact parathyroid hormone (postoperative iPTH)

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Introduction

Thyroid cancer is the most prevalent malignant endocrine neoplasm and the leading malignancy of the head and neck region (1). In recent years, the incidence of thyroid cancer in older patients has been rising steadily, a trend attributed to the aging of China's population and the increased routine checkup with thyroid screenings. One of the most common postoperative complications in these patients is symptomatic hypocalcemia (SH). Depending on the duration of postoperative hypocalcemia, SH can be classified as temporary hypocalcemia and permanent hypocalcemia. Temporary hypocalcemia is defined both by the American Thyroid Association and the European Society of Endocrinology as postoperative hypocalcemia lasting less than 6 months, and permanent hypocalcemia as lasting more than 6 months (2,3). The median incidence of temporary and permanent SH following thyroidectomy ranges from 19% to 38% and 0% to 3%, respectively (4). Although most cases are transient, a considerable proportion of patients may progress to permanent hypocalcemia.

Highlight box

Key findings

- This study found that postoperative intact parathyroid hormone (iPTH) is an independent risk factor for predicting symptomatic hypocalcemia (SH) in older patients with thyroid cancer, with an area under the curve (AUC) of 0.855, sensitivity of 87.5%, and specificity of 71.9%.

What is known and what is new?

- Postoperative iPTH has a good predictive value for SH occurrence in older patients with thyroid cancer.
- Preoperative iPTH is also an independent predictor of SH in older thyroid cancer patients, and older patients with higher preoperative iPTH levels are more likely to develop SH. However, its prediction efficiency is limited, with an AUC of only 0.570.

What is the implication, and what should change now?

- In order to avoid the occurrence of postoperative SH and reduce hospitalization costs and length, calcium supplementation should be given as soon as possible according to the level of postoperative iPTH.

Tolone *et al.* reported that patients over 50 years have a 20-fold increased risk of developing postoperative hypocalcemia (5). Data from previous studies in our center suggested a similar conclusion that SH often occurs in older patients. With aging, there is often a decline in intestinal calcium absorption due to reduced vitamin D synthesis and responsiveness, which can impair calcium homeostasis (6). Age-related declines in renal function can also impair the activation of vitamin D, which is essential for parathyroid hormone (PTH)-mediated calcium regulation (7). In short, older patients with thyroid cancer tend to have a higher burden of underlying diseases, a lower metabolic rate, diminished physiological recovery capacity, and an elevated risk of postoperative complications compared to younger patients.

The most common symptoms of SH are paresthesia or numbness and tingling of the perioral region and the limbs. Muscle stiffness, laryngeal spasms, and asphyxia caused by strong muscle contraction may occur, resulting in impaired quality of life and even life-threatening conditions for patients after surgery (2,8,9). Studies have confirmed that the detection and timely intervention of postoperative hypocalcemia following thyroidectomy can prevent the further progression of the condition to a certain extent, which is conducive to the rapid recovery of patients, shorten the length of hospitalization, and reduce hospitalization costs. Intact PTH (iPTH) is an effective predictor of early postoperative parathyroid function (10). Many studies have pointed out that postoperative iPTH is related to SH (11-13). However, existing studies often generalize findings across all age groups. There is a paucity of evidence regarding the predictive value of iPTH for postoperative SH in older patients with thyroid cancer. The purpose of this study is to analyze the potential risk factors of SH after thyroid cancer surgery in older patients, and to further explore the predictive value of postoperative iPTH on SH, so as to provide new ideas for clinical prevention and treatment of SH following thyroid cancer surgery in older patients. We present this article in accordance with the STARD reporting checklist (available at https://gs.amegroups.com/article/view/10.21037/gs-2024-526/rc).

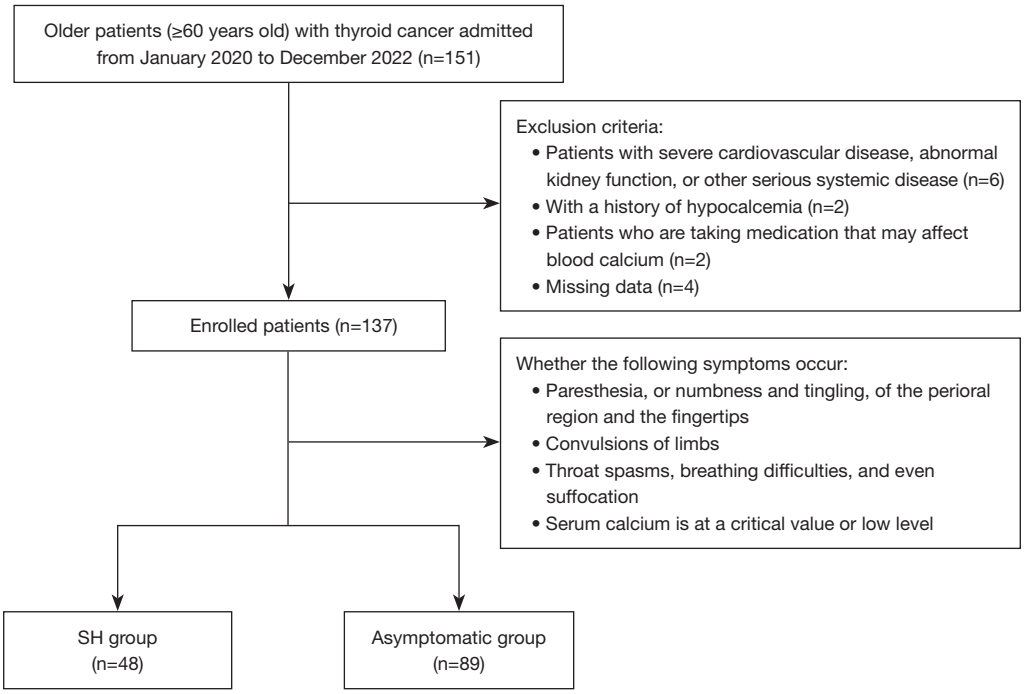

Figure 1 Participants flow diagram. SH, symptomatic hypocalcemia.

Methods

Patients

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and was approved by the ethics committee of Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School, Nanjing, China (No. 2025-0140-01). Written informed consent was obtained from all participants. This was a retrospective study of a consecutive sample of patients. A total of 137 older patients (≥60 years old) with thyroid cancer admitted to the Department of Thyroid Surgery, Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School from January 2020 to December 2022 were included. Data collected included demographics [age, gender, body mass index (BMI), hypertension, diabetes], preoperative data (preoperative iPTH, preoperative serum calcium, preoperative serum phosphorus), intraoperative data (surgical duration, surgical procedure), postoperative data (postoperative iPTH, postoperative serum calcium, postoperative serum phosphorus), pathological diagnosis (maximum tumor diameter, number of lymph nodes metastasized and dissected, stage, whether parathyroid resection), hospitalization cost, postoperative hospitalization days. Preoperative iPTH and serum calcium levels were measured at 6:00 a.m. on the following morning after admission, and postoperative iPTH and serum calcium levels were measured at 6:00 a.m. on the following morning after surgery.

Inclusion criteria included thyroid cancer patients with age ≥60 years, and the operation was performed by the Department of Thyroid Surgery, Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School. Exclusion criteria included patients with severe cardiovascular disease, abnormal kidney function, or other serious systemic disease, patients with a history of hypocalcemia, patients who are taking medication that may affect serum calcium and missing data. Based on the occurrence of SH, patients were divided into the SH group and the asymptomatic group (*Figure 1*).

All enrolled patients underwent unilateral thyroidectomy or bilateral thyroidectomy + central lymph node dissection ± lateral cervical lymph node dissection. All operations were performed by the Department of Thyroid Surgery, Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School. During the operation, the surgeon should dissect thyroid surgical membrane and identify the parathyroid carefully. For patients who suspected of unintentionally removing the parathyroid

Table 1 Patient characteristics

Characteristics	Data
Gender	
Male	39 (28.47)
Female	98 (71.53)
Age (years)	65.35±4.31
60–69	109 (79.56)
70–79	27 (19.71)
80–89	1 (0.73)
BMI (kg/m^2)	24.46±3.35
Hypertension	68 (49.64)
Diabetes	20 (14.60)
Length of hospital stay (days)	5.05±2.40
Cost of hospital stay (CYN)	27,144.77±4,749.33

Data are presented as n (%) or mean ± SD. BMI, body mass index; CNY, Chinese Yuan; SD, standard deviation.

or affecting the parathyroid blood supply, parathyroid autotransplantation should be performed immediately. The removed suspected parathyroid tissue should be immersed in 1–2 mL of sterile 0.9% sodium chloride solution. Following confirmed with "water sinking method", the tissue was cut to a suitable size with surgical scissors, and then implanted in the ipsilateral sternocleidomastoid muscle.

Diagnosis and management of SH

After thyroid surgery, patients with the following clinical manifestations can be diagnosed as SH (2). (I) Paresthesia, or numbness and tingling, of the perioral region and the fingertips; (II) convulsions of limbs; (III) throat spasms, breathing difficulties, and even suffocation; and (IV) serum calcium is lower than the lower limit of the reference value provided by the laboratory of our hospital. iPTH and serum calcium were detected by the clinical laboratory of Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School. The normal iPTH level is 1.96 to 9.33 pmol/L and serum calcium (without albumin adjustment) is 2.025 to 2.75 mmol/L. Once diagnosed with SH, oral calcium supplementation should be initiated promptly. If symptoms remain significant after oral calcium supplementation, or if severe symptoms (such as convulsions of limbs) are present from the outset, intravenous calcium gluconate supplementation should be administered.

Statistical analysis

Statistical analysis was performed using the SPSS version 26.0. Quantitative data were expressed as mean ± standard deviation (SD). Categorical data are expressed as number or percentage (%). Univariate logistic regression analysis was used to identify potential risk factors for SH. Data were analyzed at a 95% confidence interval (CI) and statistical significance was set at $P<0.05$. Multivariate logistic regression analysis was performed to detect independent predictors based on statistically significant variables identified in univariate logistic regression analysis. Receiver operating characteristic (ROC) curves were constructed to identify the predictive value of independent risk factors for SH in older patients with thyroid cancer after surgery.

Results

According to the inclusion and exclusion criteria mentioned above, among the 151 patients, six patients had severe cardiovascular disease, abnormal kidney function, or other serious systemic disease, two patients had a history of hypocalcemia, two patients were taking medication that may affect serum calcium, and four patients had incomplete data. These patients were excluded and a total of 137 older patients, ranging in age from 60 to 81 years old, with an average age of 65.35 years old (*Table 1*), were included in this study, of which 48 (35.04%) patients developed SH, and 89 (64.96%) patients were asymptomatic (*Table 2*). There were 41 female patients (85.42%) and 7 male patients (14.58%) in the SH group, and 57 female patients (64.04%) and 32 male patients (35.96%) in the asymptomatic group. The mean preoperative iPTH in the SH group and the asymptomatic group was 7.00±5.25 and 5.52±1.80 pmol/L respectively. While the mean postoperative iPTH in the SH group and the asymptomatic group was 0.69±0.95 and 3.30±2.28 pmol/L respectively. One hundred and eighteen patients underwent total thyroidectomy and 19 underwent unilateral thyroidectomy. Among the 118 patients who underwent total thyroidectomy, 46 patients developed SH (38.98%). However, SH occurred in only 2 of 19 patients who underwent unilateral thyroidectomy (10.53%). The comparison of other indicators between the SH group and the asymptomatic group is shown in *Table 2*, including preoperative and postoperative serum calcium, preoperative and postoperative serum phosphorus, length of surgery,

Table 2 Univariate analysis of postoperative SH in older patients with thyroid cancer

Characteristics	SH group (n=48)	Asymptomatic group (n=89)	P valve	OR	95% CI
Gender			0.01	0.304	0.304–0.122
Male	7 (14.58)	32 (35.96)			
Female	41 (85.42)	57 (64.04)			
Age (years)	65.31±4.31	65.37±4.73	0.94	0.997	0.923–1.077
BMI (kg/m^2)	24.13±3.22	24.64±3.42	0.40	0.955	0.857–1.063
Preoperative iPTH (pmol/L)	7.00±5.25	5.52±1.80	0.04	1.175	1.010–1.367
Preoperative serum calcium (mmol/L)	2.38±0.13	2.37±0.13	0.65	1.893	0.122–29.347
Preoperative serum phosphorus (mmol/L)	1.12±0.13	1.10±0.16	0.23	4.486	0.383–52.598
Length of surgery (minutes)	105.00±38.30	111.07±47.08	0.44	0.997	0.988–1.005
Procedure of surgery			0.03	5.431	1.198–24.611
Unilateral resection	2 (4.17)	17 (19.10)			
Bilateral resection	46 (95.83)	72 (80.90)			
Postoperative iPTH (pmol/L)	0.69±0.95	3.30±2.28	<0.001	0.369	0.259–0.525
Postoperative serum calcium (mmol/L)	1.98±0.17	2.09±0.18	0.001	0.021	0.002–0.200
Postoperative serum phosphorus (mmol/L)	1.21±0.19	1.14±0.21	0.06	5.271	0.906–30.662
Maximum tumor diameter (cm)	1.10±0.69	1.30±1.49	0.35	0.851	0.605–1.197
Dissected lymph nodes	11.56±10.35	12.92±13.19	0.54	0.991	0.961–1.021
Metastatic lymph nodes	2.25±3.90	2.43±4.55	0.82	0.990	0.911–1.076
Tumor stage			0.59	1.216	0.602–2.456
I	23 (47.92)	47 (52.81)			
II	25 (52.08)	42 (47.19)			
Inadvertent parathyroid removal			0.32	1.636	0.626–4.279
Yes	9 (18.75)	11 (12.36)			
No	39 (81.25)	78 (87.64)			

Data are presented as n (%) or mean ± SD. BMI, body mass index; CI, confidence interval; iPTH, intact parathyroid hormone; OR, odds ratio; SH, symptomatic hypocalcemia; SD, standard deviation.

procedure of surgery, maximum tumor diameter, dissected lymph nodes, metastatic lymph nodes, tumor stage, and inadvertent parathyroid removal.

Univariate logistic regression analysis showed that there were significant differences between the SH group and the asymptomatic group in gender (SH group: male 7, female 41; asymptomatic group: male 32, female 57; P=0.01), preoperative iPTH (SH group: 7.00±5.25 pmol/L; asymptomatic group: 5.52±1.80 pmol/L; P=0.04), postoperative iPTH (SH group: 0.69±0.95 pmol/L; asymptomatic group: 3.30±2.28 pmol/L; P<0.001), postoperative serum calcium (SH group: 1.98±0.17 mmol/L; asymptomatic group: 2.09±0.18 mmol/L; P=0.001), procedure of surgery [SH group: unilateral resection 2 (4.17%), bilateral resection 46 (95.83%); asymptomatic group: unilateral resection 17 (19.10%), bilateral resection 72 (80.90%); P=0.03], with statistical significance (P<0.05), as shown in *Table 2*.

Multivariate logistic regression analysis showed that taking and gender, preoperative iPTH, postoperative

Table 3 Multivariate analysis of postoperative SH in older patients with thyroid cancer

Characteristics	P value	OR	95% CI
Gender	0.25	0.506	0.157–1.627
Preoperative iPTH (pmol/L)	0.004	1.405	1.115–1.770
Postoperative iPTH (pmol/L)	<0.001	0.315	0.199–0.499
Postoperative serum calcium (mmol/L)	0.43	3.358	0.168–67.150
Procedure of surgery	0.71	0.689	0.099–4.792

CI, confidence interval; iPTH, intact parathyroid hormone; OR, odds ratio; SH, symptomatic hypocalcemia.

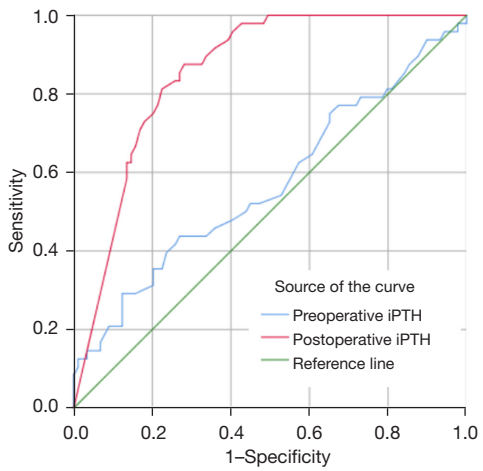

Figure 2 AUC of preoperative iPTH and postoperative iPTH as predictors of SH: preoperative iPTH AUC: 0.570 (95% CI: 0.466–0.675), postoperative iPTH AUC: 0.855 (95% CI: 0.794–0.917). AUC, area under the curve; iPTH, intact parathyroid hormone; SH, symptomatic hypocalcemia.

iPTH, postoperative serum calcium, and procedure of surgery into the logistic regression equation, it was found that both preoperative iPTH and postoperative iPTH were independent risk factors for predicting postoperative SH in older patients with thyroid cancer, as shown in *Table 3*.

The area under the curve (AUC) of the ROC can be used to evaluate the value of screening or diagnostic tests, with an AUC of 0.5–0.7 indicating low test authenticity and 0.7–0.9 indicating high test authenticity. As shown in *Figure 2*, the AUC of postoperative iPTH in predicting postoperative SH in older patients with thyroid cancer is 0.855 (95% CI: 0.794–0.917), indicating that postoperative iPTH is significant in predicting postoperative SH in older patients with thyroid cancer, and the cut-off rate is 0.5941 (sensitivity, 87.5%; specificity, 71.9%). While compared to postoperative iPTH, preoperative iPTH has the lower diagnostic efficacy, which AUC in older patients with thyroid cancer is 0.570, cut-off rate is 0.1681 (sensitivity, 29.2%; specificity, 87.6%).

Discussion

As one of the most common postoperative complications of thyroid cancer, SH is often manifested by symptoms such as numbness and discomfort in the perioral region and the fingertips, and even limb convulsions, diaphragm spasms, asphyxia death, etc., which seriously reduces the quality of life of patients (2). With advancements in medical care, the detection rate of older thyroid cancer patients in China has gradually increased. Our study focuses specifically on older patients (aged ≥60 years), which distinguishes it from prior research that primarily investigated a general population or younger cohorts. Older patients often exhibit unique physiological characteristics, such as reduced renal function, vitamin D deficiency, and diminished endocrine homeostasis, which may influence postoperative outcomes, including SH (6,7). By concentrating on this demographic, our study provides insights into predicting SH in a population that is both understudied and at higher risk for complications, aiming to provide ideas for the prevention and treatment of SH in older patients with thyroid cancer, so as to reduce hospitalization costs, shorten hospitalization time and improve the postoperative life quality of patients.

In our study, 48 (35.04%) developed SH, while 89 (64.96%) remained asymptomatic among the 137 included patients. Univariate logistic regression analysis identified significant differences between the SH and asymptomatic groups in terms of gender, preoperative iPTH, postoperative iPTH, postoperative serum calcium, and procedure of surgery. Multivariate logistic regression further demonstrated that both preoperative and postoperative iPTH levels were independent risk factors for predicting postoperative SH. Notably, postoperative

iPTH showed high diagnostic efficacy with an AUC of 0.855 (95% CI: 0.794–0.917), while preoperative iPTH had lower predictive value (AUC =0.570). These findings suggest that postoperative iPTH is a reliable marker for predicting SH in older thyroid cancer patients, whereas preoperative iPTH has limited utility in this context.

Previous studies have shown that SH is correlated with many factors, such as gender, age, postoperative iPTH and its change rate, postoperative serum calcium, and its change rate, Graves' disease, procedure of surgery, length of surgery, central lymph node dissection, accidental parathyroid resection, history of previous neck surgery, and hypomagnesemia (4,11-16). While few studies focused on older patients, this study showed that the incidence of SH after surgery in older patients with thyroid cancer is 35.04%, of which 4.17% were unilateral thyroidectomy and 95.83% were bilateral thyroidectomy. Both preoperative iPTH and postoperative iPTH were important factors affecting the occurrence of SH after operation. Postoperative iPTH has a good predictive value for SH occurrence in older patients with thyroid cancer. When postoperative iPTH is lower than 0.5941 pmol/L, patients are more likely to develop SH. This is consistent with the conclusions of several previous studies. For example, Lam *et al.* (17) found that symptomatic and biochemical hypocalcemia occurred in all patients with iPTH level <9 pg/mL 1 hour after surgery, requiring calcium and vitamin D treatment, while hypocalcemia did not occur in patients with iPTH ≥9 pg/mL. Islam *et al.* (18) also reached a similar conclusion, about 60% of patients (19/32) with early iPTH level <23 ng/L developed early hypocalcemia, while none of the patients with early iPTH level >23 ng/L developed hypocalcemia. Combined with the results of previous studies and this study, it is possible to identify high-risk older patients with SH after thyroid cancer surgery through postoperative iPTH, and offer timely calcium supplementation therapy.

At present, the relationship between preoperative iPTH and SH is still controversial. This study found that preoperative iPTH is an independent predictor of SH in older thyroid cancer patients after surgery, and older patients with higher preoperative iPTH levels are more likely to develop SH. This finding is consistent with the results reported by Del Rio *et al.* (19) and Maeda *et al.* (20). Interestingly, Zuberi *et al.* showed that there was no statistical significance in preoperative iPTH level in the incidence of SH after thyroid surgery (21). The authors hypothesize that several factors may contribute to this phenomenon. On the one hand, older patients may exhibit elevated baseline iPTH levels compared to younger patients due to age-related factors such as vitamin D deficiency or declining renal function, which contribute to increased iPTH levels with age (7). On the other hand, compared to younger patients, older patients have a diminished capacity to regulate endocrine homeostasis, leading to greater fluctuations of iPTH after thyroid surgery. The authors suggest that future studies should include additional indicators, such as vitamin D levels, to enable a more comprehensive assessment of parathyroid function. However, this study found that the AUC of preoperative iPTH in predicting postoperative SH in older patients with thyroid cancer was only 0.570 (95% CI: 0.466–0.675), its predictive value was lower compared with postoperative iPTH. There is still no definite conclusion on its predictive value for SH occurrence, which needs further study.

The results of the univariate logistic regression analysis indicated statistical differences between the SH group and the asymptomatic group in terms of gender. However, gender did not show statistical significance in the multivariate analysis, suggesting that it is not independent predictors of SH. Existing studies have shown a correlation between SH and gender after thyroid cancer surgery, but the results are not entirely consistent. Several studies have shown that female gender is one of the predictors of permanent postoperative hypocalcemia, which may be related to factors such as smaller parathyroid gland size in women, increased susceptibility to intraoperative damage, and the potential influence of estrogen levels on calcium metabolism and parathyroid function (22,23). While Lalos *et al.* (24) and Jan *et al.* (25) reported that no statistical difference was found between sex in predicting post-operative SH, which was consistent with our findings. Future research is needed to further clarify the relationship between gender and SH.

Although total thyroidectomy was associated with a significantly higher incidence of postoperative hypocalcemia compared to unilateral thyroidectomy in our study, multivariate analysis revealed that surgical procedure was not an independent predictor of SH. This finding contrasts with previous studies that identified total thyroidectomy as an independent risk factor (26). The discrepancy may be attributed to advancements in surgical techniques, such as intraoperative nerve monitoring and meticulous parathyroid gland identification, which may have mitigated the impact of total thyroidectomy on parathyroid function. These findings highlight the importance of individualized postoperative management strategies, particularly for patients undergoing

total thyroidectomy, while underscoring the need for further research to elucidate the complex interplay between procedure of surgery and other risk factors.

In our study, univariate analysis revealed that postoperative serum calcium levels were significantly lower in the SH group compared to the asymptomatic group. It is well known that decreased postoperative serum calcium levels are one of the manifestations of SH. However, further multivariate analysis showed that postoperative serum calcium levels were not an independent predictor of SH in older thyroid cancer patients. The authors speculate that this phenomenon may be related to the following reasons. First, the study population consisted exclusively of older patients aged over 60 years, which differs from previous studies in terms of age-related baseline characteristics. Second, postoperative serum calcium levels are a dynamically changing indicator. The actual timing of surgery completion varied among patients, while postoperative serum calcium levels in this study were uniformly measured from blood samples collected at 6:00 a.m. on the first postoperative day. This may explain why postoperative serum calcium did not emerge as an independent predictive factor in our analysis. Despite these findings, postoperative calcium monitoring remains clinically significant for the early detection of hypocalcemia. Future studies should explore the dynamic changes in calcium levels and their interactions with other risk factors to better predict and manage postoperative SH.

Vitamin D plays a critical role in calcium metabolism and parathyroid function, and its deficiency has been linked to an increased risk of postoperative SH (27,28). However, in our retrospective study, we did not have the data for preoperative vitamin D levels, which limits our ability to fully assess its impact on SH. This gap is primarily due to the fact that preoperative vitamin D testing is not routinely performed in clinical practice, particularly among older patients. Despite this limitation, our analysis of other key indicators provides valuable insights into the prediction of SH. We believe that future research should incorporate preoperative vitamin D levels to better understand its role in postoperative hypocalcemia and to develop more comprehensive predictive models.

As one of the major postoperative complications of older thyroid cancer, SH affects the life quality of patients. Early identification and timely intervention should be taken into clinical work, which is conducive to accelerating postoperative recovery, shortening hospitalization time, and reducing hospitalization costs. The authors put forward following suggestions. First of all, strengthen preoperative management, routine monitoring of preoperative iPTH, and preoperative calcium. Secondly, familiar with the anatomical structure of the neck, carefully identify and dissect the parathyroid during the operation, and rationally use energy instruments to avoid parathyroid injury. Last but not least, routinely monitor postoperative iPTH and postoperative calcium, identify high-risk patients with SH as soon as possible, and timely give oral or intravenous calcium supplement therapy.

There are some limitations in this study. First, it was a retrospective study, which may have introduced selection bias. Second, it was a single-center study with a small data sample, and the results may not be general to other settings. Third, certain relevant factors, such as perioperative vitamin D, were not included in the analysis. The authors sincerely hope that prospective studies can be conducted in the near future by designing well-structured research protocols, which will provide more clinically relevant guidance. Additionally, we aim to collaborate with multiple centers in future research, increase the sample size, and incorporate additional indicators, such as vitamin D levels, to enhance the rigor and depth of the study.

Conclusions

Postoperative iPTH is an independent risk factor for predicting SH after thyroid cancer in older patients, with an AUC of 0.855. Preoperative iPTH is also a significant factor in the occurrence of postoperative SH in older patients with thyroid cancer, but its predictive efficacy is limited. In order to avoid the occurrence of postoperative SH and reduce hospitalization costs and length, calcium supplementation should be given as soon as possible according to the level of postoperative iPTH.

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Footnote

Reporting Checklist: The authors have completed the STARD reporting checklist. Available at https://gs.amegroups.com/article/view/10.21037/gs-2024-526/rc

Data Sharing Statement: Available at https://gs.amegroups.

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and was approved by the ethics committee of Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School, Nanjing, China (No. 2025-0140-01). Written informed consent was obtained from all participants.

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