

Comparative outcomes of thyroid surgery in elderly patients: A retrospective cohort study

Yaşlı hastalarda tiroid cerrahisinin karşılaştırmalı sonuçları: Retrospektif bir kohort çalışması

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Abstract

Aim: The prevalence of benign and malignant thyroid diseases increases with age. Since the population continues to age, the necessity and feasibility of thyroid surgery in the elderly has become more questionable. The aim of this study is to evaluate thyroid surgery and determine whether thyroidectomy is a safe option in the elderly population, by comparing with younger counterparts.

Methods: The data of 471 consecutive patients (370 females, 101 males) with benign or malignant thyroid disorders who underwent thyroid surgery between June 2016 and May 2018 were evaluated retrospectively. The patients were divided into two groups, as younger (age <65) and elderly group (age ≥65). Both groups were compared in terms of indications, post-surgical complications, and histopathological results. All statistical tests were performed using SPSS, version 18.0, software (SPSS Inc., Chicago, IL).

Results: Thyroid surgery in the elderly patients showed similarities compared to younger patients in terms of indications and most of the postoperative complications ($P>0.05$ for each). However, some differences were seen such as increased postoperative hemorrhage and length of hospital stay in favor of the elderly ($P=0.035$ and $P<0.001$, respectively). The incidence of malignant disease was found to be slightly higher in the younger group compared to the elderly (42.96% vs. 31.81%, respectively, $P=0.095$). Surgery-related death was not observed.

Conclusion: Our experience confirms that successful results can be achieved with low morbidity in experienced hands if careful and close monitoring of co-morbid conditions is provided in elderly patients.

Keywords: Thyroidectomy, Elderly, Thyroid surgery, Complication, Geriatric

Öz

Amaç: Benign ve malign tiroid hastalıklarının prevalansı yaşla birlikte artar. Nüfus yaşlanmaya devam ettiğinden, yaşlılarda tiroid cerrahisinin gerekliliği ve uygulanabilirliği daha tartışılabilir hale gelmiştir. Bu çalışmanın amacı, yaşlı hastalarda tiroid cerrahisini değerlendirmek ve genç hastalarla karşılaştırıldığında tiroidektominin yaşlı popülasyonda güvenli bir seçenek olup olmadığını belirlemektir.

Yöntemler: Haziran 2016-Mayıs 2018 tarihleri arasında benign veya malign tiroid hastalığı olan ve tiroid cerrahisi geçiren 471 ardışık hastanın (370 kadın, 101 erkek) verileri retrospektif olarak incelendi. Hastalar genç grup (yaş <65) ve yaşlı grup (yaş ≥65) olmak üzere iki gruba ayrıldı. Her iki grup endikasyonlar, cerrahi sonrası komplikasyonlar ve histopatolojik sonuçlar açısından karşılaştırıldı. Tüm istatistiksel testler SPSS, sürüm 18,0, yazılım (SPSS Inc., Chicago, IL) kullanılarak yapıldı.

Bulgular: Yaşlı hastalarda tiroid cerrahisi, endikasyon ve postoperatif komplikasyonların çoğu açısından genç hastalara göre benzerlikler gösterdi ($P>0.05$). Bununla birlikte, artmış postoperatif kanama ve hastanede kalış süresi gibi yaşlılar lehine bazı farklılıklar görüldü (sırasıyla $P=0.035$ ve $P<0.001$). Malign hastalık insidansı genç grupta yaşlılara göre biraz daha yüksek bulundu (sırasıyla %42,96 ve %31,81, $P=0,095$). Cerrahi ile ilişkili ölüm gözlenmedi.

Sonuç: Deneyimlerimiz, yaşlı hastalarda ko-morbid durumların dikkatli ve yakından izlenmesi durumunda, deneyimli ellerde düşük morbidite ile başarılı sonuçların elde edilebileceğini doğrulamaktadır.

Anahtar kelimeler: Tiroidektomi, Yaşlı, Tiroid cerrahisi, Komplikasyon, Geriatrik

Introduction

As people get older, the frequency of benign and malignant thyroid disease increases [1]. In almost 50% of patients over the age of 65, nodules can be shown on ultrasound scanning. Ninety percent of women over 60 years of age and 60% of men over 80 years of age refer to the physician with symptoms caused by thyroid nodules, and of these, %5 have malignant nodules [2]. Due to the increased incidence of malignancy, nodules require a more careful examination in elderly patients. Furthermore, it has been reported many times in the literature that the course of malignant cases tends to be more aggressive in elderly patients. Some subtypes of malignant thyroid diseases, such as anaplastic thyroid cancer and primary thyroid lymphoma, occur particularly over the age of 60 years [3,4]. Also, some authors reported that patients over 60 years of age who present with hyperfunctional thyroid nodules are at risk for developing osteoporosis and severe cardiac arrhythmia [5]. However, when it comes to the treatment of thyroid diseases in elderly patients, there is a general belief that surgical treatment will be risky due to advanced age and co-morbidities. Therefore, patients are often followed up with conservative treatment methods such as medical therapy or radioactive iodine. But because of long-term medical treatment, delays in surgical procedures may expose elderly patients to undesired risks such as compression-related respiratory distress, hyperthyroidism-related arrhythmias, bone loss, and metastasis in malignant cases.

The aim of this study is to evaluate thyroid surgery in elderly patients in terms of indications for surgery, post-surgical complications, and histopathological results and to determine whether thyroidectomy is a safe option in the elderly population by comparing with younger counterparts.

Materials and methods

The data of 471 consecutive patients (370 female, 101 male) with benign or malignant thyroid disorders who underwent thyroid surgery between June 2016 and May 2018 at the endocrine surgery department of a single tertiary level referral center were retrospectively evaluated. The study protocol was approved by the Ethics Committee of Ankara Numune Training and Research Hospital (Date: 07/02/2019, No: E-19-2474). Informed consent form was obtained from patients at the time of registry. The study was conducted in accordance with the Declaration of Helsinki. All patients were evaluated by an endocrinologist and an anesthesiologist before surgery. If necessary, patients with co-morbidities were consulted from the relevant clinics, and their treatment was rearranged before surgery. Patients who had preoperative recurrent laryngeal nerve (RLN) palsy and/or parathyroid disorder were excluded from the study. Patients were divided into two groups. The first group included 405 patients under the age of 65 years (85.98%), named as the younger group. The second group included 66 patients (14.02%), who were 65 years and over, and defined as the elderly group. Both groups were compared in terms of gender, body mass index, initial complaints, family history, previous thyroid surgery, preoperative indications, co-morbid diseases, surgical procedures, length of post-operative hospital stay, post-operative complications (laryngeal nerve injury, hypocalcemia,

hemorrhage, seroma, wound infection and systemic complications) and final histopathological results.

All operations were performed by surgeons who had experience in thyroid surgery (more than 50 surgeries per year). In the postoperative period, all patients received prophylactic calcium supplementation therapy consisting of oral calcium combined and, if needed, vitamin D. In the follow-up period, patients were evaluated in the 3rd and 6th months after thyroidectomy. Postoperative hypocalcemia is diagnosed in the presence of hypocalcemia (serum calcium < 8.0 mg/dL) with an inadequate parathyroid hormone (PTH) concentration (below 15 ng/L) which persists 12 months after cervical surgical procedure. All patients were examined with an indirect laryngoscope to evaluate vocal cord mobility in the pre and postoperative period. The RLN palsy is considered "temporary", if the motility of the vocal cords is normal within 6 months. If RLN palsy lasts longer than this period, it is considered "permanent". Surgery-related mortality was defined as death occurring within 30 days postoperatively.

Statistical analysis

All statistical tests were performed using SPSS, version 18.0, software (SPSS Inc., Chicago, IL). Descriptive analyses were presented as number/percentage for categorical variables, and mean (standard deviation (SD)), percentages, minimum and maximum values for continuous variables. One-way analysis of variance (ANOVA) was used to compare continuous variables. The difference between the ratios was compared using the Pearson Chi-square test. Differences were calculated for their statistical significance using the Fisher exact test. A *P*-value <0.05 was considered statistically significant.

Results

Of the 471 patients undergoing thyroid surgery, 405 were younger, and 66 were elderly. The mean age was 45 (11 years in the younger group and 71 (6) years in the elderly group ($P<0.001$). Among the complaints of the patients, especially in the elderly group, compressive symptoms were more common than the younger group (28.78% vs. 12.09%) ($P<0.001$). The indication of thyroidectomy in the younger group was suspicious or malignant nodule in 53 (13.08%). In the elderly group, 7 (10.6%) of the patients had malignancy diagnosed preoperatively by fine needle aspiration biopsy (Table 1). One or more co-morbidities were observed in 37.03% of the patients in the younger group and 74.24% of the patients in the elderly group ($P<0.001$). In both groups, hypertension and diabetes were the most common co-morbid diseases. The distribution of co-morbidities is presented in Table 2. Total thyroidectomy (TT) was the most common operation in both younger (96.8%) and elderly groups (97%). However, neck dissections were performed in 40 (9.88%) patients in the younger group and 5 (7.5%) in the elderly group. The mean operation time was 68.5 (13.09) minutes in the younger group and 75.44 (9.55) minutes in the elderly group, and the difference was not statistically significant ($P=0.14$). When postoperative complications were evaluated, the rates in groups were similar. In younger and elderly groups, permanent hypocalcemia was observed in 2.46% and 3%, permanent vocal cord paralysis, in 1.23% and 1.52%,

seroma, in 0.74% and 1.51%, and wound infection, in 1.23% and 1.51%, respectively.

Table 1: Comparison of demographics and other characteristics of patients

Variables	Younger Group	Elderly Group	P-value
	Age <65 years (n=405)	Age ≥65 years (n=66)	
Age (years)	45 (11)	71 (6)	<0.001
Sex			
-Male	86 (21.23)	15 (22.72)	0.795
-Female	319 (78.77)	51 (77.28)	
Body mass index (kg/m ²)	28.73 (4.08)	28.07 (5.31)	0.507
Preoperative complaint			
-Asymptomatic	105 (25.92)	19 (28.78)	0.71
-Neck swelling and pain	162 (40)	15 (22.73)	0.22
-Compressive symptoms	49 (12.09)	19 (28.78)	0.001
-Hyperthyroidism	64 (15.81)	12 (18.19)	0.52
-Hypothyroidism	25 (6.18)	1 (1.52)	0.024
Family history			
-No	396 (97.8)	65 (98.48)	0.684
-Yes	9 (2.2)	1 (1.52)	
Previous thyroid surgery			
-No	384 (94.81)	61 (92.42)	0.889
-Yes	21 (5.19)	5 (7.58)	
Indications for thyroidectomy			
-MNG	270 (66.67)	42 (63.64)	
-Toxic goiter	82 (20.25)	17 (25.76)	0.316
-Suspicious & malignant nodule	53 (13.08)	7 (10.60)	

MNG: Multinodular goiter, values in parentheses are percentages, the data are used as the mean (standard deviation) for age and body mass index.

Table 2: Comparison of co-morbidities between groups

Co-morbidities	Younger Group	Elderly Group	P-value
	Age <65 (n=405)	Age ≥65 (n=66)	
-None	255 (62.96)	17 (25.75)	
-Hypertension	37 (9.14)	19 (28.79)	
-Diabetes Mellitus	48 (11.85)	10 (15.16)	
-Cardiovascular disease	9 (2.23)	6 (9.09)	
-Pulmonary disease	7 (1.72)	4 (6.07)	
-Dyslipidemia	10 (2.46)	3 (4.54)	
-Renal failure	4 (0.98)	1 (1.52)	
-History of cancer	9 (2.23)	3 (4.54)	
-Other diseases	26 (6.43)	3 (4.54)	
Total number of patients with co-morbidities	150 (37.03)	49 (74.24)	<0.001

Values in parentheses are percentages.

The postoperative hemorrhage rate was higher in the elderly group (4.54% vs. 1.72%), and this difference was statistically significant ($P=0.035$). Tracheostomy was performed in 3 patients in the younger group and 1 in the elderly group due to respiratory distress after bilateral vocal cord paralysis. Due to postoperative hemorrhage and hematoma, 2 patients from the younger group and 1 patient in the elderly group required re-surgery. Hematoma, in other cases, was reabsorbed spontaneously. Wound infections were successfully treated with abscess drainage and antibiotics in 5 (1.23%) patients in the younger group and 1 (1.51%) in the elderly group. In the younger group, 2 male patients aged 49 and 64 years were followed up in the postoperative intensive care unit due to postoperative angina pectoris, one 52-year-old female due to pneumonia (patient with tracheostomy), and 2 other patients due to resistant hypertension. In the elderly group, a 74-year-old male patient with ischemic heart disease and arrhythmia and another patient who was re-operated due to a postoperative hematoma were also followed up in the postoperative intensive care unit. Postoperative length of hospital stay was 1.7 (0.91) and 2.2 (0.34) days for younger and old groups, respectively ($P<0.001$). Surgical procedures, postoperative complications, and length of hospital stay between groups are presented in Table 3.

Final pathology results revealed malignancy in 174 (42.96%) cases in the younger group and 21 (31.81%) in the elderly group. However, in both groups, micro-papillary cancers accounted for the majority of malignant cases. While all 4 follicular cancer cases were observed in the younger group, the single anaplastic cancer case was detected in an 80-year-old male

patient. Although the malignancy rates were similar between the groups ($P=0.095$), the distribution of histological subtypes differed statistically ($P<0.001$) (Table 4). However, the tumor size, bilaterality, multifocality, extra-capsular invasion and lymph node involvement were similar. Distant metastasis was not detected in any of the patients. The mean follow-up time after surgery was 18.62 (7.79) months (4-33 months), and death associated with thyroid disease occurred in one case. The patient diagnosed with anaplastic cancer died in the 4th postoperative month.

Table 3: Surgical procedures, postoperative complications and length of hospital stay between groups

Variables	Younger Group	Elderly Group	P-value
	Age <65 (n=405)	Age ≥65 (n=66)	
Type of thyroidectomy			
-Lobectomy	8 (1.97)	0 (0)	0.435
-Total	392 (96.8)	64 (97)	
-Complementary	5 (1.23)	2 (3)	
Neck dissection			
-No	365 (90.12)	61 (92.5)	0.773
-Yes	40 (9.88)	5 (7.5)	
-Central	24 (5.92)	4 (6.0)	
-Lateral	16 (3.96)	1 (1.5)	
Operation time (min)	68.5 (13.09)	75.44 (9.55)	0.14
Hypocalcemia			
-Transient	29 (7.16)	7 (11)	0.412
-Permanent	10 (2.46)	2 (3)	
RLN injury			
-Transient	17 (4.19)	4 (6.06)	0.22
-Permanent	5 (1.23)	1 (1.52)	
Seroma	3 (0.74)	1 (1.51)	0.314
Post-operative hemorrhage	7 (1.72)	3 (4.54)	0.035
Wound infection	5 (1.23)	1 (1.51)	0.374
Tracheostomy	3 (0.74)	1 (1.51)	0.071
Systemic complications	5 (1.23)	2 (3.03)	0.068
Post-operative length of hospital stay (day)	1.7 (0.91)	2.2 (0.34)	<0.001

RLN: Recurrent laryngeal nerve. Values in parentheses are percentages. The data are presented as mean (standard deviation) for the duration of surgery and hospital stay.

Table 4: Histopathological results

Variables	Younger Group	Elderly Group	P-value
	Age <65 (n=405)	Age ≥65 (n=66)	
Final Pathology			
-Benign	231 (57.04)	45 (68.19)	0.095
-Malignant	174 (42.96)	21 (31.81)	
Histological type of malignancies			
PTMC	92 (52.87)	9 (42.85)	<0.001
PTC	66 (37.93)	7 (33.35)	
FTC	4 (2.31)	0 (0)	
MTC	1 (0.57)	4 (19.04)	
ATC	0 (0)	1 (4.76)	
Others	11 (6.32)	0 (0)	
Tumor size (mm)	10 (1.77)	8 (2.105)	0.922
Bilaterality	59 (10)	6 (9)	0.739
Multifocality	91 (38)	9 (43)	0.645
Extracapsular Invasion	35 (15)	4 (19)	0.576
LN involvement			
No	151 (86.78)	19 (90.47)	0.88
Yes	23 (13.21)	2 (9.53)	

PTMC: Papillary thyroid microcarcinoma, PTC: Papillary thyroid carcinoma, FTC: Follicular thyroid carcinoma, MTC: Medullary thyroid carcinoma, ATC: Anaplastic thyroid carcinoma, LN: Lymph node. Values in parentheses are percentages.

Discussion

Since the population continues to age, it is further questioned whether thyroidectomy is a safe option in the treatment of thyroid diseases in the elderly. The definition of the elderly differs between studies. Usually, patients between the ages of 16 and 64 years are classified as younger, those 65 to 79 years old are classified as elderly, and those 80+ years old are classified as super-elderly [6,7]. Since the number of patients over 80 was insufficient in our series, we designed our study in 2 groups. There are many single-center studies evaluating thyroidectomy in many aspects among younger and elderly patients [5,8]. In these studies, indications for thyroid surgery in elderly patients are reported as benign enlargements with compressive symptoms, medical treatment-resistant thyrotoxicosis, and malignancy or suspicious diagnoses. In the

present study, although the compressive symptoms were at the forefront in elderly patients as in Tartaglia's study [8], there was no significant difference between the groups in terms of surgical indications. Contrary to the study of Passler et al. [9], it was noteworthy that the indication for malignancy was higher in the younger group. This situation has been associated with an increase in the detection of micro cancer as a result of advanced diagnostic imaging methods and ultrasound-guided needle biopsies. The safety of thyroidectomy in elderly patients is still a controversial issue in the literature. Although there is no consensus on this issue, surgery is rarely recommended due to increased operative risks in elderly [10]. The common approach among surgeons has long been avoiding elective surgery in the elderly, due to high co-morbidity rates. Even Passler et al. [9] and Miccoli et al. [11] suggested the surgery in elderly patients only when absolutely necessary. However, some authors have also reported that mortality is related to biological age and co-morbidities rather than chronological age [8]. Tartaglia et al. [8] reported a 2.45% postoperative mortality in 448 patients aged 65+ due to co-morbidities unrelated to thyroidectomy. In our study, in the elderly group, 75% of the patients had a minimum of one co-morbidity, and hypertension was the most common. In different series that report high mortality, cardiovascular diseases (such as coronary arteriosclerosis or cardiac arrhythmia) are most frequently reported as co-morbidities [8]. Although age is not a determining factor for the radicality of the surgery to be chosen, TT is the preferred surgical method in our clinic to minimize the recurrence of the disease and decrease the morbidity due to re-intervention, especially in elderly patients. Two of 66 elderly patients in our study underwent complementary thyroidectomy, and 64 underwent TT. Our postoperative mortality rate was 0 as Seybt et al. [12] and two other studies [9-11]. Although postoperative complication rates were slightly higher in the elderly group, statistical significance was found only in terms of postoperative hemorrhage. All elderly patients who developed hematoma were hypertensive and had a history of cardiac stents requiring anti-coagulation medication. Recently, a meta-analysis of thyroidectomy for thyroid cancer (TC) in elderly patients reported increased mortality rates [Hazard Ratio 1.95] and risk of complications [Odds Ratio 1.82] following thyroidectomy compared to younger patients [13]. In another study, Echanique et al. [1] reported that the incidence of RLN injury increased in patients with age >65 while hypoparathyroidism decreased with age >65 but <85 years. However, in the current study, similar complication rates were observed in younger and elderly groups. Permanent RLN damage rate was 1.23% vs. 1.52%, while permanent hypocalcemia rates were 2.46% and 3%, respectively. As in Tartaglia [8] and Seybt's [12] studies, we did not find a statistically significant difference between the groups in terms of these two primary complications. In accordance with the literature [1,14], our study showed that the length of hospital stay increases with patient age. This finding can be associated with co-morbidities that may predispose the patients to increased complications, which may result in a prolonged hospital stay.

In contrast to some articles in the literature [9,12], we found that malignancy rates were significantly higher in the younger group (42.96% vs. 31.81%). Almost all undifferentiated cancers were detected in patients 65 years and older, as expected.

It is a general belief that TC in elderly patients may be more aggressive with a poor prognosis due to the fact that undifferentiated types are more common and diagnosed at an advanced stage. Moreover, several authors concluded that TC in elderly patients was associated with larger tumors and higher rates of extrathyroidal extension than that in younger patients [4, 7]. However, we found no significant difference between the younger and elderly groups in terms of tumor size, bilaterality, multifocality, extra-capsular invasion, or lymph node involvement.

Limitations

The most important limitations of this study are insufficient sample size of elderly patients and retrospective nature as it has an inherent selection bias for the surgical patient. Even so, the current study presents a unique evaluation of thyroid surgery performed in both the younger and elderly patients by demonstrating trends in surgical outcomes.

Conclusion

Thyroid surgery in elderly patients are similar to younger patients in terms of indications, surgical procedures, and postoperative complications; however, some differences were seen, such as increased postoperative hemorrhage and length of hospital stay. In addition, an increase in favor of the elderly was not found in terms of malignancy rates, but it was confirmed that almost all undifferentiated tumors were seen at 65 years and older. Therefore, an aggressive surgical approach may be required for elderly patients due to the worse prognosis of malignancies and to avoid recurrence and reinterventions, particularly in the case of toxic diseases. In light of the results obtained from this study (similar complication rates and no surgery-related mortality), it can be said that thyroidectomy in elderly patients is not more dangerous than in younger patients. Our experience confirms that successful results can be achieved with low morbidity in experienced hands if careful and close monitoring of co-morbid conditions is provided in elderly patients.

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