Yaşlılarda Enerji Cihazları İle Yapılan Total Tiroidektomi Sonuçları

Outcomes Of Total Thyroidectomy Performed With Energy Devices In The Elderly

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ÖZ

GİRİŞ ve AMAÇ: *Bireylerin yaşam süresinin uzamasıyla birlikte tiroid nodüllerinin prevalansı da artmıştır. Bunun sonucu olarak, yaşlılarda yapılan tiroidektomi oranı da artmıştır. Ancak yaşlılarda tiroidektomi genç hastalara göre daha yüksek risk taşımaktadır. Bu çalışma, yaşlı hastalarda tiroidektomide iki enerji bazlı cihazın etkinliğini değerlendirmeyi amaçladı.*

YÖNTEM ve GEREÇLER: *Ocak 2013-Ekim 2017 tarihleri arasında tiroidektomi geçiren hastalar geriye dönük olarak incelendi. Hastanın demografik, cerrahi ve klinik verileri hastane veri tabanından değerlendirildi. Geçici veya kalıcı hipokalsemi, vokal kord paralizi, kanama, hastanede kalış süresi ve tekrar ameliyat oranları analiz edildi.*

BULGULAR: *224 hastanın 36'sı 65 yaş ve üzerindeydi ve geri kalanı gençti. Beş hasta (%13.9) erkek, 31 hasta (%86.1) kadındı. Hastaların ortalama yaşı 67,5 idi. Gruplar arasında operasyon süresi, postoperatif kanama, vokal kord paralizisi oranı ve postoperatif hipokalsemi, postoperatif paratiroid hormon düzeyleri ve reoperasyon oranı açısından anlamlı fark yoktu (p> 0.05). Uzun süreli yatış ve postop birinci gün dren çekilememesi yaşlı hastalarda anlamlı olarak daha yüksek bulundu (p <0.05).*

TARTIŞMA ve SONUÇ: *İleri teknolojiler, yaşlı hastalarda cerrahi sırasında morbidite ve mortaliteyi azaltmaktadır. Sonuçlarımız, enerji bazlı cihazların yaşlı hastalarda güvenli tiroidektomi sağladığını gösterdi.*

Anahtar Kelimeler: *tiroidektomi, enerji bazlı cihazlar, yaşlı hastalar*

ABSTRACT

NTRODUCTION: *The prevalence of thyroid nodules has been increased as a result of the high life expectancy of individuals. By the way, the rate of thyroidectomy also increased in the elderly. However, thyroidectomy in the elderly has a higher risk when compared to young patients. This study aimed to evaluate the efficacy of two energy-based devices in thyroidectomy in elder patients.*

METHODS: *Patients who had undergone thyroidectomy between January 2013 and October 2017 were retrospectively analyzed. The patient's demographic, surgical, and clinical data were evaluated from the hospital database. Transient or permanent hypocalcemia, vocal cord paralysis, bleeding, duration of hospitalization, and reoperation rates were analyzed.*

RESULTS: *Thirty-six out of 224 patients were 65 years or older and the remaining were young. Five patients were male (13.9 %), 31 patients were female (86.1%). The mean age of the patients was 67.5 years. There was no significant difference among the groups in terms of operative time, postoperative hematoma/seroma after the drainage tube was removed, rate of vocal cord paralysis, and postoperative hypocalcemia, postoperative parathyroid hormone levels, and rate of reoperation (p>0.05). Long-term hospitalization and inability to the withdrawal of drainage tubes within one day were significantly higher in elderly patients (p<0.05).*

DISCUSSION AND CONCLUSION: *Advanced technologies reduce morbidity and mortality during surgery in elderly patients. Our results showed that energy-based devices provide safe thyroidectomy in elderly patients.*

Keywords: *thyroidectomy, energy-based devices, elderly patients*

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INTRODUCTION

The prevalence of thyroid nodules increases with age. The incidence of thyroid nodules is 90% in women over 60 years old and 60% in men over 80 years old (1, 2). The reported incidence of thyroid nodules in the autopsy series was 50% over 65 years of age (3). Furthermore, the incidence of highly malignant thyroid tumors, such as anaplastic thyroid carcinoma, also increases with age and reaches up to 8.8% in people older than 65 years(1, 4-6). The rate of thyroidectomy in the elderly is increased over the past decade(3, 7, 8). However, thyroidectomy in the elderly has higher risks when compared with the thyroidectomy performed in young patients. The risk is not only due to age but also the presence of co-morbidities(9). It is well known with the evidence of literature, surgery or surgery time is an independent and potentially modifiable risk factor for complications such as surgical site infection, venous thromboembolism, bleeding, hematoma formation, and necrosis(10). For this reason, it is important to use appropriate technology to reduce operative time, postoperative pain, and provide efficient hemostasis, especially in elderly patients during thyroidectomy (3). Today, energy-based devices are increasingly using during thyroidectomy because they provide enhanced hemostatic advantages over conventional surgical techniques(11).

The worldwide population of over 60 years of age in the early 2000s was 600 million, and it is predicted to reach 1.2 billion in 2025 and 2 billion in 2050(1). It can be assumed that the rate of elective surgery will gradually increase. However, the main classification of the geriatric age group and the safety and efficacy of thyroidectomy in the elderly is still controversial in the medical literature(12, 13). The age limit of geriatric populations has changed in different studies including 60, 65, 70, and even 80 years (14). The energy-based devices have been shown that reduced operative time and increased the hemostasis during thyroidectomy (15-17). This study aimed to evaluate the efficacy of two energy-based devices in thyroidectomy elderly patients.

PATIENTS AND METHODS

Study design:

The study protocol was approved by the Clinical Research Ethics Committee of Derince Training and Research Hospital (Approval number: 2021/16). All phases of the study were conducted in line with the principles of the Helsinki Declaration. Two-hundred and twenty-four patients out of 267 patients who had undergone thyroidectomy between January 2013 and October 2017 were retrospectively analyzed. Forty-three patients were excluded; 3 patients underwent surgery for toxic solitary nodules, 3 patients for recurrent multinodular goiter, and 37 patients underwent parathyroidectomy at the same time. The patients were divided into two groups; group 1 consisted of patients who were younger than 65 years of age, and group II who were 65 years or older. Demographic, surgical, and clinical data of the patients were evaluated retrospectively from the hospital database. Group I and Group II were compared in terms of transient or permanent hypocalcemia, vocal cord paralysis, bleeding, duration of hospitalization, and reoperation rates.

Preparation of the patients for surgery:

Each patient received standard preoperative evaluation including thorough clinical and laboratory evaluation. Furthermore; every comorbidity was evaluated by the relevant clinics in terms of impact on the surgical risk. All operations were performed by two senior surgeons with two energy base devices; Harmonic® Scalpel (HS) (Johnson and Johnson, USA) or LigaSure® (LS) (Medtronic, UK). Oral intake was started at the postoperative 6th hour in uncomplicated cases, and drains were removed when the drain output was under 20 cc. All patients are discharged home with 100 μg/day levothyroxine. Routine postoperative control was performed in the first week and follow-up measurement of TSH every four weeks

Statistical Analysis:

Data were analyzed by using SPSS 20.0 for Windows (Armonk, NY, IBM Corp). Results were given as percentages or median and ranges. Quantitative and qualitative variables were compared with the Mann-Whitney U test and Chi-square (Pearson's or Fischer's Exact) tests, respectively. A p-value of less than 0.05 was considered to be significant.

RESULTS

Thirty-six out of 224 patients were 65 years or older. 5 (13.9%) patients were male, 31(86.1%) patients were female. The mean age of the patients was 67.5 years (range: 65-80 years). The diagnoses of the patients were as follows; multinodular goiter in 29 (80.6%) patients, toxic multinodular goiter in 7 (19.4%) patients. In Group I, 53 (28.2%) patients had co-morbidities, while in Group II there were 26 (72.2%) patients. The rate of hypertension and type 2 diabetes was significantly higher in group I than in patients in group II ($p = 0.000$ and $p = 0.002$, respectively). In group two, neither Graves' disease nor malignancy was diagnosed as a preoperative diagnosis. 24 (66.7%) patients were normoactive, 2 (5.6%) were hypoactive, 10 (27.8%) were hyperactive preoperatively in group two. The

distribution of co-morbidities and demographic variables are summarized in Table 1.

The rate of LS usage in Group I and II was 121(64.4%), and 28 (77.8%) respectively. However, the rate of HS usage in Group I and II were 67 (35.6%), and 8 (22.2%) respectively. There was no significant difference between the study groups in terms of choice of energy-based device use. The operation time in the group I and II were 65 and 62.5 minutes respectively and no statistically significant difference between two groups was found in terms of operation time. However prolonged hospitalization and retained drain due to high drain-output were significantly higher in elderly patients (p=0.005 and 0.019, respectively). Hornless was seen in 2 (1.1%) patients in group I and 1 (2.8%) patients in group two. The postoperative calcium value was 8.4 (ranged: 5.6-11.8) and 8.2 (ranged: 6.5-9.6) in groups I and two respectively. Postoperative hypocalcemia was found in 18 (9.6%) patients and 4 (11.1%) patients in groups I and II respectively.

There was no significant difference among the groups in terms of hematoma/seroma formation, rate of vocal cord paralysis, rate of postoperative hypocalcemia, postoperative parathyroid hormone levels, and rate of need for reoperation (Table II).

The postoperative pathologic analysis revealed papillary thyroid carcinoma in 33 (17.53 %) and 5 (13.9%) patients in Group I and II respectively. There was no significant difference regarding the rate of malignant and benign thyroid disease between the two groups.

Table I: Demographic characteristics of patients

	Younger than *age 65* (n=188)	*65 years and older* (n=36)	p
Gender			
Male	33 (17,6%)	5 (13.9 %)	**0,592**
Female	155 (82,4%)	31 (86.1 %)	
Age	50,5 (19-64)	67,5 (65-80)	**NA**
Comorbidity			
Hypertansion (HT)	40 (21.3%)	22 (61.1%)	**0,000**
Diabetes Mellitus (DM)	18 (9,6%)	11 (30,6%)	**0,002**
Coronary Artery Disease (CAD)	3 (1,6%)	1 (2,8%)	**0,506**
Chronic Obstructive Pulmonary Disease (COPD)	9 (4,8%)	5 (13,9%)	**0,054**
Hyperlipidemia (HL)	1 (0.5%)	1 (2,8%)	**0,296**
Previous malignancy	2 (1.1%)	0	**0,999**
Total	53 (28.2%)	26 (72,2%)	**0.000**
Preop function			
Normo active	147 (78,2%)	24 (66,7%)	**0.247**
Hypoactive	4 (2.1%)	2 (5,6%)	
Hyperactive	37 (19,7%)	10 (27,8%)	
Preop diagnosis			
Multinodular goiter (MNG)	142 (75,5%)	29 (80,6%)	**0,941**
Toxic Multinodular Goiter	40 (21,3%)	7 (19,4%)	
Graves' disease	4 (2.1%)	0	
Papillary carcinoma	2 (1,1%)	0	
Nerve monitoring	15 (8.0%)	3 (8,3%)	**0.999**
Energy device			**0,118**
LigaSure® (LS)	121 (64,4%)	28 (77.8%)	
Harmonic® Scalpel (HS)	**67 (35,6%)**	**8 (22,2%)**	

Table II: Postoperative outcomes

	Group I	Group II	p
Operation time	65 (45-95)	62,5 (45-90)	**0.259**
Drainage tube that cannot be withdrawn next day	17 (9,0)	9 (25.0)	**0.019**
Hematoma/seroma	2 (1,1)	1 (2.8)	**0.410**
Hoarseness	2 (1,1)	1 (2.8)	**0.410**
Hypocalcemia	18 (9.6)	4 (11.1)	**0.762**
Postop Ca value	8.4 (5.6-11.8)	8.2 (6.5-9,6)	**0.619**
Postop PTH value	40 (2,0-1052,3) (n=31)	40 (4.9-119) (n=4)	**0.959**
Reoperation	2 (1,1)	1 (2.8)	**0.410**
The patient who could not be discharged the next day	30 (16,0)	13 (36,1)	**0.005**
Surgeon			
Surgeon A	67 (35,6)	8 (22,2)	**0,118**
Surgeon B	121 (64,4)	28 (77,8)	
Pathology	(n=186)	(n=35)	**0,474**
Benign	154 (81.9)	30 (83,3)	
Malignant	**32 (17.0)**	**5 (13,9)**	

DISCUSSION

Thyroidectomy is the most commonly performed surgical procedure for the treatment of thyroid diseases all over the world(18-20). Thyroidectomy indications in the elderly are the same as young patients; suspicion of thyroid cancer, thyrotoxicosis, and large nodular goiter causing compression of adjacent structures(2). Previous studies have shown that the complication is mainly due to biological age and comorbidities such as hypertension, diabetes, coronary disease, cardiac arrhythmias, and pulmonary disease (1, 21). Physicians should keep in mind that taking measures to reduce the operation time in elderly individuals will reduce the complication rate(21). Current studies show that using a device alternative to traditional methods for dissection and hemostasis in geriatric patients is needed(2). So that, in the present study we used two energy-based devices to assist thyroidectomy in elderly patients.

The thyroid is one of the best-perfused organs in the human body. The blood flow through is 8 ml/100 g-tissue/second and, it increases above normal in hyperthyroid states almost double the normal value (16-17ml/100g-tissue/second)(18). Over the past decade, surgeons have always shown a greater willingness of performing safe and fast surgical procedures with sensitive, and dynamic hemostasis, minimal contralateral dissection damage (16, 22, 23). Hemostasis is the important step of thyroid surgery as all other surgical procedures, however, significant vascularization and small operation field forced the surgeon to establish meticulous hemostasis for a successful outcome in thyroid surgery. Because the most common cause of reoperation in the early postoperative period is bleeding and thus the risk of recurrent nerve and parathyroid injury increases (24). Conventional hemostatic procedures tying and/or clipping of blood vessels are the mainstay for achieving hemostasis but all of them are time-consuming techniques(5). Therefore, energy-based devices which provide hemostasis by sealing vessels, have become more and more favored during thyroidectomy(2, 5).

Energy-based devices reduce the operating time of thyroid surgery without increasing the estimated blood loss (17, 25). Zarebczan et al. have reported that operation time for thyroidectomy with LS and HS was 74 and 59 minutes, respectively(20). Our operation time was compatible with the literature. It was 62.5 and 65 minutes for thyroidectomy with LS and HS in elderly and younger patients but there were no statistically significant differences. When we compared two groups in terms of postoperative complications such as seroma, hematoma, wound infection, transient or definite hypocalcemia, or recurrent nerve palsy, we did not find a statistically significant difference. As the age of the population grows, the importance of safe thyroidectomy in the geriatric age group is becoming increasingly important (3). In general, surgeons do not tend to perform operations in the elderly for the risk of increased complications due to co-morbidities and long hospitalization periods (3). Previous studies were shown that thyroidectomy which is performed for thyrotoxicosis or compressive symptoms in elderly patients has good outcomes (1, 14). However, as in any kind of surgical procedure, thyroidectomy has a higher morbidity and complication rate in the elderly when compared with young patients(3, 12, 25). Passler et al. suggested that the increased complication rates in the elderly were associated with an increased incidence of malignancy in this age group(12).

However, Seybt et al. demonstrated that thyroidectomy can be performed safely with an acceptable complication rate in elderly patients(3). In

our study, no mortality was observed in the geriatric patient population.

The anticoagulant and antiaggregant treatments commonly used in elderly patients may cause bleeding tendencies and the development of a hematoma(3, 12, 26-28). The incidence of postoperative neck hematoma in the literature was 0.1%-4.7% (29-31). Passler et al. have found hematoma in 10.9% of their patients and reoperated 5.5% of these patients(12). Bliss at all has reported a hematoma rate of 0.9% in their series(32). Dehal et al. reported the incidence of postoperative neck hematoma in their study was 1.5% and they reported that age at discharge, sex, race, type of insurance, smoking, and alcohol abuse history, comorbidity, underlying diagnosis, and type of surgical procedure has a significant influence on the incidence of neck hematoma (26). On the other hand, previous studies have identified demographic characteristics such as advanced age and male gender as independent risk factors for neck hematoma (29, 33, 34). Tolone et al. compared the use of energy-based devices during thyroidectomy in elderly and younger patients and found no significant difference between the two groups(6).

The use of energy-based devices in geriatric patients can reduce hematoma development following thyroidectomy (2). Current literature also favors the use of energy-based devices to reduce the incidence of intraoperative hemorrhage, hematoma, and complication rates in elderly patients (2, 25, 27, 35). In our study, we observed hematoma following thyroidectomy in two (1.1%) patients in group one and one patient (2.8%) in group two. These patients are reoperated for this reason but there was not a statically significant difference. However, the drain that can't be removed within the next day due to high drain output was higher in group two and the difference was statically significant.

The treatment of hypercalcemia in the elderly is difficult because of the drugs used in the treatment of hypertensive and cardiac diseases generally seen in these patients (27). Seybt et al. have analyzed 428 patients and found an increased incidence of hypocalcemia following thyroidectomy in the elderly(12). However, other studies, reported that changes in patients' ages did not make a statistically significant difference(36, 37).

Passler et al. have reported a 13.6% hypocalcemia rate in their study(12). In our study, we have observed hypocalcemia in 4 (11.1%) patients. There was no significant difference in the rate of hypocalcemia and parathormone levels among elderly and young patients. Energy-based devices did not create a significant risk in terms of hypocalcemia in our study. Recurrent laryngeal nerve damage or palsy is an important complication of thyroidectomy and in some studies, age was considered as a risk factor for RLN injury, however, most of the studies were shown that there was no significant difference in terms of nerve injury in the elderly and young patients (27). But Bergenfelz et al. have found a correlation between aging and permanent nerve damage (38). Passler et al. reported their recurrent laryngeal nerve injury rate as 6.3%(12). In our study recurrent laryngeal nerve palsy injury rate was 2.8% and there was no statically significant difference between elderly and young patients in terms of nerve injury.

As a result, advanced technological devices reduce the morbidity and mortality related to surgery in elderly patients. Our results show that energy-based devices reduce the rate of complications and provide safe thyroidectomy in elderly patients.

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