ABSTRACT

Objective: The most feared complications of thyroid surgery, which is one of the most performed operations of endocrine surgery, are hoarseness due to recurrent nerve damage and hematoma formation in the neck. With the advancement of technology, the use of energy devices has increased during thyroid operations. However, there are different opinions about using energy devices during thyroid operations. Our study aimed to examine the reliability of energy use in thyroid operations.

Material and Methods: The data of 144 patients who underwent thyroid surgery for various reasons were reviewed retrospectively. The patients were divided into 2 groups, those who used energy devices during the operation and those who were operated with the conventional method. Demographic data of the patients, duration of operation, complication rates were evaluated comparatively.

Result: The majority of patients were women. It was observed that the operation time was shorter, and the amount of bleeding was less in the group in which the energy device was used ($p \leq 0.001$). It was determined that the duration of hospital stay of the patients was significantly longer in the conventional surgery group ($p \leq 0.001$). There was no significant difference between the two groups in terms of incision lengths. Likewise, there was no difference between the two groups in terms of complication development frequency. Postoperative verbal pain score was significantly higher in the group operated on by conventional method ($p \leq 0.001$).

Conclusion: Energy devices can be used safely in thyroid surgery with less hospital stay, less postoperative pain levels, better bleeding control and complication rates similar to conventional surgery.

Keywords: Thyroid, thyroidectomy, euthyroid goiter, energy device

INTRODUCTION

Thyroid operations are the most common operations of endocrine surgery. Approximately 130,000 thyroid operations are performed annually in the United States (1, 2). The standardization of surgery for thyroid tissue, an organ that receives a large amount of blood, was made by Emil Theodor Koher in the 1900s. The most feared complications are neck hematoma and hoarseness due to recurrent nerve injury.

Today, with the advancement of technology, energy devices have started to be used instead of the classical bonding technique during operation. Harmonic focus is one of the devices used for this purpose (3). The device working with ultrasonic energy can perform coagulation and cutting processes. However, the cutting process is done uncontrollably (4, 5).

Studies have shown that with the increase in the use of energy devices, the duration of the operation and the amount of bleeding have decreased by up to 65% (6).
MATERIAL and METHODS

The prospectively collected data of patients who underwent thyroid surgery in the general surgery service between 2014 and 2018 were retrospectively analyzed. We excluded patients with bleeding disorders, those who underwent additional surgeries, and individuals with missing data from the study. A total of 144 patients were included in the study. The patients who were operated with the classical ligation method were divided into Group A, and the patients who used only energy devices during the operation were divided into Group B.

Age, gender and body mass index (BMI), histopathological findings, operation time, length of incision, length of drain, length of hospital stay and complications (recurrent nerve damage, hematoma, hypocalcemia, seroma) were evaluated as demographic data.

The patients were prescribed thyroxine hormone at 100mc/day at the time of discharge.

Surgical Technique

All operations were performed in the supine position under general anesthesia. Ethicon’s Harmonic Scalpel (HS) FOCUS was used as the energy device. No context was used in patients using harmonic focus. The thyroid tissue was stripped from the trachea after the lower an

Continuous data are presented as mean ± standard deviation or the median with interquartile ranges. Clinical parameters were compared using Student’s t-test or Mann-Whitney U test for continuous data and using the chi-square test or Fisher’s exact test for categorical variables between the HS and HSCAT groups (SPSS 25.0 for Windows). P values < 0.05 were considered statistically significant.

Statistical Analysis

RESULTS

A total of 144 patients whose data could be fully accessed were included in the study. The vast majority of patients were female (135, 93%). The mean BMI was 28.8±3.5 years, and the mean age was 40.9±10 (20-71).

Mean incision lengths were 62.9±5.6 mm (45-77). No significant relationship was found between Group A and Group B (p=0.187). Mean operative times were measured as 70.5±27.9 minutes. The mean operation time was 47 minutes in the harmonic focus group and 98 minutes in the classical surgery group, and this difference was statistically significant (p<0.001).

The bleeding was evaluated with the amount of wetted gauze and was determined as 1.6±0.6 sponge. While it was 1.4 sponges in the energy device group, it was measured as 2 sponges in the classical binding group (p<0.001)

Drains were not used in 9 of the patients. It was observed that the drains were removed after an average of 2.06±0.8 days in patients who used drains. It was determined that 9 patients who did not use drains were in the harmonic focus group (p<0.001)

It was determined that the patients stayed in the hospital for an average of 3.1±1.02 days. The hospital stay was longer in the classical bagging group, 3.8 days (p<0.001). No patient was discharged with a drain.

The number of complications in the postoperative period was equal in both groups. In Group B, one patient experienced hematoma, one had seroma, and four patients had transient hypocalcemia. In Group A, hoarseness was observed in two patients, and transient hypocalcemia was noted in four patients (p = 0.39) (see Table 1).

According to the verbal pain scale (VAS) evaluated on the 1st postoperative day, the mean pain was 1.8 in group B and 3.2 in group A (p<0.001).

When the histopathological evaluations of the patients were made, papillary thyroid cancer was found in 15% of the patients and multinodular goiter was found in the majority (69%).

No patient underwent subtotal thyroidectomy. Lobectomy was performed in six patients (4%).

Table 1. Patients and groups characteristics

<table>
<thead>
<tr>
<th></th>
<th>Group A (Convansional)</th>
<th>Group B (Harmonic)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td>0.171</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>60</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Age (mean)</strong></td>
<td>42</td>
<td>40.3</td>
<td>0.615</td>
</tr>
<tr>
<td><strong>Operation Time (min)</strong></td>
<td>98</td>
<td>47</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Incision length (mm)</strong></td>
<td>65</td>
<td>61</td>
<td>0.187</td>
</tr>
<tr>
<td><strong>Perioperative Bleeding (ml)</strong></td>
<td>20</td>
<td>16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Drain take out (day)</strong></td>
<td>2.25</td>
<td>1.8</td>
<td>0.27</td>
</tr>
<tr>
<td><strong>Drain using</strong></td>
<td>66/66</td>
<td>9/78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Hospital stay (day)</strong></td>
<td>3.8</td>
<td>2.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Complication</strong></td>
<td></td>
<td></td>
<td>0.39</td>
</tr>
<tr>
<td><strong>Hematoma</strong></td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Seroma</strong></td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Hypocalcemia</strong></td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Recurren nerve damage</strong></td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>VAS (postoperative 1. Day)</strong></td>
<td>3.2</td>
<td>1.8</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
DISCUSSION

Bleeding control is of vital importance in the surgery of the thyroid tissue, which is one of the organs with the most blood supply in the body. In the 1800s, mortality rates in thyroid surgery were quite high (40%). With Emil Theodor Kocher's standardization of thyroid surgery in the 1900s, morbidity and mortality rates decreased (3, 4, 5). In our study, mortality did not develop among the operated patients. Especially with the use of energy devices in surgery, bleeding control can be achieved more easily, operation times are shortened, mortality and morbidity rates are significantly reduced.

Better control of bleeding with energy devices will enable working in a cleaner environment during surgery and better detecting and protecting the recurrent nerve and parathyroid glands. Furthermore, some publications argue that employing the conventional technique near the recurrent nerve and parathyroid glands may be more beneficial to prevent heat damage. There was no significant relationship between the group in which conventional technique was applied and the development of complications (p=0.39). Different cut-off values have been used for hypocalcemia in different publications. Serum calcium value is 7mg/dl 9, 8mg/dl 10 and 8.5mg/dl (11, 12). In this study, when the serum calcium limit value was taken as 8mg/dl, temporary hypocalcaemia occurred in 4 patients in Group A and Group B.

Similar to the studies performed (7), in our study, the duration of hospital stay was shorter in the energy device group compared to the conventional group (p<0.001). It can be thought that the shortening of the hospital stay can balance the increased cost increase with the use of energy devices.

In meta-analyses (13), which were also performed as an indicator of bleeding control, the amount of bleeding during the operation and the amount of bleeding that drained after the operation were evaluated. 0.001. A fully wetted 4 cm2 gauze was evaluated to represent 10 ml of blood loss (14). Similarly, when evaluating the postoperative blood drainage, it was significantly lower in the energy device group, averaging 59 ml (p = 0.012).

Although studies have indicated that high postoperative pain scores are related to the size of the incisions, although there was no significant difference between the incision sizes between the two groups in our study, the VAS in the energy device group (1.8) was higher than that in the conventional surgery group (3.2). It was determined that it was less than , and this difference was statistically significant (p<0.001). We think that this difference may be due to the shorter operative time in the energy device group and, accordingly, the shorter exposure of the patient to exclusion.

CONCLUSION

Energy devices used by experienced surgeons can be used safely in thyroid surgery, which is the most performed endocrine surgery, with less hospital stay, less postoperative pain levels, better bleeding control and complication rates similar to conventional surgery.

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Author Contributions: EE, FE; contributed to the conception of the work, execution of the study, revision of the draft, EE; approval of the final manuscript version, and concur with all aspects of the work. All authors have reviewed the manuscript, and affirm that they fulfill the ICMJE criteria for authorship.

Ethical approval: The present study was conducted in strict accordance with the principles outlined in the Declaration of Helsinki. Ethical approval for the study was obtained from the appropriate ethics committee, and all participants provided informed consent before participating in the study. T.C Çukurova University Faculty of Medicine Non-Invasive Clinical Research Ethics Committee, with its decision dated December 3, 2021 and numbered 16, "Can Energy Devices Be Used Instead of Conventional Methods in Thyroidectomy?" Ethics committee approval was received for the retrospective project title.

REFERENCES


