Clinical Science

Quality of life after thyroid surgery in women with benign euthyroid goiter: influencing factors including Hashimoto’s thyroiditis

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KEYWORDS: Autoimmune thyroiditis; Hashimoto’s thyroiditis; Quality of life; Thyroidectomy; Anti–thyroid peroxidase antibodies

Abstract

BACKGROUND: Hashimoto’s thyroiditis is associated with decreased quality of life (QoL). Thyroid surgery could hypothetically lead to an increase in QoL.

METHODS: In a follow-up analysis of a prospective cohort study that included euthyroid women undergoing thyroid surgery for benign thyroid disease, 248 patients were willing to answer the SF-36 QoL questionnaire.

RESULTS: At follow-up after a median of 26 months, only the SF-36 module of “bodily pain” had increased ($P = .046$). Preoperative anti–thyroid peroxidase antibody levels were positively correlated with increasing QoL in the SF-36 modules “bodily pain” ($P < .001$) and “role emotional” ($P < .001$). For the presence of histologically confirmed Hashimoto’s thyroiditis, a significant positive correlation ($P < .001$) was found for all modules apart from “physical functioning.”

CONCLUSIONS: In women with benign euthyroid goiter, thyroid surgery does not lead to an overall improvement in health-related QoL. It should not be recommended for patients with elevated anti–thyroid peroxidase antibody levels. Patients with histologically confirmed Hashimoto’s thyroiditis might benefit in terms of QoL.

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Chronic autoimmune thyroiditis (Hashimoto’s thyroiditis), characterized by the presence of anti–thyroid peroxidase antibodies (TPO-Ab), is one of the most common autoimmune, gender-specific disorders, affecting 5% to 10% of the female population of childbearing age.\textsuperscript{1,2} It has been shown to be associated with decreased quality of life, as measured by a short-form health survey with 36 questions (the SF-36).\textsuperscript{3,4} In a recent prospective study, we demonstrated that overt hypothyroidism might be only 1 of the factors that contribute to the development of conditions associated with Hashimoto’s thyroiditis, including decreased quality of life.\textsuperscript{5} Hypothetically, other influencing factors might be subclinical hypothyroidism, fluctuating thyroid hormone levels, or even antibody load itself.\textsuperscript{5}
It has been claimed that there is a potential systemic effect of autoimmunity as a contributing factor of negative symptoms also in the presence of euthyroidism. With total or near total removal of the thyroid gland, the antibody load should decrease. Whether this would suffice to alter patients’ status of autoimmunity and its associated conditions is problematic. However, removal of all thyroid tissue also leads to overt “total” hypothyroidism. Patients then undergo lifelong substitution with thyroid hormones, which likely results in a state of constant euthyroidism. Thus, it might be hypothesized that thyroidectomy could lead to an increase in quality of life in patients with Hashimoto’s thyroiditis, given that adequate thyroid hormone substitution is provided.

All patients in the above-mentioned study underwent thyroid surgery. In this female patient population, we aimed to evaluate (1) quality of life–related outcome as a major objective and (2) the change in individual symptom load as a secondary objective in the long-term after thyroid surgery.

Methods

The primary hypothesis was that health-related quality of life, as measured by the SF 36 questionnaire, (1) would increase after thyroidectomy and (2) was more likely to increase in women with higher TPO-Ab levels or histologically confirmed Hashimoto’s thyroiditis and after total or near total thyroidectomy, in contrast to less extensive procedures. As a second study objective, we focused on complications after thyroid surgery and evaluated possible risk factors. As defined by the study protocol, all data were prospectively obtained and entered in a database. This included the preoperative and postoperative symptom and SF-36 questionnaires, as well as data on the operation and postoperative complications. We chose the SF-36 questionnaire and not a questionnaire for thyroid disorders because, in our experience, Hashimoto’s thyroiditis is associated with symptoms both specific and nonspecific for thyroid dysfunction.

Patient population and study design

As published previously, we had prospectively included a total of 426 consecutive patients on the basis of the following preoperative inclusion criteria: (1) Women who planned to undergo thyroid surgery and were ≥19 years of age were included. Austria is an area of endemic iodine deficiency, with a comparatively high incidence of thyroid disease. The diagnoses and indications for surgery were euthyroid nodular goiter (mechanical obstruction or cold nodule). The diagnosis was based on neck ultrasound and scintigraphy. All procedures were in accordance with the German Association of Endocrine Surgeons practice guidelines for the surgical treatment of benign thyroid disease. (2) Women who had thyroid-stimulating hormone levels within the institutional normal range (0.25 to 4.20 μIU/mL) were included (ie, only euthyroid patients). (3) Women with parathyroid hormone levels within the institutional normal range (0 to 63 IU/mL) were included. Patients with thyroid malignancies, as diagnosed by histology of the removed specimen, were excluded retrospectively. For this analysis, we included all patients who were willing to undergo a follow-up investigation, including the questionnaires, ≥12 months after the operation (n = 248 [58.2%]).

Patients gave written, informed consent, and all procedures were performed in accord with the Good Scientific Practice Standards set forth by the Medical University of Vienna, which are based on the ethical standards of the revised Declaration of Helsinki of 2008. Approval of the local ethics committee was not necessary.

Patients had undergone unilateral as well as bilateral thyroid operations, including subtotal, near total, and total lobectomy and thyroidectomy. To analyze the impact of the extent of resection, patients were subdivided into the following groups: (1) those with total or near total thyroidectomy and (2) those with less extensive procedures.

Serum levels of thyroid-stimulating hormone, free T4, and free T3 were measured preoperatively and postoperatively, including at the follow-up visit. Preoperatively, TPO-Ab had been measured using a chemiluminescent microparticle immunoassay (Elecsys 2010; Roche, Vienna, Austria).

All patients answered 2 questionnaires on the day before surgery and at the follow-up examination: (1) a symptom questionnaire, comprising questions on general symptoms and female health (these data were pooled in a summarizing score), and (2) the SF-36 quality-of-life questionnaire.

The whole thyroid parenchyma was routinely histologically examined. According to a previous publication, Hashimoto’s thyroiditis was defined as a lymphocytic infiltration of grade 3 or 4 according to Williams and Doniach, with destruction of follicular cells and the presence of oncocytic changes in the follicular thyroid epithelium. We also focused on the weight of the removed thyroid specimen and the following postoperative complications: (1) Hypocalcemia or hypoparathyroidism was defined as serum parathyroid hormone or calcium level below the normal range or when calcium and/or vitamin D supplementation was necessary to treat hypocalcemia-related symptoms. If the situation persisted for >12 months, permanent hypoparathyroidism was defined. (2) On the 2nd to 4th day after the operation, all patients were examined by an ear, nose, and throat specialist for vocal cord function by indirect laryngoscopy with a mirror or, if indirect laryngoscopy was not feasible, by direct laryngoscopy with a flexible endoscope. If postoperative nerve injury occurred, follow-up examinations were performed on day 14 and after 2 to 3, 6, and 12 months. Palsy (lack of mobility) on days 3 to 4 was classified as recurrent laryngeal nerve injury regardless
of whether recovery was rapid or slow; reduced mobility on the first examination was left unclassified and reinvesti-
gated after 10 days. If the reduced mobility persisted, the patient was considered to have recurrent laryngeal nerve in-
jury. Patients in whom the second examination showed nor-
mal mobility were not classified as having recurrent laryngeal nerve injury. Recurrent laryngeal nerve injury that did not resolve within the first 12 months was classified as permanent recurrent laryngeal nerve injury.12 (3) Postop-
erative hemorrhage was defined as bleeding after wound closure that required reintervention.13 (4) We also assessed the presence of wound infection.

As possible risk factors for transient hypocalcemia and transient recurrent laryngeal nerve injury, we evaluated age, preoperative TPO-Ab, bilateral versus unilateral thyroid surgery, the presence of histologically confirmed Hashimoto’s thyroiditis, and the weight of the removed thyroid specimen.

Statistical analysis

Variables are expressed as frequencies, mean ± SD, or medians and ranges. There were no missing data. Thus, in each analysis, all patients were included. Preoperative TPO-Ab level was analyzed as a numeric parameter. Statistical analysis was performed using Wilcoxon’s rank-sum test with continuity correction. Because of multiple testing, Bonferroni’s correction was applied to all paired tests. Differences were considered statistically significant at \( P < .05 \). Statistical analysis was performed with the open-source statistical package R version 2.15.1 (http://www.r-project.org). In addition, a logistic regression model with Wald’s tests was used to test the statistical significance of all coefficients for transient recurrent laryngeal nerve injury and transient hypocalcemia. Adjusted odds ratios are given, including 95% confidence interval. Generalized linear models were applied to each module of the SF-36 score, taking into account the following confounding factors: preoperative SF-36 score, preoperative TPO-Ab level, the presence of Hashimoto’s thyroiditis at histologic examination, and the extent of thyroid resection (total or near total thyroidectomy vs subtotal thyroidectomy or unilateral procedures). A Poisson link function was used.

Results

Patient characteristics

Details on preoperative patient characteristics are shown in Table 1. Bilateral total or near total thyroidectomy was performed in 169 patients (68.1%), whereas the remaining 79 patients (31.9%) underwent bilateral subtotal or unilateral procedures. Histologic examination of the removed thyroid tissue revealed Hashimoto’s thyroiditis in 29 patients (11.7%).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>56 (21–82)</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>26.5 (17.0–47.6)</td>
</tr>
<tr>
<td>Preoperative TSH (µU/mL)</td>
<td>1.1 (0.7–2.5)</td>
</tr>
<tr>
<td>Preoperative fT3 (pmol/L)</td>
<td>4.6 (3.1–7.5)</td>
</tr>
<tr>
<td>Preoperative fT4 (ng/dL)</td>
<td>1.3 (0.9–1.9)</td>
</tr>
<tr>
<td>Preoperative TPO-Ab (IU/mL)</td>
<td>8.0 (0–600.0)</td>
</tr>
</tbody>
</table>

Postoperative complications

Transient postoperative recurrent laryngeal nerve injury was recorded in 19 patients (7.7%), transient hypocalcemia in 48 (19.4%), postoperative hemorrhage in 3 (1.2%), and wound infection in 1 (.4%). All patients with hypocalcemia and recurrent laryngeal nerve injury had recovered within 6 months. Thus, none of the patients had postoperative permanent laryngeal recurrent nerve paralysis or permanent hypoparathyroidism or hypocalcemia. In a logistic regression model, risk factors for transient recurrent laryngeal nerve injury and transient hypocalcemia were analyzed (Table 2). Significant risk factors were found only for transient hypocalcemia, namely, bilateral thyroid surgery (in contrast to unilateral surgery) and the weight of the removed thyroid specimen.

Quality of life and symptom load at long-term follow-up

Patients underwent follow-up after a median of 26 months (range, 12 to 33 months). No differences were found between median preoperative and follow-up body mass index (26.5 kg/m² [range, 17.0 to 47.6 kg/m²] vs 26.4 kg/m² [range, 16.6 to 46.9 kg/m²], respectively, \( P = .668 \)). At follow-up, all patients were in need of thyroid hormone replacement, in contrast to 61 of 248 (24.6%) before the operation (\( P < .001 \)).

When focusing on the modules of the SF-36 quality-of-life questionnaire, apart from a significant improvement in the module of “bodily pain” (\( P = .046 \)), none was found to have significantly increased or decreased at follow-up examination (Table 3). We then analyzed the influence of preoperative SF-36 score, preoperative TPO-Ab level, the presence of Hashimoto’s thyroiditis at histologic examination, the extent of thyroid resection (total or near-total thyroidectomy vs subtotal thyroidectomy or unilateral procedures), and postoperative complications (transient hypocalcemia, transient recurrent laryngeal nerve injury, and wound infection) on postoperative SF-36 score in a

![Table 1 Preoperative patient characteristics (n = 248)](http://www.r-project.org) | Variable                  | Value       |
<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>56 (21–82)</td>
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<td>26.5 (17.0–47.6)</td>
</tr>
<tr>
<td>Preoperative TSH (µU/mL)</td>
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<tr>
<td>Preoperative fT3 (pmol/L)</td>
<td>4.6 (3.1–7.5)</td>
</tr>
<tr>
<td>Preoperative fT4 (ng/dL)</td>
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</tr>
<tr>
<td>Preoperative TPO-Ab (IU/mL)</td>
<td>8.0 (0–600.0)</td>
</tr>
</tbody>
</table>

Data are expressed as median (range) or as number (percentage).

BMI = body mass index; TPO-Ab = anti–thyroid peroxidase antibodies; fT4 = free T4; fT3 = free T3; TSH = thyroid-stimulating hormone.
multivariate model. Table 3 provides an overview. In detail, for all 8 modules, preoperative and postoperative scores were significantly positively correlated \((P < .001)\). For the presence of histologically confirmed Hashimoto’s thyroiditis, a significant positive correlation \((P < .001)\) was found for all SF-36 modules except “physical functioning.” Although none of the quality-of-life modules, apart from “bodily pain,” changed preoperatively to postoperatively in the whole study population, it seems that in patients with Hashimoto’s thyroiditis diagnosed at histologic examination, quality of life was likely to increase on the basis of postoperative symptom dysphagia, present in 48 of 248 patients before surgery (19.4%), had completely resolved in 34 of those 48 patients (70.8%).

Concerning the influence of the extent of resection, total or near total thyroidectomy led to lower postoperative quality-of-life levels for the following SF-36 modules: “general health” \((P = .033)\), “physical functioning” \((P < .001)\), “role physical” \((P < .001)\), “vitality” \((P = .038)\), “role emotional” \((P < .001)\), and “social functioning” \((P < .001)\).

When focusing on postoperative complications, transient hypocalcemia negatively influenced postoperative quality-of-life levels for the following SF-36 modules: “physical functioning” \((P < .001)\), “role physical” \((P < .001)\), “bodily pain” \((P < .001)\), “vitality” \((P = .001)\), “role emotional” \((P = .025)\), and “mental health” \((P = .004)\). Transient recurrent laryngeal nerve injury had a negative influence only on “physical functioning” \((P < .001)\) and “social functioning” \((P < .001)\). Wound infection was found to have had a negative impact on “general health” \((P = .035)\), “bodily pain” \((P = .002)\), and “vitality” \((P = .002)\).

The summary score for general symptoms increased from a median of 4 (range, 0 to 14) before to a median of 5 (range, 0 to 15) after the operation \((P = .004)\). A higher postoperative symptom score was significantly associated with a higher preoperative symptom score and higher preoperative TPO-Ab levels \((P < .001)\). Notably, the mechanical symptom dysphagia, present in 48 of 248 patients before surgery (19.4%), had completely resolved in 34 of those 48 patients (70.8%).

**Comments**

In this prospective study on 248 women who underwent surgery for benign euthyroid goiter, unaltered health-related quality-of-life levels were found at follow-up 12 to 33 months after surgery. However, the higher their TPO-Ab levels had been preoperatively, the more patients were

### Table 2

Multivariate analysis of risk factors for temporary recurrent laryngeal nerve injury and temporary hypocalcemia

<table>
<thead>
<tr>
<th>Variable</th>
<th>Yes (n=48)</th>
<th>No (n=200)</th>
<th>OR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preoperative TPO-Ab (IU/mL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Histologically confirmed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of removed thyroid specimen (g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are expressed median (range) or as number (frequency).

CI = confidence interval; OR = odds ratio; TPO-Ab = anti–thyroid peroxidase antibodies.

*Statistically significant.

### Table 3

Preoperative and postoperative quality of life as measured by the SF-36 questionnaire

<table>
<thead>
<tr>
<th>Health concept</th>
<th>Preoperative score</th>
<th>Postoperative score</th>
<th>P</th>
<th>Factors influencing postoperative scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive influence</td>
<td>Negative influence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General health</td>
<td>HT</td>
<td>TT, WI</td>
<td>.642</td>
<td></td>
</tr>
<tr>
<td>Physical functioning</td>
<td>—</td>
<td>TT, TH, TLRNI</td>
<td>.172</td>
<td></td>
</tr>
<tr>
<td>Role physical</td>
<td>HT</td>
<td>TT, TH</td>
<td>1.00</td>
<td>TPO-Ab, HT, TH, WI</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>TPO-Ab, HT</td>
<td>TH, WI</td>
<td>.046</td>
<td></td>
</tr>
<tr>
<td>Vitality</td>
<td>HT</td>
<td>TT, TH, WI</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Social functioning</td>
<td>TPO-Ab, HT</td>
<td>TH, TLRNI</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Role emotional</td>
<td>HT, TPO-Ab</td>
<td>TH, TH</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Mental health</td>
<td>HT</td>
<td>TH</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

Data are expressed as median (range).

HT = Hashimoto’s thyroiditis (diagnosed by histologic examination); TH = transient hypocalcemia; TPO-Ab = higher preoperative anti–thyroid peroxidase antibody level; TRLNI = transient recurrent laryngeal nerve injury; TT = total or near total thyroidectomy; WI = wound infection.
likely to benefit from the operation in the terms of the “role emotional” and “bodily pain” modules of the SF-36 questionnaire. Nonetheless, we did not observe a clear benefit for women with higher TPO-Ab levels. This is of clinical significance, because thyroidectomy is considered an eventual treatment option for symptomatic Hashimoto’s thyroiditis.\textsuperscript{5,14,15} However, we can confirm the previous finding that mechanical problems (ie, compression leading to discomfort in swallowing and tightness in the neck) are relieved after surgery.\textsuperscript{14–16} In our data set, complete relief for dysphagia was found in about 70% of women. In contrast to these previous trials, neck compression was not the most frequent preoperative symptom in our patient population, which might have contributed to the differences in postoperative findings.

There is good evidence for the association of Hashimoto’s thyroiditis, as suspected by elevated TPO-Ab levels, with various organ-specific and non-organ-specific autoimmune diseases.\textsuperscript{4,7,10} These and other associated diseases and conditions are thought to contribute to the diminished quality of life in patients with Hashimoto’s thyroiditis.\textsuperscript{5} From a variety of hypotheses about the association between Hashimoto’s thyroiditis and systemic autoimmune diseases, one of the most feasible explanations seems to be a polyclonal autoimmune response against organ-specific autoantigens.\textsuperscript{19} Thus, elevated TPO-Ab levels could be seen as a “surrogate parameter” for an altered immunity. In this case, it is unlikely that removal of the thyroid gland leads to substantial improvements in quality of life unless the thyroid gland was the major stimulating factor for autoimmunity.

To hypothetically achieve a substantial reduction of autoantigens and, thereby, remove the major stimulus for the production of thyroid-specific antibodies, one would have to perform extensive thyroid resections. However, the extensive procedures of total and near total thyroidectomy were associated with decreases in several postoperative quality-of-life domains. Thus, our data support the idea that thyroidectomy is not an appropriate tool for increasing quality of life in women with higher TPO-Ab levels suspicious for Hashimoto’s thyroiditis, except for patients with mechanical symptoms. Whether these results have been influenced by some kind of selection bias can be neither verified nor excluded. The mechanical symptom dysphagia, for example, was not associated with a trend toward more extensive resections (data not shown).

In contrast to TPO-Ab levels, there were substantial associations between the presence of histologically confirmed Hashimoto’s thyroiditis and a postoperative improvement in the majority of quality-of-life domains (Table 3). One might hypothesize that this was due to a reduction in local symptoms that might not have been included in our study protocol. For instance, we did not ask about a feeling of tightness in the neck. However, the observation that a patient’s quality of life can be positively influenced by thyroid surgery when Hashimoto’s thyroiditis is histologically confirmed is of interest. On one hand, even when the cutoff level for TPO-Ab was optimized, the histologic diagnosis of Hashimoto’s thyroiditis could not be predicted with an overall accuracy of 100%.\textsuperscript{4} On the other hand, higher TPO-Ab levels represent a different disease pattern, because they are probably indicative of an altered immunity, as mentioned above, and need treatments other than thyroid surgery. Hence, the histologically confirmed diagnosis of Hashimoto’s thyroiditis should not be confused with the presence of higher TPO-Ab levels. This is in accordance with previous observations that several parameters associated with Hashimoto’s thyroiditis have changed over the past decades, serum autoantibodies among them.\textsuperscript{20}

The summary symptom score was found to have increased at follow-up. Although such a summary score might not be the optimal way to analyze patients’ individual symptom load, we chose this method for evaluation of the secondary objective for statistical reasons, as we wanted to avoid further multiple testing. The summary symptom score had increased by a median of only 1 symptom. The more objective measures of the SF-36 questionnaire suggest that this slight increase of symptom load was only of minor clinical relevance. However, a higher postoperative symptom score was associated with higher preoperative symptom score and TPO-Ab levels. This suggests that thyroid surgery is not effective in reducing women’s symptom load.

Quality-of-life outcomes after surgical procedures always need to be seen in the context of postoperative adverse events. Notably, none of the operations was complicated by permanent laryngeal recurrent nerve paralysis or permanent hypoparathyroidism or hypocalcemia. This might be because only patients with benign euthyroid goiter had been included and those with recurrent thyroid disease had been excluded. We are aware of the fact that this is not reflective of the situation in clinical practice. However, transient complications that had resolved within 6 months after the operation, including transient recurrent laryngeal nerve palsy and hypocalcemia, as well as wound infections, were demonstrated to have had significant negative influences on postoperative quality of life (Table 3). It is worthwhile mentioning that SF-36 follow-up was performed 12 months after the operation at the earliest. We find it hard to comment on these findings. It is reasonable that wound infections could lead to hypertrophic scars or inflammatory rearrangement of the neck tissue and, thus, could have a negative effect on “vitality,” as shown in Table 3. One might also hypothesize that complications led to high levels of distress with a long-lasting impact on “social functioning,” “role emotional,” and “mental health.” However, one should keep this effect in mind when caring for patients with postoperative complications.

As a secondary study aim, we focused on risk factors for transient recurrent laryngeal nerve palsy and transient hypocalcemia. For the latter, larger weight of the removed thyroid specimen and bilateral procedures were significantly associated with increased risk, whereas higher preoperative TPO-Ab levels were only borderline significant \((P = .053;\) Table 2). Although the explanatory power of these analyses is limited, the results confirm previous observations that the size of...
the removed specimen and the extent of the resection are of significant impact.\textsuperscript{21,22}

Only about 60\% of our patients were willing to undergo this follow-up analysis, which has to be considered a study limitation. This might be because patients with benign goiter and without permanent complications (hypoparathyroidism and recurrent laryngeal nerve injury) undergo routine follow-up with their general practitioners and not at the hospital. Moreover, only women were enrolled. However, Hashimoto’s thyroiditis, regardless of whether it is defined by the presence of autoantibodies or histologic characteristics, is a gender-specific disease. In the literature, female/male ratios of up to 8:1 have been reported.\textsuperscript{5,9} Another possible study limitation is the median follow-up of 26 months, which might be considered low. A median time of about 6 years for the disappearance of TPO-Ab has already been demonstrated after total or near total thyroidectomy with or without additional radioiodine therapy.\textsuperscript{15} Thus, the present data set is preliminary, and we plan to reevaluate quality of life in the long term in this study population. Moreover, only euthyroid women were included in this analysis, and thus, the present results apply only to these women.

Conclusions

Thyroid autoimmunity itself might be 1 of the factors responsible for decreased quality of life in patients with higher TPO-Ab levels indicative of Hashimoto’s thyroiditis. Nonetheless, in women with benign euthyroid goiter with or without increased preoperative TPO-Ab levels, thyroid surgery does not lead to an improvement in health-related quality-of-life levels. The same holds true for the overall symptom load. Thus, surgical intervention, regardless of its extent, should not be recommended as a treatment option for patients with decreased quality of life due to higher TPO-Ab levels. Transient complications can have a long-lasting negative effect on patients’ quality of life. In contrast, thyroid surgery does improve quality of life in female patients with histologically confirmed Hashimoto’s thyroiditis. Thyroidectomy can be recommended in selected cases in which the risks of surgery are less than the risks of the thyroid disease. This includes patients who suffer from compression symptoms, which is in accordance with previous reports.\textsuperscript{14,15}

References