Nationwide Survey on the Treatment Policy for Well-differentiated Thyroid Cancer — Results of a Questionnaire Distributed at the 37th Meeting of The Japanese Society of Thyroid Surgery —

NAOYUKI SHIGEMATSU, HIROSHI TAKAMI*, NOBUTAKE ITO AND ATSUSHI KUBO

Department of Radiology, Keio University School of Medicine, Tokyo 160-8582, Japan
*Department of Surgery, Teikyo University School of Medicine, Tokyo 173-8605, Japan

Abstract. The treatment policy for patients with well-differentiated thyroid cancer varies among institutions. Although surgery has been the mainstay of treatment for this cancer, there is no consensus concerning the optimal extent of thyroid resection or the extent of lymph node dissection. Furthermore, controversy remains with regard to the indications for radiation therapy and hormonal therapy in surgical or non-surgical cases and the treatment modalities for cancer recurrence. To determine the actual status of treatment policies for thyroid cancer in Japan, a questionnaire was distributed to all physicians who participated in the 37th meeting of the Japanese Society of Thyroid Surgery, to inquire into treatment options for well-differentiated thyroid cancer in relation to clinical stages in actual situations. The replies to this questionnaire were analyzed in this study.

Key words: Well-differentiated thyroid cancer, Treatment policy, The Japanese Society of Thyroid Surgery

THYROID cancer can be classified into various histological types and well-differentiated thyroid carcinomas (papillary thyroid carcinomas and follicular thyroid carcinomas) account for 85–90% of all thyroid cancers. Patients with papillary or follicular carcinoma can be categorized as either the low-risk group comprising those having extremely favorable prognosis or the high-risk group comprising those with poor prognosis. The treatment policies for these two groups vary from institution to institution. Surgery is no doubt the treatment of choice for patients with well-differentiated carcinoma; but no consensus exists concerning the optimal extent of thyroid resection or lymph node dissection. There is also no general agreement on the indications for radiation therapy (radioiodine treatment and external irradiation) or hormonal therapy (TSH suppression therapy), their effects in surgical or non-surgical cases, or treatment modalities in cases of recurrent cancer. The present survey was therefore designed to determine the actual status of treatment policy for thyroid cancer in Japan by distributing a questionnaire to all physicians who participated in the 37th meeting of the Japanese Society of Thyroid Surgery. The questionnaire included questions about therapeutic policies for well-differentiated thyroid cancer, principally according to the clinical stage and illustrated by specific clinical descriptions. The replies were analyzed in this study.

Materials and Methods

The questionnaire was distributed to 520 members at the 37th meeting of the Japanese Society of Thyroid Surgery and 133 (26%) filled out the form and returned it. Among the respondents, 64 were affiliated with
university hospitals or cancer centers and the other 69 with general hospitals. The specialties of the responding physicians were surgery (n = 101), rhinolaryngology and head and neck specialty (n = 26), internal medicine (n = 3), radiology (n = 2), and urology (n = 1). Surgeons accounted for 76% of all respondents. When stratified by district, 6 were from Hokkaido, 12 from Tohoku, 38 from Kanto, 24 from Chubu, 26 from Kinki, 8 from Chugoku, 5 from Shikoku, and 14 from Kyushu and Okinawa, demonstrating the nationwide representation of the data that were obtained from the present survey.

Results

1. Treatment modalities for small papillary carcinomas of the thyroid

Case presentation
An ultrasound examination performed during a routine medical checkup detected a thyroid adenoma in a 35-year-old woman, who sought further examination in the department of surgery at a leading hospital in her district. An aspiration cytology under ultrasonic guidance showed papillary carcinoma, while the ultrasonic imaging revealed that it was localized at the inferior pole of the thyroid lobe with no signs of tumor infiltration. No enlarged lymph nodes were observed.

Answer the following questions with reference to the tumor diameter specified before each set of questions.

[Tumor diameter ≤0.5 cm] (≤0.5 cm on ultrasound):

Do you request cytology?
☐ Yes
☐ No
(If your answer is “no”, skip the following questions)

Do you prefer surgery?
☐ Surgery
☐ Observation without surgery
☐ PEIT

Surgical options:
☐ Partial thyroid lobectomy
☐ Thyroid lobectomy
☐ Subtotal thyroidectomy
☐ Total thyroidectomy (near-total thyroidectomy)

Lymph node dissection:
☐ No
☐ Paratracheal lymph node dissection on the affected side
☐ Paratracheal lymph node dissection on both sides
☐ Neck dissection on the affected side

[Tumor diameter 0.5–1 cm] (0.5 cm< and ≤1 cm on ultrasound):

Do you request cytology?
☐ Yes
☐ No
(If “no”, you need not answer the following questions concerning surgery)

Do you prefer surgery?
☐ Surgery
☐ Observation without surgery
☐ PEIT

Surgical options:
☐ Partial thyroid lobectomy
☐ Thyroid lobectomy
☐ Subtotal thyroidectomy
☐ Total thyroidectomy (near-total thyroidectomy)

Lymph node dissection:
☐ No
☐ Paratracheal lymph node dissection on the affected side
☐ Paratracheal lymph node dissection on both sides
☐ Neck dissection on the affected side

[Tumor diameter 1–2 cm] (1 cm< and ≤2 cm on ultrasound):

Therapeutic options:
☐ Surgery
☐ Observation without surgery
☐ PEIT

Surgical options:
☐ Partial thyroid lobectomy
☐ Thyroid lobectomy
☐ Subtotal thyroidectomy
☐ Total thyroidectomy (near-total thyroidectomy)
Lymph node dissection:
□ No
□ Paratracheal lymph node dissection on the affected side
□ Paratracheal lymph node dissection on both sides
□ Neck dissection on the affected side
□ Neck dissection on both sides

For papillary carcinomas ≤0.5 cm, 40% of the respondents stated that they would request a cytology and 68% opted to conduct surgery if the results from the cytology were positive. For those measuring 0.5 to 1 cm, 82% would request a cytology and if the result was positive, 73% favored surgical treatment. On the whole, the percentage of those who preferred surgery for tumors measuring ≤0.5 cm, 0.5–1 cm, and 1–2 cm were 27%, 60%, and 99%, respectively (Table 1).

Cytology is not requested for tumors of ≤0.5 cm at many institutions. It is conducted for tumors measuring 0.5–1 cm, which were often subjected to surgery at many hospitals. For 1–2 cm tumors, surgery is indicated at the majority of the institutions.

Fig. 1 shows surgical options according to the tumor size at the primary sites. Thyroid lobectomy (including partial lobectomy) was chosen by 94% for tumors of ≤0.5 cm, by 89% for those measuring 0.5 to 1 cm, and by 68% for those measuring 1 to 2 cm. The preference for subtotal thyroidectomy and total thyroidectomy was positively related to the tumor size.

Fig. 2 shows the extent of lymph node dissection. Paratracheal lymph node dissection on the affected side is the most commonly preferred procedure and its percentage is negatively correlated with the increase in tumor size. The percentage of those preferring modified neck dissection was 6% for tumors ≤0.5 cm, 14% for tumors 0.5–1 cm, and 40% for tumors 1–2 cm. The tumor diameter is positively related to the extent of lymph node dissection.

2. Treatment modalities for large papillary carcinomas of the thyroid

Case presentation
A 40-year-old man presented to the department of surgery of a leading hospital in his district with a complaint of a mass detected at the right thyroid lobe. Ultrasound and CT examinations revealed a mass 3 cm

Table 1. Percentages of surgery performed for small papillary carcinomas of the thyroid stratified by primary tumor size

<table>
<thead>
<tr>
<th>Primary tumor size (cm)</th>
<th>Surgical cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.5</td>
<td>27</td>
</tr>
<tr>
<td>0.5–1.0</td>
<td>60</td>
</tr>
<tr>
<td>&gt;1.0–2.0</td>
<td>99</td>
</tr>
</tbody>
</table>

![Fig. 1. Surgical options for small thyroid papillary carcinomas stratified by primary tumor size.](image-url)
in diameter, localized within the thyroid gland and 2 enlarged lymph nodes each on the paratracheal and the lateral side of the internal jugular vein of the affected site. A cytological examination yielded a well-differentiated papillary carcinoma of the thyroid. Laryngoscopy exhibited normal movement of the vocal cords. Either CT or $^{99m}$Tc bone scanning revealed no evidence of distant metastasis.

Surgical options:

- □ Lobectomy
- □ Subtotal thyroidectomy
- □ Total thyroidectomy (near-total thyroidectomy)

Lymph node dissection:

<table>
<thead>
<tr>
<th></th>
<th>Affected side</th>
<th>Both sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paratracheal lymph node dissection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral cervical lymph node dissection</td>
<td></td>
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</tbody>
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Postoperative TSH suppression therapy:

- □ Throughout lifetime as a rule
- □ At least for 5 years
- □ For 1–2 years
- □ Not conducted

Postoperative high-dose radioiodine therapy combined with total (near-total) thyroidectomy:

- □ Yes
- □ No
- □ Yes, if possible

Surgical approaches chosen for the primary site in the thyroid were: lobectomy, subtotal thyroidectomy, and total thyroidectomy by 35%, 45%, and 20%, respectively. Subtotal thyroidectomy was the approach chosen relatively more frequently (Fig. 3).

The extent of lymph node dissection is shown in Table 2. Dissection of the paratracheal lymph nodes on the affected side was chosen by 100%, the lateral lymph nodes on the affected side by 93%, the paratracheal lymph nodes on the intact side by 67% and lateral cervical lymph nodes on the intact side by 11%.

For postoperative TSH suppression therapy, 37% were against it; 29% upheld the practice for 1 to 5 years; and 34% favored its application for the rest of the patient’s life. It appeared that the respondents were roughly divided in thirds in each response category (Fig. 4).

Total thyroidectomy is a prerequisite to an indication for postoperative high-dose radioiodine treatment. However, 26 favored total thyroidectomy and 40 responded to the question on high-dose radioiodine treat-
When one focuses on these 26 proponents of high-dose $^{131}$I therapy, 46% chose or hoped to adopt this radiotherapeutic modality. Among the 40 respondents, on the other hand, 45% chose or hoped to adopt this therapeutic modality, indicating that slightly less than half of them recognized the indication for high-dose radioiodine treatment.

3. Treatment modalities for high-risk papillary carcinomas of the thyroid

Case presentation

On ultrasound and CT scanning, a 60-year-old man
was found to have a thyroid tumor measuring 6 cm in diameter. Extra-thyroidal invasion was observed but there was no evidence of distant metastases. An elevated serum thyroglobulin level (negative thyroglobulin antibody) was noted. A cytological examination revealed poorly differentiated papillary carcinoma, which was considered to be a high-risk cancer, and the patient underwent total (near-total) thyroidectomy. Following surgery, the base level of serum thyroglobulin was reduced to below the detectable threshold. If you do not favor total (near-total) thyroidectomy as a surgical option, you need not reply to the following questions.

Do you measure the serum thyroglobulin level after an elevation of endogenous TSH secretion associated with postoperative withdrawal of L-thyroxine?
- Yes
- No

Do you favor postoperative high-dose radioiodine treatment?
- Yes
- No
- Yes, if possible

For those who prefer measuring the serum thyroglobulin level after an elevation of endogenous TSH secretion:
- Yes, for elevated thyroglobulin cases
- Yes, even for non-elevated thyroglobulin cases
- Yes, if possible

For those who do not measure the thyroglobulin level:
- Yes
- No
- Yes, if possible

From the institutions where total (near-total) thyroidectomy is performed, 113 responses were obtained for this analysis and 42% stated that the serum thyroglobulin content is measured after postoperative L-thyroxine administration has been suspended and endogenous TSH secretion has increased. As shown in Fig. 5, 20% stated that the radioiodine therapy will be conducted if the thyroglobulin level increases; 52% favor the treatment regardless of the thyroglobulin level; and 28% were against the treatment. The survey results showed that the indication of a high-dose radioiodine treatment is considered at many institutions.

4. Treatment modalities for high-risk well-differentiated thyroid carcinomas

Case presentation
A 70-year-old man was found to have a thyroid tumor measuring 6 cm in diameter. Ultrasound and CT scanning revealed that the tumor had infiltrated the larynx and esophagus. If surgery is considered to be the treatment of choice, total laryngectomy and esophageal extirpation appeared unavoidable. A cytological examination found the cancer to be papillary carcinoma. CT scanning of the neck revealed that

![Fig. 5. Indication for radioiodine treatment after total (or near-total) thyroidectomy for high-risk papillary thyroid carcinomas.](image-url)
several lateral cervical lymph nodes on both sides were enlarged. There was no evidence of distant metastasis.

What is your treatment policy?
- Observation without any treatment
- Surgery
- External irradiation

If you chose external irradiation, what irradiation field(s) do you select?
- Tumor bed only
- Tumor bed + cervical lymph nodes
- Tumor bed + cervical lymph nodes + lymph nodes of the superior mediastinum

If you chose external irradiation, what dosage do you select?
- Dose that is unlikely to cause delayed radiation injury (50 Gy)
- Dose that probably averts the development of severe delayed radiation injury (60 Gy)
- Dose that may be associated with a risk of causing delayed radiation injury (70 Gy)

The responses for the therapeutic policies were no treatment but observation (10%), surgery (51%), external irradiation (19%), and surgery plus external irradiation (20%). Institutions where physicians reported they choose both surgery and external irradiation included those where both modalities are combined (14%) and those where either is performed (6%). In about 70% of facilities, surgery was the mainstay of treatment, while in approximately 40% external irradiation was considered (Fig. 6).

The 52 responses indicating possible application of external irradiation were used to examine the irradiation fields and dosages. Responses to the questions on irradiation fields included no specification (8%), tumor bed (15%), tumor bed + cervical lymph nodes (46%), and tumor bed + cervical and the superior mediastinal lymph nodes (31%). Dosages were not specified (15%), 50 Gy (33%), 60 Gy (50%), and 70 Gy (2%).

5. Treatment modalities for recurrent papillary thyroid carcinomas after surgery

Case presentation

A 60-year-old woman had been subjected to total thyroidectomy and bilateral neck dissection for papillary thyroid carcinoma 5 years previously. Since then, the tumor recurred repeatedly at the cervical lymph nodes and on each occasion, the involved lymph nodes were extirpated. At the latest examination, she was suffering from a fifth recurrence that involved the right cervical lymph nodes.

What is your therapeutic policy?
- None other than observation

Fig. 6. Treatment policy for high risk well-differentiated thyroid cancer.
☐ PEIT
☐ Extirpation of the metastatic lymph nodes
☐ Modified neck dissection
☐ External irradiation

If you chose external irradiation, what irradiation field do you select?
☐ Newly enlarged lymph nodes only
☐ Extensive coverage, including the affected cervical lymph nodes
☐ Extensive fields, including both sides of the neck

If you chose external irradiation, what dosage do you select?
☐ Dose that is unlikely to cause delayed radiation injury (50 Gy)
☐ Dose that probably averts the development of severe delayed radiation injury (60 Gy)
☐ Dose that may be associated with a risk of causing delayed radiation injury (70 Gy)

Do you choose a high-dose radioiodine treatment?
☐ Yes, without external irradiation
☐ No, without external irradiation
☐ Yes, if possible, without external irradiation
☐ Yes, in combination with external irradiation
☐ Not in combination with external irradiation
☐ Yes, if possible, in combination with external irradiation

When multiple replies were given to the treatment policy (i.e., when both lymph node dissection and external irradiation were selected), it was impossible to determine if both modalities were combined or only one of the two was applied. For this reason, it was difficult to compile the responses. However, the overall trend was the majority preferred lymph node dissection and neck dissection (48% and 32%, respectively). External irradiation alone and in combination with the surgical procedures accounted for 14% of the replies (Fig. 7).

Only 19 replies indicated that external irradiation is considered to be a treatment option. Most of these replies (n = 11) described the external irradiation with a dose of 50 Gy delivered to the neck on the affected side.

For high-dose radioiodine treatment, 110 valid responses were obtained, which included the following: high-dose radioiodine treatment is performed or preferred if possible by 71 (76%) of 94 institutions where it is used without external radiation and by 8 (50%) of 16 institutions where it is used in combination with external irradiation. Overall, 72% considered an indication for high-dose radioiodine treatment.
Discussion

1. Treatment modalities for small papillary carcinomas of the thyroid

The detection rate for thyroid cancer is thought to be around 0.7–1.5% on ultrasound when conducted at a mass screening. Advances in ultrasound technology have enabled easy detection of small thyroid cancers measuring 1 cm or less [1]. On the other hand, the mortality from thyroid cancer accounts for only 0.5% of all cancer mortalities in Japan. Thus there is a great discrepancy between the morbidity and mortality from thyroid cancer. Although the incidence of thyroid cancer has also risen by 240% during the last 5 decades in Western countries, the mortality from the same disease has decreased to 44% [2]. The incidence of occult papillary carcinoma of the thyroid (i.e., papillary carcinoma detected only at autopsy) differs greatly depending on the method of autopsy [3], ranging from 6% to 11% in Western countries [4–6] and from 11% to as high as 28% in Japan [7, 8]. The majority of occult thyroid carcinomas were 1 cm or less in diameter. More specifically, these minute carcinomas may remain latent or undergo spontaneous resolution. Thus an important question arises as to whether all those minute thyroid carcinomas should be the target to be examined in detail and treated whenever detected. Criteria for surgical indication for minute thyroid cancer are still controversial and therapeutic guidelines vary widely among institutions.

The present survey by questionnaire revealed that in many institutions, there is a tendency to obviate cytological examination for minute papillary carcinomas that measure 0.5 mm or less; but cytology and surgery are indicated for those measuring 0.5 cm or more. For those measuring 1 cm or less in particular, the most common surgical option was partial or total thyroid lobectomy. The most prevalent mode of lymph node dissection was that applied to paratracheal nodes on the affected side. Papillary thyroid carcinoma is associated with a very favorable prognosis. Further studies are needed for the indications of examinations and treatment of these minute thyroid carcinomas.

2. Treatment modalities for large papillary carcinomas of the thyroid

If curable resection is possible, surgical treatment is the first choice for differentiated thyroid carcinomas [9]. The patient presented was a 40-year-old man without evident hematological metastasis. Mortality for such patients appears to be 1–2% [10, 11]. Although long-term postoperative survival can be expected, local recurrence or distant metastasis may occur in a few percent of them.

For primary thyroid tumors, total or near-total thyroidec- tomy is the prevalent surgical treatment option in Western countries [12]; however, this remains controversial. While there is a report stating that lobectomy is a preferable surgical approach for low-risk papillary thyroid carcinoma [13], in another report it is stated that lobectomy is associated with a higher risk of locoregional recurrence [14]. Thus there is no consensus on the standard surgical treatment for large papillary thyroid carcinomas in Japan, nor is there clear evidence to support it, although the standard surgical procedure is reportedly lobectomy on the affected side plus isthmusectomy [15].

The present survey by questionnaire revealed that surgical procedures for large papillary thyroid carcinomas include lobectomy selected by 35%, subtotal thyroidectomy by 45%, and total thyroidectomy by 20%. While total thyroidectomy or near-total thyroidectomy (sparing only a small portion of the parathyroid gland) is performed on the vast majority of patients with papillary carcinomas in Western countries, subtotal thyroidectomy was the most common practice in Japan. Subtotal thyroidectomy adopted in Japan has the advantage of preserving two thirds of the contralateral lobe, thus retaining one’s normal thyroid function in spite of surgery. On the other hand, the advantage inherent in subtotal thyroidectomy is compromised if a thyroid hormone is administered to suppress postoperative TSH secretion. Alternatively, total thyroidectomy eliminates any concern about a recurrence within the thyroid remnant or the transformation of the remnant thyroid adenocarcinoma into an undifferentiated carcinoma. Furthermore, the postoperative serum thyroglobulin level serves as a good tumor marker for a recurrence or metastasis and there is an added advantage from the use of iodine-131 in the detection and treatment of metastasis. However, such an advantage may be meaningless, if one considers that the risks of a recurrence or metastasis are only a few percent for such a low risk group. The fact that the total for the application of lobectomy and subtotal thyroidectomy in practice amounts to as high as 80% may be explained by
reasons such as those listed above.

Western countries and Japan differ in their choice on the extent of lymph node dissection. In Japan, cervical lymph node dissection on the affected side is the standard procedure [15]. It has been reported that a local recurrence may be reduced by this procedure [16].

For the extent of lymph node dissection, 100% was given for the paratracheal nodes on the affected side, 93% for the lateral cervical nodes on the affected side, 67% for the paratracheal nodes on the intact side and 11% for the lateral cervical nodes on the intact side. When compared with small papillary carcinoma, more extensive lymph node dissection was conducted for large papillary carcinomas. Paratracheal lymph nodes on the intact side are dissected in most of the institutions, while lateral cervical lymph nodes on the intact side are dissected at a ratio of one in ten institutions.

There are some reports stating that postoperative TSH suppression therapy can reduce the recurrence rate [17, 18], which also remains controversial. Once the administration of L-thyroxine is started to suppress TSH, the medication must be continued theoretically for the remainder of the patient's life. If L-thyroxine is administered for several years after subtotal thyroidectomy, the residual thyroid gland atrophies. The withdrawal of L-thyroxine thereafter is likely to compromise the thyroid function and the TSH level will increase for a second time. There is no available evidence to substantiate the assumption that an elevation of TSH at that moment is responsible for cancer recurrence. Neither has it been established to what extent the TSH level should be suppressed. Initially it was recommended that the TSH level be reduced below the detectable threshold, but in recent years it has been reported that it should be at the lower limit of the normal range [19]; a few studies have even stated that the therapeutic outcome is not improved by TSH suppression therapy [10, 20]. Bone loss and atrial fibrillation are reported to be adverse reactions associated with TSH suppression therapy in post-menopausal patients [21, 22]. TSH suppression therapy is an issue for further investigation.

The indication for postoperative radioiodine treatment is also a source of considerable debate. From the results of the present survey, almost half of the respondents included radioiodine administration in their therapeutic armamentarium. In Western countries, total thyroidectomy is performed even in patients with low-risk thyroid cancer, and postoperative radioiodine treatment is frequently considered [23]. However, there is a report stating that radioiodine treatment is not associated with any improvement in the prognosis [24]. This also requires further investigation.

3. Treatment modalities for high-risk papillary carcinomas of the thyroid

In a 60-year-old man with papillary thyroid carcinoma cited in the case presentation, the tumor measured 6 cm in diameter and with extracapsular invasion of the lymph nodes, which placed the case in the category of high-risk carcinoma. Here, even if the thyroglobulin test proved to be negative after total thyroidectomy, recurrence or metastasis cannot be ruled out during the period of L-thyroxine administration. Measuring the thyroglobulin level following an increase in TSH secretion associated with the withdrawal of L-thyroxine administration or the start of a recombinant human TSH is useful in the evaluation of a local recurrence or metastasis [25, 26].

In the present survey, 42% of the physicians reported that they measure serum thyroglobulin levels after postoperative administration of L-thyroxine has been suspended and endogenous TSH secretion has increased. This figure reflects a somewhat lukewarm attitude of the physicians towards measuring the serum thyroglobulin levels. Postoperative radioiodine treatment, on the contrary, is considered at more than 70% of the institutions. Unlike Western countries, determining the serum thyroglobulin level is not a procedure that is very much favored in Japan, for reasons unknown. Radioiodine treatment is actively practiced as a treatment option in Japan as well as in Western countries, but in Japan, high-dose radioiodine treatment is available only in a very limited number of institutions.

4. Treatment modalities for high risk well-differentiated carcinomas of the thyroid

The present survey introduced a 70-year-old man
who had a tumor measuring 6 cm in diameter involving the larynx and esophagus. The case was categorized as a high-risk cancer. For such high-risk patients, surgery requires the cooperation of specialists in the fields of thoracic and esophageal surgery. Even if the tumor involves the trachea, a sleeve resection that spares the recurrent laryngeal nerve is possible. Furthermore, even when the cancer involves the esophagus, esophageal invasion is usually limited to the tunica muscularis, and extirpation, including subsequent reconstruction using a free jejunal graft, is considered feasible. However, there is no evidence concerning surgical results. Treatment options, such as immediate resection and external irradiation, are also sources of considerable debate [27].

The following treatment modalities for this category were shown in the present survey: none selected by 10%, surgery by 51%; external irradiation by 19%; and surgery + external irradiation by 20%. External irradiation is taken into consideration by about 40% of the replies, with the most universal practice being external irradiation (applied to the tumor bed) and cervical lymph nodes at a dose of 60 Gy. Because papillary thyroid carcinomas are associated with low radiation sensitivity, the therapeutic outcome may not be improved by employing conventional radiation therapy. If an increase in radiation dosages and improvement of dose distribution are deemed desirable. This can be achieved by employing procedures such as stereotaxic and intensity modulated radiotherapies.

5. Treatment modalities for recurrent papillary carcinomas of the thyroid after surgery

We are facing a dilemma between radical treatment for recurrent papillary thyroid carcinomas and the maintenance of the patient’s quality of life in determining the treatment policy for such recurrent papillary carcinomas of the thyroid. Because the radiosensitivity of papillary thyroid carcinomas is low, surgical resection appears to be the treatment of choice if the functions of the laryngeal or recurrent laryngeal nerve can be preserved. Sugino and Asahara conducted 107 re-operations on 60 patients who developed recurrent carcinomas among 419 patients who suffered from malignant tumors of the thyroid gland. They reported that the surgery was repeated only once in most of them (60%) and 5 times or more in 10% [28]. In the present case, a local resection was repeated for recurrent lymph node involvement following the initial treatment that included total thyroidectomy and bilateral neck dissection. What treatment option should be selected for a fifth recurrence remains to be decided.

Surgical options selected by the majority were lymph node extirpation (48%) and neck dissection (32%), indicating that surgical procedures are performed as much as possible.

Only 19 replies gave external irradiation as a therapeutic option, which suggested that this therapeutic modality is not regarded to be highly promising for the treatment of recurrences such as those indicated here. On the contrary, radiiodine treatment is considered at 72% of the institutions that responded to the survey. In cases of carcinomas with multiple recurrences, as illustrated by the case presented here, radiiodine treatment is chosen as a systemic radiotherapy, considering metastases to other anatomical sites. However, the indication for radiiodine treatment has limitations because the prognosis is influenced by the accumulation of iodine-131, the tender age of a patient, and small metastatic foci. Like surgery, external irradiation is a localized treatment, but a slight enlargement of the irradiation field may perhaps be considered as one of the treatment options. Further studies are needed for post-operative recurrences.

6. Treatment policies in Japan versus in Western countries

The etiologies of thyroid cancer differ slightly in Japan and Western countries because of the differences in iodine uptake due to dietary habits and the frequency of ultrasound examinations. The most common treatment policies adopted in Western countries include total or near-total thyroidectomy. Only the enlarged lymph nodes are extirpated and the frequency of lymph node dissection is low. According to information obtained from the National Cancer Database of the United States, the proportion of total or near-total thyroidectomy for papillary thyroid carcinomas was 65% during a ten-year period from 1985 to 1995, and the frequency of application of neck dissection was only 7% [29]. The National Comprehensive Cancer Network (NCCN) has proposed the Clinical Practice Guidelines in Oncology (Version 1, 2004) as a guideline for treating malignant tumors in the United States [30]. This guideline recommends that thyroid tumors measuring 1 cm or less in diameter be observed with-
out any treatment, and that those exceeding 1 cm be subjected to biopsy. When a biopsy has shown a tumor to be a papillary carcinoma and at least one of the following factors exists, the patient is placed in the high-risk category and total thyroidectomy is performed: (1) age <15 years or >45 years, (2) history of radiation exposure, (3) known distant metastases, (4) bilateral disease, (5) extrathyroidal extension, (6) tumor >4 cm in diameter, (7) cervical lymph node metastases, and (8) family history of papillary or follicular thyroid cancer. When positive lymph node involvement is also found, the procedure is combined with a neck dissection. When none of the conditions listed above exists, total thyroidectomy or lobectomy plus isthmusectomy is recommended. Fig. 8 shows a flowchart of treatment modalities proposed by the NCCN. It can be seen in the figure that total thyroidectomy is recommended for many patients with thyroid cancer, followed by radioiodine treatment or external irradiation whenever possible. Finally, TSH suppression therapy is recommended for all cases. These treatment policies are not always absolute. Compared with the results of the current survey, this NCCN guideline actively promotes total thyroidectomy, with less emphasis on neck dissection. Radiotherapy and TSH suppression therapy are also strongly recommended.

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References