Postoperative Prognosis of Intrathyroidal Papillary Thyroid Carcinoma: Long-Term (35–45 Year) Follow-Up Study

YOSHIHIDE FUJIMOTO AND IWAO SUGITANI

Division of Head and Neck, Cancer Institute Hospital, Tokyo 170-0012, Japan

Abstract. We performed a long-term (35 to 45 year) follow-up study on patients who underwent surgery for intrathyroidal papillary thyroid carcinoma in order to reveal the natural history of the disease. Forty-nine patients underwent primary surgery for intrathyroidal papillary carcinoma during an 11-year period, 1950–1960. Various primary surgeries were performed, including neck exploration alone, tumor enucleation, hemi-, subtotal- and total-thyroidectomy in 2, 7, 21, 5 and 14 instances, respectively. Postoperative external irradiation was performed for most patients during the latter half of the period, and TSH suppression was carried out from 1956 through 1970. Follow-up studies were done in 1958, '62, '66, '69, '76 and currently 1997. Two patients, who had had only neck exploration and external irradiation, subsequently spent nearly normal lives for 10 and 32 years. Of the 28 patients who received hemithyroidectomy or lesser surgery, cancer recurrence in the remnant thyroid occurred in nine, of whom five received reoperation. At present, of all 49 patients, 22 are alive and well, and three are alive with asymptomatic recurrence. Only one male patient who had noted the initial lymph node metastases at age 15 died of bone metastasis 22 years after neck surgery. No other patients died definitely of thyroid cancer, although the causes of three deaths were unknown and one patient was lost after incomplete resection. The results of this study strongly support the idea that the majority of intrathyroidal papillary carcinomas remain non life-threatening for over 40 years and that they can be successfully treated by complete removal of macroscopic tumors by conservative surgery, hemi- or subtotal thyroidectomy, without associated adjuvant therapies.

Key words: Intrathyroidal papillary thyroid carcinoma, Long-term follow-up study, Natural history

ACCORDING to recent retrospective investigations with respect to cancer-specific mortality after surgery for papillary thyroid carcinoma, several authors [1–5] agree that there are two distinctly different groups of patients, a low-risk group and a high-risk one, and proposed methods to differentiate between these two groups. The most important prognostic factors common to the discriminating methods are local cancer invasion and distant metastasis [1–6]. In iodine-intake sufficient areas, 85% to 90% of patients with papillary thyroid carcinoma have a primary lesion confined within a thyroid capsule without distant metastasis, which is referred to as “intrathyroidal” papillary carcinoma. Although patients with intrathyroidal papillary thyroid carcinoma have negligible risk of cancer-specific death, the treatment of the disease is still controversial concerning the extent of thyroidectomy and the extent of neck dissection, and postoperative adjuvant therapies including whole body ablation with radioactive iodine and suppression of TSH secretion [1–11].

A long term follow-up study is essential to reveal the natural history of intrathyroidal papillary thyroid carcinomas, including whether microscopic
cancer foci left behind in the contralateral lobe would develop into clinical cancer lesions and whether transformation to a more malignant disease would occur, especially when patients were exposed to irradiation or their serum TSH concentrations were not suppressed and when they became 45 years old or older.

We carried out a long-term, 35 to 45 year, follow-up study of patients who underwent primary surgery for intrathyroidal papillary carcinoma. Our series included patients who were treated by incomplete resection of cancer lesions in 1953 or earlier, when there was no clear clinico-pathological entity of papillary thyroid carcinoma in our country. It was expected that a long follow-up study after incomplete surgery might show more clearly the natural history of the disease than after complete resection. On the basis of the results, we wanted to formulate a rational approach for treatment of the disease.

**Materials and Methods**

Determination of intrathyroidal cancers was based on the absence of evidence indicative of either local direct invasive characteristics of the tumor or distant metastasis, at the time of initial surgery. The overall review included all 49 patients who underwent the primary surgery for intrathyroidal and pathologically proven papillary carcinoma, at the Second Department of the University of Tokyo Hospital during an 11-year period, from 1950 through 1960. Three other patients, with an incidentally found occult sclerosing papillary carcinoma less than 1 cm in diameter, were not included in this study, because the cancer is generally accepted as a harmless tumor different from the usual clinical cancers. Ten other patients with papillary carcinoma who had evidence of extrathyroidal invasive growth or distant metastasis were strictly excluded. We have reviewed all medical records and also examined permanent paraffin sections. The status of a primary lesion of the thyroid (T) and that of metastatic lesions in the regional lymph nodes (N) were determined according to the latest TNM classification introduced in 1992 by the International Union Against Cancer.

**Follow-up study**

Follow-up studies for this series of patients had previously been carried out in 1958, '62, '66, '69 and '76. Twenty-one years have passed since the last study in 1976, when a total of 49 patients 15 had died of causes other than thyroid cancer, and another patient had been alive and well for 16 years after surgery and then was lost. In the current study, a questionnaire was sent to patients inquiring about vital status, local and distant tumor recurrence, management of recurrent disease, thyroid and parathyroid functional status and some hazardous conditions caused by surgical complications. Further detailed information, if necessary, was obtained from individual patients, relatives, physicians, registrars at city or town halls and the judicial office (for inquiry about the cause of death) by letter or telephone. Ten patients came to the outpatient clinic recently, where physical examination, ultrasonography of the neck, fine needle aspiration biopsy, thyroid and parathyroid function tests including the serum thyroglobulin concentration and anti-thyroglobulin antibody titer, and chest x-rays were carried out.

**Characteristics of this series of patients and methods of treatment**

Sex and age distribution at diagnosis: As shown in Table 1, females outnumbered males by a factor of 7:1. Patients' age distribution showed peaks in the 3rd and 4th decades in both men and women.

Primary lesion in the thyroid and regional lymph node metastasis: As seen in Table 2, more than half of the patients presented with a large thyroid tumor, 4 cm or larger, although some had a cystic component.

General trend in methods of treatment: In 1953 and earlier most surgery was simply a removal of thyroid nodule(s) without strict differentiation between malignant and benign lesions. In 1954 and subsequently performance of either hemithyroidectomy, subtotal thyroidectomy or total thyroidectomy, combined with nodal resection or modified neck dissection, has become the common procedure for patients with a diagnosis of thyroid cancer at the time of surgery. Marked nodal enlargement in those years was often initially...
incorrectly managed under suspicion of a tuberculous lesion, because tuberculosis was common in that period. Postoperative external irradiation with 60 Gy was recommended for all patients during the period from 1954 through 1960, and it was actually carried out in 27 patients (67% of the total number). The irradiation field covered principally only the area where thyroid and lymph nodal surgery was performed, and no prophylactic irradiation over the contralateral thyroid lobe and nodes was carried out. TSH suppressive therapy was carried out with desiccated thyroid on most patients since 1956 until 1970, when it was discontinued for the reasons given later.

### Results

**Surgical procedures and outcome in general (Table 3)**

Of all 49 patients, two underwent an exploratory neck incision with lymph node biopsy alone followed by external irradiation, and subsequently had spent nearly normal lives for 10 and 32 years, respectively, until their death due to unrelated diseases. Of 28 patients who had had hemithyroidectomy or lesser tumor resection surgery, cancer recurrence in the remnant thyroid occurred in nine. Those recurrences were removed by reoperation in five patients, 5 to 20 years after the initial operation, and all of them have been alive and well since then except for one who died of bleeding immediately after the reoperation elsewhere. In the other patients, the recurrent tumors have remained small and asymptomatic. Distant metastasis was seen only in one male patient who died of lumbar metastatic lesion 22 years after the initial surgery of hemithyroidectomy with bilateral modified neck dissection. Nineteen patients who underwent either subtotal- or total thyroidectomy had no tumor recurrence in the remnant thyroid or in the thyroid bed. Recurrence in the nodes occurred in three patients, in whom reoperation was carried out 10 to 33 years after the initial thyroid surgery, and subsequently they have been alive and well.

In the current follow-up study, 22 patients have been alive and well. Three patients are alive with asymptomatic tumor recurrences which are in the remnant thyroid in two patients and in the paratracheal lymph nodes in another. Only one patient definitely died of thyroid cancer as stated above. Twenty-three patients had been alive and well until the previous follow-up studies, and then 14 died of unrelated diseases, three died of unknown causes, and six were lost to follow-up.

**Patients with specific postoperative courses**

During a long postoperative period after the initial surgery, several patients had specific clinical courses which were worth describing in detail. Those cases will be mentioned according to the type of the initial surgery.

Patients who underwent neck exploration (with lymph node biopsy) alone: Two patients, a 55-year-old female with a unilateral lesion (T2N0M0) and a 33-year-old male with bilateral lesions (T2N1M0), underwent neck exploration with biopsy of a lymph node alone because of the surgeons' judgment that the neck lesions were too advanced to perform complete resection without causing grave complications. Nevertheless, these patients did not present with any symptoms suggesting cancer invasion of the adjacent

### Table 1. Sex and age of patients with intrathyroidal papillary thyroid carcinoma at diagnosis

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19-29</td>
</tr>
<tr>
<td>Male</td>
<td>0</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 2. Primary thyroid lesion and nodal metastasis at diagnosis

<table>
<thead>
<tr>
<th>TNM</th>
<th>Under 45 years</th>
<th>45 years and over</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>T1N0M0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>T2N0M0</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>T3N0M0</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>T2N1M0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>T3N1M0</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>28</td>
</tr>
</tbody>
</table>

TNM, UIICC TNM classification of thyroid cancer; T (primary tumor), N (nodal involvement), M (distant metastasis).
structures and, at the time of surgery, adhesion of the thyroid lesion to the trachea and internal jugular vein was probably falsely interpreted as invasion. Both of them received 60 Gy of external irradiation and subsequently had had a normal life-style with full activity until one of them died of bronchial asthma 10 years later, and the other died of unrelated cancer 32 years later. The latter patient, a 33-year-old male had an initial neck exploration in 1960 (Fig. 1), and in 1991 developed hypopharyngeal cancer for which a complete neck resection including laryngo-pharyngo-esophagectomy was performed at the National Cancer Center Hospital. Pathological study revealed that the hypopharyngeal squamous cell carcinoma occurred independently of the thyroid cancer, that the old papillary carcinoma of the thyroid never invaded the trachea beyond the layer of tracheal ring cartilages, and that each of multiple cancer lesions in the thyroid had undergone degenerative changes (Figs. 2 and 3). There were no sections of cervical lymph nodes with old metastatic lesions, probably because the nodes had become too small to be noticed at the pathological examination. The patient died of recurrence of the hypopharyngeal cancer one and a half years later.

Patients who underwent simply tumor enucleation: Two female patients, both with a T3N0M0 lesion and 20 and 30 years old when they initially had tumor enucleation surgery in 1953, developed clinically noticeable tumor recurrence in the thyroid and regional lymph nodes and underwent subtotal thyroidectomy with modified neck dissection 13 and 14 years later. Those two patients have, to our surprise, been perfectly well for the past 29 years.

Another 38-year-old female patient with a T2N0M0 lesion underwent enucleation of a cystic...
tumor in 1950. Six years later she presented with a local tumor recurrence, 8 × 4 cm in size, in the left thyroid lobe along with a palpable suprACLavicular lymph node, for which hemithyroidectomy along with resection of the cervical esophagus, 10 cm in length, was carried out, because the recurrent cancer reached the submucosal layer of the esophagus. Thereafter she had been well until she died of lung cancer at the National Cancer Center Hospital 29 years later. Occurrence of the lung cancer independently of the previously treated thyroid cancer was verified by the clinical course and pathological study.

Another 64-year-old woman with a cystic thyroid nodule (T2NOM0) located in the isthmus underwent tumor enucleation in 1956, and developed a local recurrence 20 years later, when she complained of marked dyspnea due to an intratracheally protruding recurrent polypoid tumor, approximately 1 cm in diameter. The tumor was removed in combination with resection of part of the trachea and she had enjoyed her life for four more years until she died of an unrelated disease at the age of 88 years. The above two patients were included in the intrathyroidal cancer group, because they initially underwent a simple operation for intrathyroidal papillary cancer and a locally recurrent tumor had grown up in a less resistant direction as a dense scar formed by a prior operation obstructed the outward proliferation. Neither of them showed signs of distant metastasis during a long follow-up period.

Patients who underwent hemithyroidectomy: We saw only one case of cancer-specific death. A male patient first noted metastatic cervical lymph node enlargement bilaterally at the age of 15 years, and 6 years later (in 1957) underwent right hemithyroidectomy along with modified neck dissection on both sides for marked lymph node metastases. This patient had never returned to our outpatient clinic, but we followed him up by mail. He subsequently had been alive with full activity until the follow-up study in 1976. In the present follow-up study we were informed of his death in 1979 with bone metastasis of one and a half years’ duration in the fourth lumbar vertebra, when small pulmonary metastatic foci were found on the chest x-rays and there were no clinically identifiable recurrent tumors in the neck.

A 33-year-old female patient had a hemithyroidectomy in 1951, and has been alive with a palpable nodule in the opposite lobe, which was noted 11 years after the initial surgery and has remained almost the same size for 34 more years, at present being 1.7 × 1.5 cm. The recurrent tumor has findings of typical papillary carcinoma on a high-quality ultrasonogram, such as a heterogenous
tumor mass with an irregular outline and with punctate calcific deposits, but the patient has been under conservative follow-up since the tumor has never shown any evidence of local invasion. In the current follow-up study, another patient first presented with a recurrent tumor, 1 x 1.5 cm in size, in the opposite lobe, and one other patient had an enlarged ipsilateral paratracheal lymph node, 2.6 x 1.5 cm in size. Since these recurrences are asymptomatic, they are under careful observation.

**Therapeutic effect and complications of postoperative external irradiation**

Irradiation was performed in two patients after exploratory surgery alone, in whom thyroid tumors had remained without notable change in size until death due to other diseases. In one of them, as shown in Figs. 2 and 3, marked fibrosis and degenerative change in cancer cells were interpreted as partly due to late effects of the therapy. After tumor enucleation, local recurrence occurred in both irradiated and non-irradiated patients (Table 4). Following hemithyroidectomy or larger thyroid resection, no patient in either irradiated or non-irradiated group had a local recurrence on the thyroidectomy side. Of patients who had irradiation after hemithyroidectomy, two developed intrathyroidal recurrence, but the recurrence was in the non-irradiated contralateral lobe. Cancer recurrence in the regional lymph nodes was clinically apparently lower after irradiation than in a nonirradiated group (Table 5), and most recurrences in the nodes in the irradiated group appeared outside the area of prior irradiation.

Some effects of irradiation were therefore recognized, but side effects of the therapy were hazardous, including narrowing of the upper esophagus in two patients, repeated ulcer and bleeding of the upper esophagus in one, and hypothyroidism in three, all having occurred 10 to 40 years after irradiation. In another male patient, irradiation might be one of the causative factors in the development of hypopharyngeal cancer 32 years after the therapy.

**Surgical complications**

Simple excision of the primary lesion carried out

<table>
<thead>
<tr>
<th>Surgical procedure for lymph nodes</th>
<th>TNM</th>
<th>Total</th>
<th>Postoperative external irradiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not done</td>
<td>N0</td>
<td>5/25</td>
<td>4/15 1/10</td>
</tr>
<tr>
<td>Removal of enlarged nodes</td>
<td>N0</td>
<td>2/8</td>
<td>1/1 1/7</td>
</tr>
<tr>
<td></td>
<td>N1</td>
<td>0/6</td>
<td>0/0 0/6</td>
</tr>
<tr>
<td>Neck dissection</td>
<td>N0</td>
<td>0/1</td>
<td>0/0 0/0</td>
</tr>
<tr>
<td></td>
<td>N1</td>
<td>1/8</td>
<td>1/3 0/5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>9/49</td>
<td>6/20* 3/29*</td>
</tr>
</tbody>
</table>

No. of patients with recurrence / Total no. of patients treated. *The difference in rates between the non-irradiated and irradiated groups in postoperative lymph node recurrence: P=0.08. TNM, UICC TNM classification of thyroid cancer; N (nodal involvement).
in seven patients did not result in any surgical complications, but four of them underwent a second operation for tumor recurrence, after which recurrent nerve palsy occurred in one patient and permanent hypoparathyroidism in another. Fourteen total thyroidectomies were associated with complications in 11 of them (79%), including recurrent nerve palsy in 9 (64%) and permanent hypoparathyroidism in 4 (29%). All those complications were the result of surgeons’ intentional attempts, in those years, to remove the lesions completely on the one hand, and of the characteristics of some cancers with a cystic component which caused severe adhesion to the adjacent structures on the other hand.

Discussion

One of the authors (YF) with his collaborators presented the result of a relatively short term (5–13 year) follow-up study of a total of 444 patients who underwent surgery for papillary thyroid carcinomas at the Tokyo Women’s Medical College Hospital (TWMCH), in which, similar to reports by other authors [1-5], there were two distinctly different groups of patients in terms of the risk of cancer-specific mortality [6]. The present follow-up study was carried out on a series of patients different from the TWMCH series and the number of patients was rather small, but it covered a much longer follow-up period and was characterized by two features: (1) since follow-up studies have been carried out by us five times previously on this same series of patients, we could tell the postoperative course of individual patients at six different points, and (2) since the present series of patients included those who underwent lesser surgery in which cancer tissues might be left behind, we could pursue the natural history of the disease more clearly than in a series of patients who underwent complete resection. In the study, it was important to determine whether there was any case with definite evidence to indicate transformation from an intrathyroidal, namely low-risk, papillary carcinoma to a more malignant, high-risk, cancer during the long follow-up period. During the same 11-year period at the same hospital, we saw 10 patients who underwent surgical treatment for extrathyroidal, high-risk, papillary thyroid carcinoma, all of whom died of thyroid cancer 1 to 18 years after the initial surgery. In sharp contrast, in the present group of 49 patients with intrathyroidal cancers followed up, only one patient died of thyroid cancer from a bone metastasis 22 years after the initial therapy. This patient first noted cervical adenopathy bilaterally at the age of 15 years (Table 6, Case 1). Cancer-specific death

Table 6. Critical review of cases of questionable malignant transformation

<table>
<thead>
<tr>
<th>Patient Age, Sex</th>
<th>Initial surgery</th>
<th>Issue of possible transformation to malignant cancer and our judgment (Interval after surgery, years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 21, M</td>
<td>Hemithyroidectomy</td>
<td>22 y: Died of bone metastasis.—Transformation is not likely, but natural outcome of a ‘childhood thyroid cancer’.</td>
</tr>
<tr>
<td>2. 64, F</td>
<td>Enucleation</td>
<td>20 y: Infratracheal recurrence.—No transformation, because this was a local recurrence, with no distant metastasis.</td>
</tr>
<tr>
<td>3. 38, F</td>
<td>Enucleation</td>
<td>6 y: Local recurrence with submucosal invasion of esophagus; 35 y: Died of proven lung cancer.—No evidence of transformation.</td>
</tr>
<tr>
<td>4. 32, M</td>
<td>Enucleation</td>
<td>32 y: Died of proven hypopharyngeal cancer.—No evidence of transformation.</td>
</tr>
<tr>
<td>5-7. 61-69, all, F</td>
<td>Total thyroidectomy</td>
<td>9-19 y: Died of unknown cause.—Probably no transformation. Complete resection, and perfectly well 5-12 y after surgery.</td>
</tr>
<tr>
<td>8. 25, F</td>
<td>Hemithyroidectomy</td>
<td>32 y: Moved to Austria.—Probably no transformation. Complete resection, and alive and well 20 y after surgery.</td>
</tr>
<tr>
<td>9. 33, F</td>
<td>Enucleation</td>
<td>Alive and well until 12 y after incomplete resection, then lost.—Transformation not determined.</td>
</tr>
<tr>
<td>10-13. 30-62, all F</td>
<td>Total thyroidectomy (n=3), hemithyroidectomy (n=1)</td>
<td>Probably no transformation, because of complete resection and good postoperative course for 15–19 y before loss of contact.</td>
</tr>
</tbody>
</table>
in this case may represent a natural outcome of his biologically aggressive thyroid cancer, since thyroid neoplasms occurring in children occasionally show fatal distant metastasis far late after initial therapy [12, 13]. There were several other questionable cases we had to review critically (Table 6). The patients included one who had a recurrence inside the trachea (Case 2), and another who developed a recurrent tumor with invasion of the submucosal layer of the esophagus (Case 3), and one patient lost to follow-up having possible cancer foci in the remnant thyroid (Case 9). After strictly reviewing the data, we found no patient with definite evidence of malignant transformation, although there remained seven patients whose cause of death or final outcome was not determined. It is very likely that, if malignant transformation should ever occur, it would be exceedingly rare, particularly when patients are young adults at the time of diagnosis. Thus far many investigators have suggested that irradiation, an abnormally high serum TSH concentration and age over 40 years for males and over 50 years for females might have some effect in inducing malignant transformation, but we did not find this to be the case in our series.

On the other hand, we were surprised to find several instances of unexpectedly favorable outcome in our series. Two patients who had neck exploration alone followed by external irradiation had spent almost normal lives with full activity for 10 and 32 more years. Three others are alive with recurrent tumors, which have remained small and completely asymptomatic without evidence of local invasion for a long time, a mean of 40 years. Four patients underwent complete resection of recurrent cancers six to 20 years (mean, 13 years) after the initial incomplete excision, and subsequently they had or have been alive and perfectly well for quite a long time. Those results imply that patients with intrathyroidal papillary carcinomas can be treated with a favorable outcome similar to that with early operation even if complete resection is delayed several years after diagnosis.

Among the low-risk group of patients, a 2% cancer-specific death rate was reported from several different series including ours [2–6]. This 2% figure should not be interpreted as the rate of malignant transformation, but it rather represents the rate of our false judgment at the initial diagnosis. Those exceptional, small number of patients with a truly high-risk cancer would almost always suffer from either local invasive recurrence or distant metastasis usually within 3 or at most 10 years after initial surgery, when we can change the prior classification of a low-risk cancer to a high-risk one and treat the patients properly. There lies the importance of a postoperative follow-up study.

The results of our long-term follow-up study indicate that (1) intrathyroidal papillary thyroid carcinomas are eventually not life-threatening cancers, and at the same time (2) complete resection of macroscopic cancer lesions in the thyroid and regional lymph nodes is important in order not to cause tumor recurrence. There has been controversy concerning the proper treatment of intrathyroidal papillary thyroid carcinomas. One of the extreme treatments consists of total thyroidectomy followed by $^{131}$I whole body ablation and TSH suppression [7, 8, 10, 11]. Currently total thyroidectomy without causing permanent hypoparathyroidism can be carried out by many experienced surgeons by means of either preservation of blood supply to the parathyroid glands [14] or heterotopic autotransplantation of the glands [15, 16]. Surgeons at the Mayo Clinic advocate a near-total thyroidectomy for decreasing the incidence of hypoparathyroidism with the same cancer-controlling effect [17]. Total or near-total thyroidectomy has advantages [7, 8], such as no fear of postoperative tumor recurrence in the remnant thyroid tissue, easy determination of the serum thyroglobulin concentration in order to detect tumor recurrence, capability of whole body tumor ablation or examination and treatment of recurrent cancer with $^{131}$I. Among retrospectively reviewed patients in our series, only the one patient who died of bone metastasis 22 years after an initial surgery would have been better treated if he had undergone total thyroidectomy followed by whole body ablation with radioiodine and TSH suppression. The patient missed another chance to have a completion total thyroidectomy, since he had never returned to us. For all the other patients, however, none of those advantages described above are essential requirements if intrathyroidal papillary carcinomas have a negligible risk of cancer death.

As has been suggested by several investigators [5, 18, 19], we confirmed in the current long-term follow-up study that microscopically detectable
minute cancer foci in the contralateral lobe and regional lymph nodes would not develop to noticeable clinical lesions so long as the gross cancer lesions are completely resected. Therefore, once the diagnosis of intrathyroidal papillary carcinoma is made, a more conservative approach appears to be justified. For patients with a primary cancer lesion localized in one thyroid lobe, since 1970 we have chosen hemithyroidectomy with removal of the isthmus along with central zone dissection or ipsilateral modified neck dissection [6]. If cancer dissemination in the thyroid gland reaches the isthmus, the medial third of the opposite lobe is included in the resection, the procedure referred to as subtotal thyroidectomy in our series [6]. With these thyroidectomy methods, 63% of all 150 patients recently evaluated had normal thyroid function postoperatively. It has been our policy since 1970 to maintain the patient’s serum TSH level in the normal range. Total thyroidectomy is reserved only for those with cancer lesions in the bilateral lobes, including those with a diffuse sclerosing variant [20], or with enlarged lymph nodes bilaterally.

Complete resection of macroscopically identifiable primary cancer lesion(s) by hemithyroidectomy or larger resection is important. Otherwise, recurrence occurs even under complete TSH suppression, and secondary surgery is frequently accompanied by surgical complications because it is hard to identify important structures because of a scar formed by the previous operation. After an incomplete resection a recurrent tumor may occasionally be driven toward the esophagus and/or trachea because its growth is obstructed by a locally formed dense scar, as seen in two patients in our series.

A modified neck dissection is justified when patients have grossly recognizable lymph node metastases. Prophylactic dissection may be indicated when (1) the patient is a child [13], (2) the primary lesion lies in the upper pole of the thyroid lobe [6], and (3) the patient has an intrathyroidal dissemination of cancer or apparent multiple nodal metastases in the central zone.

Postoperative external irradiation with 60 Gy given in our series showed therapeutic effects for metastatic lesions in the lymph nodes, but only limited effect for cancer lesions in the thyroid gland. The different effects of irradiation may arise from the fact that the normal thyroid tissue is resistant but the lymph nodes themselves are almost completely destroyed by 60 Gy irradiation. External irradiation is, however, generally not advocated, because it also induces hazardous side effects. In our institution, irradiation was discontinued at the end of 1960. Postoperative whole body ablation with radioactive iodine has never been adopted in our clinic for patients who underwent intrathyroidal papillary carcinomas.

TSH suppression therapy was discontinued in our series in 1970, because we found that, of a total of 36 patients who were under the therapy, 20 eventually had nonsuppressed serum TSH levels mainly due to poor drug compliance [21], and we also noted no difference in the postoperative tumor recurrence rate in patients with a suppressed serum TSH level and those with a nonsuppressed TSH level [22]. We agree with Vickery et al. [1] and Cady et al. [3,23] who stated that patients undergoing surgery for low-risk intrathyroidal papillary thyroid carcinomas have such a favorable prognosis that further beneficial effects of total thyroidectomy, radioiodine whole body ablation and/or TSH suppression therapy have never been convincingly shown.

Acknowledgements

We thank Drs. Koichi Hirano, Takeshi Sano and Tadakazu Shimoda (Departments of Head and Neck Surgery, Surgery, and Pathology, National Cancer Center Hospital), Dr. Tamiko Takemura (Department of Pathology, Japanese Red Cross Medical Center) and Drs. Masatoshi Makuuchi and Noriyuki Baba (Department of Surgery, the University of Tokyo Hospital) for their help in the current follow-up study.

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