Background: Although age itself is no contraindication for major surgical procedures, few patients 75 years and older undergo thyroid surgery.

Hypothesis: Thyroid surgery in the geriatric patient can be performed with low morbidity and mortality.

Design: Retrospective analysis of prospectively documented data.

Setting: University hospital referral center.

Patients: We included 738 patients undergoing thyroid surgery within 5 years, of whom 55 (7.5%) were 75 years or older (group 1) (mean±SD age, 79.9±4.1 years).

Main Outcome Measures: Indication for surgery, surgical strategy, morbidity, and mortality were analyzed and compared with those in younger patients (<75 years; group 2).

Results: Malignancy was suspected or verified in 29 patients (52.7%) in group 1; 21 (38.2%) had mechanical symptoms due to large bilateral nodular goiters; and 5 (9.1%) presented with benign nodular goiter. The main indication in group 2 (n=683) was benign nodular goiter in 455 (66.6%); 142 patients (20.8%) presented with suspected malignancy and 21 (3.1%) with mechanical symptoms (P<.001). Most patients underwent total thyroidectomy, hemithyroidectomy, or near-total thyroidectomy (n=50 [90.9%; group 1] vs n=597 [87.4%; group 2]; P=.53). Frequency of malignancy was higher in group 1 (n=20 [36.4%] vs n=179 [26.2%]; P=.17). Morbidity of thyroid surgery was comparable in both groups. One (2.3%) of 44 patients in group 1 had permanent hypoparathyroidism, compared with 10 (2.0%) of 502 in group 2 (P=.61); permanent recurrent laryngeal nerve paralysis occurred in 1 (1.05%) of 95 nerves at risk in group 1 compared with 3 (0.26%) of 1172 nerves at risk in group 2 (P=.22). There was no perioperative mortality in either group.

Conclusions: Thyroid surgery in patients 75 years or older can be performed with low morbidity. The guarantees for success include an individual risk-and-benefit analysis and careful preoperative preparation.

Arch Surg. 2002;137:1243-1248
Table 1. Indications for Surgery in 738 Consecutive Patients Undergoing Solitary Thyroid Surgery*

<table>
<thead>
<tr>
<th>No. (%) of Patients</th>
<th>Group 1 (n = 55)</th>
<th>Group 2 (n = 683)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign goiter</td>
<td>5 (9.1)</td>
<td>455 (66.6)</td>
</tr>
<tr>
<td>Unifocal autonomy</td>
<td>4 (7.3)</td>
<td>61 (8.9)</td>
</tr>
<tr>
<td>Thyrotoxicosis</td>
<td>0</td>
<td>99 (14.5)</td>
</tr>
<tr>
<td>Multinodular goiter</td>
<td>0</td>
<td>77 (11.3)</td>
</tr>
<tr>
<td>Cold nodule in goiter</td>
<td>0</td>
<td>113 (16.5)</td>
</tr>
<tr>
<td>Solitary cold nodule</td>
<td>1 (1.8)</td>
<td>105 (15.4)</td>
</tr>
<tr>
<td>Suspected malignancy</td>
<td>21 (38.2)</td>
<td>142 (20.8)</td>
</tr>
<tr>
<td>Abnormal PG stimulation†</td>
<td>1 (1.8)</td>
<td>34 (5.0)</td>
</tr>
<tr>
<td>ref Proto-oncogene carrier</td>
<td>0</td>
<td>4 (0.6)</td>
</tr>
<tr>
<td>Suspect FNAB</td>
<td>7 (12.7)</td>
<td>89 (13.0)</td>
</tr>
<tr>
<td>Clinical suspicion</td>
<td>13 (23.6)</td>
<td>15 (2.2)</td>
</tr>
<tr>
<td>Verified malignancy</td>
<td>8 (14.5)</td>
<td>65 (9.5)</td>
</tr>
<tr>
<td>MTC biochemically</td>
<td>6 (10.9)</td>
<td>34 (5.0)</td>
</tr>
<tr>
<td>Lymph node metastases</td>
<td>0</td>
<td>13 (1.9)</td>
</tr>
<tr>
<td>Operated-on carcinoma</td>
<td>2 (3.6)</td>
<td>18 (2.6)</td>
</tr>
<tr>
<td>Mechanical symptoms</td>
<td>21 (38.2)</td>
<td>21 (3.1)</td>
</tr>
<tr>
<td>Large nodular goiter</td>
<td>17 (30.9)</td>
<td>19 (2.8)</td>
</tr>
<tr>
<td>Thyrotoxicosis</td>
<td>4 (7.3)</td>
<td>2 (0.3)</td>
</tr>
</tbody>
</table>

*Patient groups are described in the ‘Methods’ section. Data are given as number (percentage) of patients. PG indicates pentagastrin; FNAB, fine-needle aspiration biopsy; and MTC, medullary thyroid carcinoma. †Indicates abnormal elevation of calcitonin secretion after PG stimulation.

Table 2. Surgical Strategy*

<table>
<thead>
<tr>
<th>No. (%) of Patients</th>
<th>Group 1 (n = 55)</th>
<th>Group 2 (n = 683)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radical</td>
<td>58 (90.9)</td>
<td>597 (87.4)</td>
</tr>
<tr>
<td>TH</td>
<td>37 (67.3)</td>
<td>388 (56.8)</td>
</tr>
<tr>
<td>NTTH</td>
<td>3 (5.5)</td>
<td>49 (7.2)</td>
</tr>
<tr>
<td>HTH</td>
<td>7 (12.7)</td>
<td>160 (23.4)</td>
</tr>
<tr>
<td>Extirpation of recurrence†</td>
<td>3 (5.5)</td>
<td>0</td>
</tr>
<tr>
<td>Nonradical</td>
<td>5 (9.1)</td>
<td>86 (12.6)</td>
</tr>
<tr>
<td>EN</td>
<td>1 (1.8)</td>
<td>1 (0.1)</td>
</tr>
<tr>
<td>USR</td>
<td>0</td>
<td>11 (1.6)</td>
</tr>
<tr>
<td>BSR</td>
<td>2 (3.6)</td>
<td>5 (0.7)</td>
</tr>
<tr>
<td>HTH + SR</td>
<td>2 (3.6)</td>
<td>69 (10.1)</td>
</tr>
</tbody>
</table>

*Patient groups are described in the ‘Methods’ section. TH indicates total thyroidectomy; NTTH, near-total thyroidectomy; HTH, hemithyroidectomy; EN, enucleation; USR, unilateral subtotal resection; BSR, bilateral subtotal resection; and SR, contralateral subtotal resection. †Indicates radical extirpation of local or lymph node recurrence of differentiated (n = 2) or medullary (n = 1) thyroid carcinoma.

The main indication for surgery in group 1 was suspected or verified malignancy (n = 29 [52.7%]), followed by mechanical symptoms (n = 21 [38.2%]). These 2 indications were much less frequent in group 2, ie, 207 patients (30.3%) and 21 (3.1%), respectively. In contrast, benign indications were a rarity in group 1 (n = 5 [9.1%]) compared with group 2 (n = 455 [66.6%]). These differences were statistically highly significant (P < .001).

We also compared the frequency of thyroid surgery owing to recurrent disease. In group 2, 46 patients (6.7%) underwent recurrent thyroid surgery. This proportion was significantly higher in group 1 (n = 10 [18.2%]; P = .006).

INDICATIONS FOR SURGERY

The surgical strategy in groups 1 and 2 is summarized in Table 2. Most of the patients underwent radical surgical treatment as defined above (group 1, n = 50 [90.9%]; group 2, n = 597 [87.4%]). We found no significant difference in surgical radicalness between the 2 age groups (P = .53).

SURGICAL STRATEGY

Definitive diagnosis after histological examination of the surgical specimens disclosed malignancy in 20 (36.4%) invasive carcinomas infiltrating the recurrent nerve. Five patients in group 1 presented with a preoperative recurrent laryngeal nerve palsy. None of the preoperative palsies improved after thyroid surgery. These preoperatively damaged or intentionally cut nerves were excluded from further analysis, resulting in a total number of 1267 nerves at risk. For calculating the rate of hypoparathyroidism, only bilateral surgical procedures (n = 546) were taken into account.

We established the following 3 major indications for surgery: (1) benign goiter, consisting of a solitary cold nodule, a cold nodule in nodular goiter, nodular goiter without a cold nodule, thyrotoxicosis, or unifocal or multifocal autonomy; (2) suspected or verified malignancy, including suspected fine-needle aspiration cytologic findings (follicular neoplasia or suspected papillary carcinoma), clinically suspected carcinoma (rapidly growing cold nodules, suspicious ultrasonographic findings, or suspicious results of palpation), elevated levels of basal calcitonin and abnormally elevated levels of calcitonin secretion after pentagastrin stimulation, biochemically verified medullary thyroid carcinoma, lymph node metastases of papillary carcinoma diagnosed using biopsy findings, or histologically verified thyroid carcinoma (completion thyroidectomy); and (3) mechanical symptoms due to large and often retrosternal goiter.

We also differentiated between radical and nonradical surgical strategies. Radical surgery consisted of total thyroidectomy, near-total thyroidectomy (leaving an unilateral thyroid remnant of approximately 1 × 1 × 1 cm), and hemithyroidectomy (under the condition of a completely healthy contralateral lobe). All other procedures were considered nonradical surgery.

Unless otherwise indicated, data are given as mean ± SD. Differences were calculated for their statistical significance using the Fisher exact test and regarded as significant if P < .05.
patients in group 1 and in 179 patients (26.2%) in group 2. Thyrotoxicosis was the definitive diagnosis in 4 patients in group 1 (7.3%) and in 90 patients in group 2 (13.2%). The remaining diagnoses included benign nodular goiters or follicular adenomas (group 1, n=31 [56.4%]; group 2, n=414 [60.6%]). We found a trend toward a higher rate of malignancy in group 1 and a higher rate of thyrotoxicosis in group 2, but no statistically significant difference \( P = .17 \). The exact distribution of the various thyroid malignancies is shown in Table 3.

**MORBIDITY AND MORTALITY**

Fourteen patients (25.5%) in group 1 had some kind of early postoperative complication, compared with 149 (21.8%) in group 2 (Table 4). Early postoperative recurrent laryngeal nerve palsy and postoperative hypocalcemia were the most frequent complications in both age groups.

In group 1, postoperative hypocalcemia developed in 6 (13.6%) of 44 patients. One permanent hypoparathyroidism (2.3%) was observed. In group 2, postoperative hypocalcemia developed in 71 (14.1%) of 502 patients, permanently in 10 (2.0%). These differences were not statistically significant \( P > .99 \) and \( P = .61 \), respectively.

The second most frequent complication was early postoperative recurrent laryngeal nerve palsy in 6 (6.3%) of 95 nerves at risk in group 1 and in 46 (3.9%) of 1172 nerves at risk in group 2. This difference was not statistically significant \( P = .24 \). In group 1, only 1 permanent palsy was observed in a patient with a widely invasive papillary thyroid carcinoma (PT4b, pN1a), accounting for 1.05% of the nerves at risk, whereas 3 early nerve palsies in group 2 remained permanent (0.26%). This difference between the age groups also did not reach statistical significance \( P = .22 \).

In group 1, complications other than hypocalcemia and recurrent laryngeal nerve paresis occurred in 6 patients (10.9%), consisting of hematomas requiring surgery in 3 (5.5%), respiratory distress that required transfer to the intensive care unit (ICU) in 2 (3.6%), and wound infection in 1 (1.8%). Further complications in group 2 were hematomas requiring surgery in 24 patients (3.5%), chylous fistula in 4 (6.0%), wound infection in 3 (0.4%), paresis of the brachial plexus in 3 (0.4%), and seroma, postoperative respiratory insufficiency, and pneumonia in 1 (0.1%) each, totaling 37 complications (5.4%). We found no statistically significant differences between the 2 age groups \( P = .12 \).

Permanent morbidity occurred in 2 patients (3.6%) in group 1 and 13 (1.9%) in group 2. Perioperative (within 30 days) mortality was 0 in both age groups.

One patient with a poorly differentiated papillary thyroid carcinoma in a large retrosternal goiter underwent complication-free transsternal thyroidectomy and presented 7 months later with a metastasis in the sternum. An osseous resection, covering the defect with a muscular flap, was performed. This patient presented with high comorbidity at the time of surgery (history of myocardial infarction, 4-fold aortocoronary bypass graft, arterial hypertension, chronic obstructive pulmonary dis-

tease, and type 2 diabetes mellitus). He died 2 days after the reintervention owing to an acute myocardial infarction. Because of this death, the mortality rate in group 1 was 1.8%.

**COMORBIDITY IN GROUP 1**

Ten patients in group 1 showed no comorbidities (18.2%). Seventeen patients (30.9%) presented with 1 concomitant disorder; 18 (32.7%), 2; and 10 (18.2%), with 3 or more. Cardiovascular disorders were seen the most frequently \( (n=44 [80.0%]) \), whereas neurologic \( (n=9 [16.4%]) \), metabolic \( (n=8 [14.5%]) \), and pulmonary diseases \( (n=7 [12.7%]) \) were seen less frequently.

Essential hypertension existed in 29 patients (52.7%) and was the most frequent of the cardiovascular diseases, followed by coronary arteriosclerosis \( (n=17 [30.9%]) \), 6 of them with a history of myocardial infarction) and cardiac arrhythmias \( (n=12 [21.8%]) \). Two patients presented with chronic cardiomyopathy, and 1 patient, with a slight insufficiency of the aortal valve.

Type 2 diabetes mellitus was the most frequent metabolic comorbidity \( (n=5 [9.1%]) \), followed by type 1 dia-

---

**Table 3. Distribution of Histological Types of Malignancies**

<table>
<thead>
<tr>
<th>Histological Findings</th>
<th>Group 1 (n = 20)</th>
<th>Group 2 (n = 179)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTC</td>
<td>5 (25.0)</td>
<td>107 (59.8)</td>
</tr>
<tr>
<td>FTC</td>
<td>3 (15.0)</td>
<td>16 (8.9)</td>
</tr>
<tr>
<td>ATC/ITC</td>
<td>4 (20.0)</td>
<td>7 (3.9)</td>
</tr>
<tr>
<td>MTC</td>
<td>7 (35.0)</td>
<td>36 (20.1)</td>
</tr>
<tr>
<td>MTC + DTC</td>
<td>0</td>
<td>9 (5.0)</td>
</tr>
<tr>
<td>Others</td>
<td>1 (5.0)</td>
<td>4 (2.2)</td>
</tr>
</tbody>
</table>

*Patient groups are described in the “Methods” section.

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralysis of the recurrent laryngeal nerve, No. (%) of nerves at risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early postoperative</td>
<td>6/95 (6.3)</td>
<td>46/1172 (3.9)</td>
</tr>
<tr>
<td>Permanent</td>
<td>1/95 (1.05)</td>
<td>3/1172 (0.26)</td>
</tr>
<tr>
<td>Hypoparathyroidism, No. (%) of patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early postoperative</td>
<td>6/44 (13.6)</td>
<td>71/502 (14.1)</td>
</tr>
<tr>
<td>Permanent</td>
<td>1/44 (2.3)</td>
<td>10/502 (2.0)</td>
</tr>
<tr>
<td>Other complications, No. (%) of patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hematoma</td>
<td>3/55 (5.5)</td>
<td>24/683 (3.5)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>1/55 (1.8)</td>
<td>3/683 (0.4)</td>
</tr>
<tr>
<td>Seroma</td>
<td>0</td>
<td>1/683 (0.1)</td>
</tr>
<tr>
<td>Chylous fistula</td>
<td>0</td>
<td>4/683 (0.6)</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>2/55 (3.6)</td>
<td>1/683 (0.1)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0</td>
<td>1/683 (0.1)</td>
</tr>
<tr>
<td>Paralysis of brachial plexus</td>
<td>0</td>
<td>3/683 (0.4)</td>
</tr>
</tbody>
</table>

*Other complications include hematoma, wound infection, seroma, chylous fistula, respiratory distress, pneumonia, and paralysis of the brachial plexus.*
After 1 year, 110 patients (55.0%) were still alive, and 90 (45.0%) had died. Median follow-up was 44 months. Thirty-eight (69.1%) of 55 patients were still alive, and 16 (29.1%) had died. Eleven patients with papillary, follicular, or medullary thyroid carcinomas (2 of whom underwent surgery for recurrence) are still alive. Nine (45.0%) of 20 patients with widely invasive follicular thyroid carcinoma (2 of whom underwent surgery for recurrence) are still alive. One patient with thyroid metastasis of a bronchial carcinoma was 70.0%±10.2% after 1 year (patients at risk, n=20), and 65.2%±11.6% after 5 years (patients at risk, n=7).

Of the 35 patients with benign histological findings, 7 patients (20.0%) died, with the first death occurring 1½ years after surgery. Estimated Kaplan-Meier survival for these patients was 100% after 1 year (patients at risk, n=35), 90.3%±5.3% after 3 years (patients at risk, n=20), and 65.2%±11.6% after 5 years (patients at risk, n=7).

The prevalence of thyroid disease increases significantly with age. The nodular quality of the thyroid, fibrosis, and lymphocytic infiltration increase. Indications for surgery and surgical strategy in thyroid nodular disease depend on whether a nodule is benign, malignant, euthyroid, or toxic, or whether a mechanical impairment of adjacent organs exists. Uncomplicated, small, and clinically unsuspicuous euthyroid nodular goiters need not undergo operation but can be followed up over time, whereas large or suspicious alterations of the thyroid should undergo early elective and definitive surgical treatment at any age to avoid acute and eventually complicated interventions.

The effectiveness of surgery in geriatric patients depends on whether it is performed safely, allowing patients to return to productive lives and an improved postoperative life expectancy or at least to a condition that is not diminished by the surgical procedure. Therefore, an individual risk-and-benefit analysis and careful selection are essential in elective surgery, especially in the geriatric patient. Furthermore, among geriatric patients, mortality is much lower in elective compared with emergency surgery. Therefore, minimization of the risks of surgical interventions in the geriatric patient by performing early elective surgery, accompanied by adequate preoperative evaluation and preparation, is essential to avoid emergency interventions.

Each of our geriatric patients underwent surgery because of an absolute necessity, ie, mechanical impairment of adjacent vital organs, thyrotoxicosis refractory to medical treatment, and high suspicion of malignancy. The evidence of careful patient selection in this group is demonstrated by the difference in the distribution of the indications for surgery, which shows a statistically significant higher proportion of patients with suspected or verified malignancy and large goiters causing mechanical symptoms in the geriatric patients compared with the younger ones.

Just 1 (1.8%) of our 55 geriatric patients underwent an emergency intervention because of extreme dyspnea accompanied by inspiratory stridor caused by a large nodular goiter with extensive compression of the trachea. All others were able to undergo evaluation and adequate preoperative preparation (delayed urgency). Mean preoperative hospital stay was 4.3 days in our patients compared with 5.3 days in the study of Steinau et al, whose patients underwent different surgical interventions.

With increasing age, morbidity and mortality after surgery also increase. Terracciano et al demonstrated age greater than 70 years as an independent risk factor for increased morbidity and mortality in a multi-

**POSTOPERATIVE COURSE**

Seven patients (12.7%) were treated in the ICU immediately after the operation. Three of them underwent overnight monitoring, and 4 with known pulmonary comorbidities were treated in the ICU for 4, 5, 10, and 14 days postoperatively because of postoperative respiratory distress.

Two patients required a tracheostomy. Both had widely invasive thyroid carcinomas (follicular thyroid carcinoma with invasion of the trachea in one and locally advanced anaplastic thyroid carcinoma in the other). Mean hospital stay was 14.2±7.5 days (median, 13 days; minimum, 4 days; maximum, 47 days). Mean preoperative hospital stay was 4.3±2.7 days (median, 4 days) for all patients, 2.9±2.1 days for patients without comorbidity, 4.2±2.8 days for patients with 1 concomitant disease, 4.9±2.0 days for patients with 2 concomitant diseases, and 4.5±3.4 days for patients with 3 or more concomitant diseases.

**FOLLOW-UP OF GROUP 1**

Median follow-up was 44 months. Thirty-eight (69.1%) of the 55 patients were still alive, and 16 (29.1%) had died. One patient was lost to follow-up. Nine (45.0%) of 20 patients with thyroid malignancy died owing to the carcinoma (n=7) or other causes (n=2; myocardial infarction in one and acute renal failure in the other). Two of the 3 patients with widely invasive follicular thyroid carcinoma (with tracheal invasion and seeding metastases) died 4½ and 5 years after primary surgery. Three of the 4 patients with anaplastic thyroid carcinoma died after 3 months, and the fourth died 2 years 2 months after the primary operation. One patient with thyroid metastasis of a bronchial carcinoma died 9 months after thyroid surgery.

Eleven patients with papillary, follicular, or medullary thyroid carcinomas (2 of whom underwent surgery for recurrence) are still alive. Estimated survival according to Kaplan-Meier for the patients with carcinoma was 70.0%±10.2% after 1 year (patients at risk, n=14), 64.2%±10.9% after 3 years (patients at risk, n=10), and 55.0%±12.6% after 5 years (patients at risk, n=3).
variety of comorbid conditions.4,10,18,19,27,28 Hand, Hannoun et al9 did not find an increased mortal-
ity of patients 85 years and older. On the other age. Their median postoperative mortality rate was 3.0% in patients younger than 65 years, 6.4% in patients aged 65 to 74 years, 8.6% in patients aged 75 to 84 years, and 19.4% in patients 85 years and older. On the other hand, Hannoune et al9 did not find an increased mortality rate in 44 patients older than 70 years undergoing pancreaticoduodenal resection compared with younger pa-
ients. Recent publications showed that increasing mortality with advancing age depends on the biological rather than the chronological age13 and therefore, on the number of comorbid conditions.4,10,19,27,28

Most of these publications concerned major surgery. Few data exist concerning thyroid surgery in the elderly patient.29,30 Har-El et al29 found a 1.9% postop-
erative mortality rate in 50 patients older than 70 years with thyroid carcinoma. In our study, the mortality rate was 0% for solitary thyroid surgery in either age group. The only patient who died after resection of sternal me-
tastases of a poorly differentiated thyroid carcinoma (af-
ter eventful transsternal thyroidectomy 7 months ear-
ier) presented with numerous concomitant conditions. He had a history of myocardial infarction, the most impor-
tant cardiac risk factor according to Mehta and Savino.31 The importance of a myocardial infarction in the patients’ history is also underlined by other authors.32,34

Many of our geriatric patients presented with cardio-
vascular diseases (hypertension in 52.7%, coronary arte-
riosclerosis in 30.9%, and cardiac arrhythmia in 21.8%). Neu-
rologic diseases were seen in 16.4%, metabolic disorders in 14.5%, and pulmonary disease in 12.7% of our geriatric patients. Steinau et al4 also found cardiovascular diseases to be the most common comorbid condition (45.9%). Hyper-
tension was present in 28.7% of their patients. Com-
pared with our patients, pulmonary (19.4%) and meta-
bolic disorders (16.6%) were seen more frequently, whereas neurologic comorbidity (7.3%) was less frequent. The rate of patients with 2 or more concomitant conditions was higher in our patient population. Of the patients de-
scribed by Steinau et al,4 25.4% had no additional disease, and 37.3% presented with 1, 24.0% with 2, and 14.0% with 3 or more additional disorders, compared with 18.2%, 30.9%, 32.7%, and 18.2%, respectively, of our patients. The reason for this lower rate of patients with multiple comor-
bidity is probably the lower age limit used by Steinau et al (>65 years).

Since mortality is now rare in thyroid surgery, the qual-
ity of the intervention is determined by the morbidity, es-
pecially the frequency of permanent recurrent laryngeal nerve paralysis and permanent hypocalcemia or hypopara-
thyroidism. The frequency of early postoperative compli-
cations in our patients was similar in the 2 age groups: 21.8% in patients younger than 75 years and 23.5% in the ger-
iatric group. This rate of complications seems quite high, but fortunately only 13 (1.9%) of the younger and 2 (3.6%) of the geriatric patients had permanent complications. This difference between the age groups is not statistically sig-
nificant but demonstrates a trend toward higher morbidity in the geriatric patients. Missing statistical signifi-
cance, however, may represent a type II statistical error. Possible explanations for the higher rate of permanent complica-
tions in the geriatric patients are the significantly higher rate of reinterventions in this group (18.2% vs 6.7%; P = .006), the significantly higher frequency of large and often retrosternal nodular goiters (38.2% vs 3.1%; P < .001), and the higher incidence of malignancy (36.4% vs 26.2%; P = .17). These conditions are known to be associated with increased morbidity.

Considering the high rate of reinterventions in el-
derly patients and the associated higher rate of morbidity, we should discuss whether thyroid surgery in gen-
eral should be more aggressive in the initial intervention, ie, total thyroidectomy for benign thyroid disease in case of bilateral nodular thyroid instead of selected removal of all nodular structures.

Despite the fact that 81.8% of the geriatric patients undergoing analysis presented with 1 or more accom-
panying disorders, internal postoperative complications (respiratory distress) developed in only 2. After ade-
quate care in the ICU, both patients were able to leave the hospital with some delay. Mean postoperative hos-
pital stay was 9.9 days compared with 15.7 days in the study by Steinau et al.4 Nevertheless, a mean (preop-
erative and postoperative) hospitalization of 14.2 days of the geriatric patients may seem extremely long compared with findings in North America. This discrepancy reflects the different medical care systems in the United States and Austria.

With increasing age, the incidence of poorly differ-
entiated and undifferentiated (anaplastic) thyroid carci-
nomas is rising.23,30,35 Har-El et al29 found a rate of 30% of anaplastic thyroid carcinomas in patients older than 70 years compared with 7.4% in all age groups. In our patients, the incidence of undifferentiated thyroid carci-
nomas was also much higher in the geriatric patient group compared with younger patients (20.0% vs 3.9%; P = .006). In addition, the prognosis of differentiated thy-
roid carcinomas is worse in the elderly patient.23,36,37 This might be due to the higher prevalence of pathologic risk factors like vascular invasion, extracapsular extension, and follicular growth pattern in older patients.38 In our patients, this prognostic exacerbation begins at 45 years of age, whereas patients older than 75 years do not have a prognosis worse than that of patients aged 45 to 75 years (C.P., B.N., unpublished data, 2002).

Thyroid surgery in the geriatric patient can be per-
fomed with low morbidity that does not differ from that of younger patients. The guarantees for success are an individual risk-and-benefit analysis and a careful preop-
erative preparation (because of the high rate of concomi-
tant diseases).

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REFERENCES


Readership Poll Results

In a recent readership poll regarding the Generation Gap in Modern Surgery (March 2002 issue), our readers were advised that there was a definite decrease for 2001 in the NRMP match for categorical positions. They were asked to which factor this decrease could be attributed. The readers responded:

- Night call and in-hospital work hours, 22
- Lifestyle issues, 61
- Duration of training, 11
- Lack of flexibility in training programs, 8
- Other, 4%

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