Hyperthyroidism: *
Comparative Results of Medical (I^{131}) and Surgical Therapy

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THE ACHIEVEMENTS of surgical therapy for hyperthyroidism have improved greatly since the introduction of the preoperative use of iodine and other antithyroid drugs. In most clinics the operations were performed with low mortality rates, low morbidity rates and recurrence rates varying from 10 per cent to 0 per cent in the best clinics. Like many operations, the results depend upon the experience and skill of the surgeon. Today, we estimate the value of an operation in many hands—some skilled and some unskilled—and the resultant criticism is leveled at the procedure, which is probably not correct because an operation should not be condemned because some operators (lacking skill) cannot achieve the good results of others. But the results do reflect the ability of the many.

The advent of Iodine^{131} therapy evolved from the desire to treat without operative trauma and the great advances made in the field of radiation and nuclear physics. There are two therapeutic schools: one group administers large dosages early and the second gives smaller dosages to be repeated as necessary to achieve euthyroidism. The repetitive small-dose method has been employed in our clinic. Ostensibly, I^{131} therapy destroys the overactive thyroid cells, thereby lessening activity, and fibrous replacement occurs. If the dose is large enough, destruction and fibrosis continue, often with increasing appearance of myxedema, sometimes of an alarming nature. Therefore, all cells are subjected to the bombardment and the adjustment of the dosage to induce only euthyroidism has not been completely satisfactory (Fig. 1).

This contrasts to surgical therapy which reduces hyperactivity by removing so much of the hyperplastic gland or the "hot nodule" that the remaining cells do not induce hyperactivity. It is not known why the remnant usually does not resume hyperactivity in time, but the amount of tissue in the remnant bears a pertinent relationship to recurrence. Proper involution of the remaining cells is believed to be established with the use of postoperative iodine. In most instances of permanent control of the disease, the patient must be in some degree of hypothyroidism, a temporary myxedematous state, usually easily controlled by daily thyroid extract varying from ½ grain to 3 grains daily, depending upon the depth of the myxedematous state.

Both methods alter thyroid cells—operation, in reduction of numbers of cells, and I^{131}, with cell destruction—but the remaining cells in the surgically-treated cases are not destroyed as are the I^{131} treated cells which are universally or uniformly damaged by the radiation. The myxedema following operation reaches a level and customarily is less severe as time passes, whereas the myxedema following radiation slowly advances and changes for a wors-

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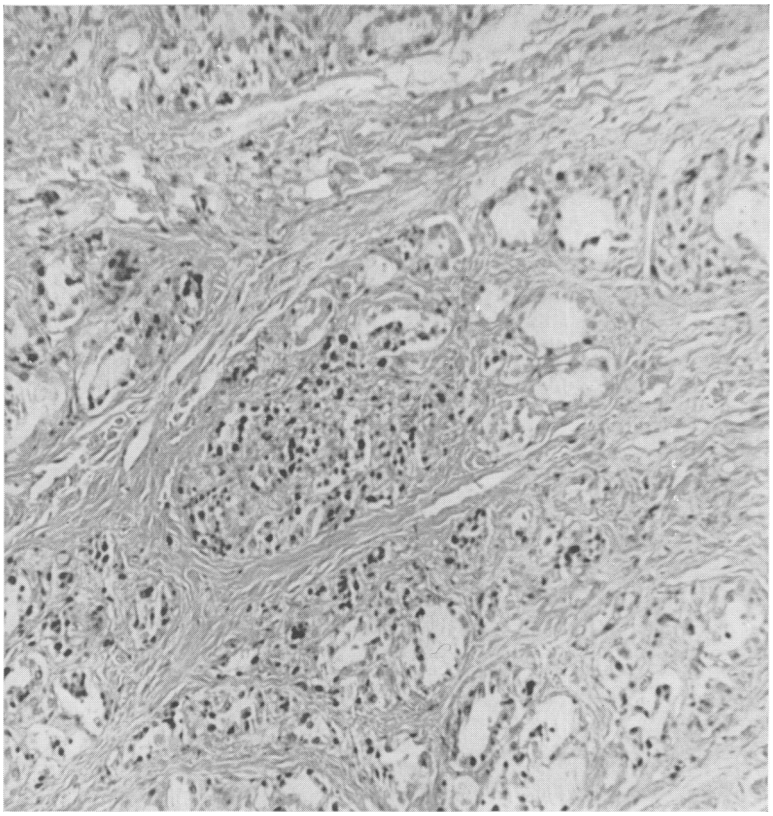

FIG. 1. Photomicrograph obtained at autopsy 3 years from start of radioactive iodine therapy. Euthyroid at one year and three months. No interstitial fibrosis and damaged cells. Cause of death was pulmonary emphysema and bronchopneumonia.

ened myxedematous state with the passage of time. Therefore, control of myxedema is more difficult after I^{131} therapy than after operation.[3, 5]

Surgical therapy is subjected to some complications such as recurrent laryngeal nerve injury and hypoparathyroidism. Postoperative hemorrhage has not been a major problem since the proper preparation of the patient by antithyroid drugs has permitted the surgeon to work slowly enough to lessen hemorrhage, and infection has never been a major problem.

The purpose of this paper is to compare the results of surgical therapy of hyperthyroidism with the results obtained by the use of I^{131} therapy in one institution. The value should appear in the uniformity of the medical and surgical therapies when significant changes in management have been very slight. This study includes observations on mortality, incidence of nerve injury, parathyroid deficiency and early complications—which of course are defects of surgical treatment and not seen in medically treated patients.

Other elements of the study are length of original hospital stay, time before euthyroidism or myxedema is achieved, number of subsequent hospital admissions, number of recurrences (medical and surgical), the period of invalidism and the ability of the patient to work and to lead a more normal life. The euthyroid state in the I^{131} treated patients has been determined by internists —not surgeons—and the internist's opinion has been accepted for this paper. Questionable euthyroid patients were readmitted to the hospital and studied by the internist whose findings were accepted by the surgeon.

There are 102 surgically-treated cases and 81 medically-treated cases.

There was only one patient with toxic

TABLE 1. *Mortality Rate and Complications of Surgical Therapy*

Patients			102
Postoperative deaths			0
Postoperative complications			9 (8.8%)
Nerve injuries (unilateral)	2	(1.9%)	
Hemorrhage (required exploration and hemostasis)	1	(0.9%)	
Hematoma	3	(2.9%)	
Hypoparathyroidism			
Permanent and severe	1		
Permanent and mild, easily controlled	1	(2.9%)	
Transient, no therapy at 6 months P.O.	1		
Infection	0	(0.0%)	
Crises	0	(0.0%)	

nodular goiter in this group and he was treated surgically.

Surgical Therapy

There was no mortality in this group. There were two recurrent laryngeal nerve injuries. Both were unilateral and compensatory mechanism permitted return of normal voice in each instance. One can detect fatigue of the nerve after long continued use, when the voice hoarsens slightly, but not enough to make the patient unhappy. There were no instances of bilateral nerve injury and no need for tracheotomy or arytenoid plastic operation. Consequently, nerve injury has not been a significant complication.

Hypoparathyroidism. There are two phases to this complication. First, there were two instances of hypoparathyroid function manifested by positive Chvostek sign and slight diminution in blood calcium level and elevation of blood phosphorus level, requiring increased calcium by mouth, following which the findings soon disappeared permanently. These are examples of transient hypoparathyroidism due to interference of the blood supply to the parathyroid, are not serious, leave no sequellae, require no extra hospitalizations and are probably unnoticed except by the most astute observer. Obviously, blood supply to the parathyroids had been compromised by the operative maneuvering and resultant local reaction, and the rapid recovery denotes insignificance.

There were three instances of significant hypoparathyroidism (Table 1).

Case 1. A patient with postoperative parathyroid tetany had a serum calcium level of 7.8 mg./100 ml. and phosphorus level of 5.0 mg./100 ml. This patient was treated by vitamin D and high calcium diet and received dihydrotachysterol intermittently. He remained apparently in this hypoparathyroid state, kidney malfunction appeared and he died 11 years after the operation in a state of uremia. A review of the chart convinces the author that this death was due to lack of parathyroid tissue resulting in death from uremia 11 years later. It appears that all attending internists did not believe that the renal insufficiency was caused by lack of parathyroid hormone, but one cannot escape the role of parathyroid absence in this patient and the invalidism and death should properly be attributed to the thyroid operation. No parathyroid glands could be located at autopsy. Chronic glomerulonephritis, cardiac hypertrophy and fibrosis, lobular pneumonia, prostatic abscess, septicemia and multiple organ abscesses were demonstrated at autopsy.

Case 2. A second example was observed following operation for recurrent goiter. Hypoparathyroidism followed the original operation, performed in a distant institution. The recurrence operation was done by the author. No parathyroid tissue could be located microscopically but moderately severe hypoparathyroidism followed. Serum calcium levels were 7.2 mg./100 ml. and the phosphorus was 4.5 mg./100 ml. This patient was treated with high calcium diet, vitamin D and dihydrotachysterol for 6 months when the gradually reduced medication ceased and the patient has remained free of hypoparathyroidism since that time.

Case 3. A third example occurred in a Negro kitchen worker, following operation for recurrent hyperthyroidism, who has worked daily but must remain on small doses of substitutive therapy permanently. There is no tetany and no evidence of kidney failure in this patient. His early postoperative chemical studies revealed a serum calcium level of 6 to 8 mg./100 ml. and a phosphorus of 4.5 to 6.3 mg./100 ml.

Consequently, there were two instances of transient hypoparathyroidism, cleared completely before the patients left the hospital and of no significance. Two patients experienced permanent hypoparathyroidism and one recurrent patient experienced a transient physiologic defect for 6 months. One death (11 years later) was due to parathyroid deficiency. No significant parathyroid deficiency has occurred on this service during the last 15 years.

Of the 102 operated patients, only one had postoperative hemorrhage which required further operation, a simple clot evacuation, and there were no further wound complications. There were three hematomas in the wound which did not delay patient's return to his home and did not mar the neck. A split or "pantaloon" drain was inserted in every patient and withdrawn usually at the 48th hour. Occasionally there was slight drainage of clear serous fluid for several days. Wound healing has been excellent. There were no infections. Scars are not unsightly. All but four of these patients were men and perhaps the hairline scar is not as important as in women (Table 2).

TABLE 2. *Results of Operation*

Total operations		102
Perfect result	89	
Very satisfactory result (10 myxedema pts. & 1 controlled hypoparathyroid pt.)	11	
Poor result (died, uremia 11 years p.o.)	1	
Too soon to evaluate	1	

Medical Therapy

After the usual diagnostic studies, the patients were treated by I^{131}, with dosages varying from 1 to 16 millicuries. These are small dosages administered purposely to achieve euthyroidism without inducing a deep myxedemic state.

Eighty-one patients have been treated, of whom 73 have been adequately followed. No nodular toxic goiter was radiated in this series.

There was no mortality attributable to the I^{131}, no early complications and no incidence of late cancer formation in this group. Myxedema, although present in two patients, has not proved to be a problem (as stated by Stanbury [5] and Dunn [3])—mainly, it is believed, because small doses were administered, repeated if the findings of hyperthyroidism persisted, but always with the small dosage.

Treatment brought about a definite slowing of the achievement of euthyroidism, required numerous hospitalizations, caused considerable time lost from work and other normal pursuits of living, frustrated many patients to the extent that they would not return to the hospital because of the time away from normal activities, and should have been dangerous to the thyrocardiac who remained hyperthyroid sometimes as long as seven years from the start of therapy (Table 3).

Hospitalization. The average number of hospitalizations for medically treated patients was five. The range was from one to 15.

The average number of hospital days for the medically treated patient was 117 with a maximum of 658 days (Table 3).

Comment. These data indicate great loss of time on account of the therapy. However, the reader must recognize the slow development of the therapy and low dosage were responsible for some of the delays in the early days of the therapy which might

TABLE 3. *Comparison of Time Involved in Medical and Surgical Treatment*

	Surgical	Medical
Average number days to achieve euthyroidism	42	453
Average number days to achieve euthyroidism in thyrocardiac patient	42	695
Average number hospitalizations	1.6	5.0
Greatest number days in hospital	169	658

be termed as "investigative," although no protocol was designed for the presumed researches and more time was spent as a consequence of the low dosage because of the dangers that might be anticipated, such as leukemia, aplastic anemia, carcinoma, chromosomal aberrations [4] and difficult control of almost absolute myxedemic state. Most of the dangers suspected at first were dissipated and the dosage better adjusted, but not so satisfactorily as most internists desire. Stanbury [5] and Dunn [3] have suggested a better adjustment of the dosage.

The surgically treated patients required an average of 1.6 hospitalizations with a maximum of ten. The average number of days for the surgically treated patient was 52 when the patient was admitted to the surgical department for diagnosis and preparation as well as operation. This preparation on the surgical service required 21 days. If the patient was admitted to the medical service where diagnosis and preparation was begun or completed, 138 days were used. It must be recognized that the number of days for the "cooling down" process was invariably increased if the preparation started on the medical service before the patient's transfer to surgery. Associated conditions were also responsible for lengthy hospital stay. In compiling the data, an attempt was made to discount increased hospital time if it were due to associated conditions and not to the goiter and its complications.

Comment. The number of hospitalizations and hospital days for the surgically treated patient was much lower than for the medically treated patient (Table 3).

Time for Achievement of Euthyroidism. The average time for achievement of euthyroidism by I^{131} therapy was 453 days, with a maximum of 1,460 days.

Euthyroidism was achieved in the surgically treated patient in 6 weeks. This period includes the time for the "cooling down" process.

Euthyroidism was achieved in the so-called thyrocardiac patient in 695 days medically and 42 days surgically.

Follow up. Seventy-nine of 102 surgically treated patients have been followed for an average time of 8 years, ranging from six months to 16 years. Seventy-three of 81 medically treated patients have been followed for an average time of 4 years, ranging from 6 months to 11 years (Table 3).

Recurrence

Surgery. The rate of recurrence was more easily determined in the surgically treated patient. There were six recurrences in 102 cases (5.8%). There were no observed instances of persistent hyperthyroidism as all patients were euthyroid shortly after operation.

The clinical records on 16 early surgically treated patients were destroyed by the Veterans Administration. The preoperative, operative and postoperative complications and early convalescence are accurately recorded in summaries, operative notes and administrative records. But late recurrence rate is unfortunately not known.

Medical. The rate of recurrence is difficult to determine. But persistent hyperthyroidism after the initial therapy from these studies existed in approximately 19.7 per cent of the patients, requiring additional therapy to achieve the euthyroid

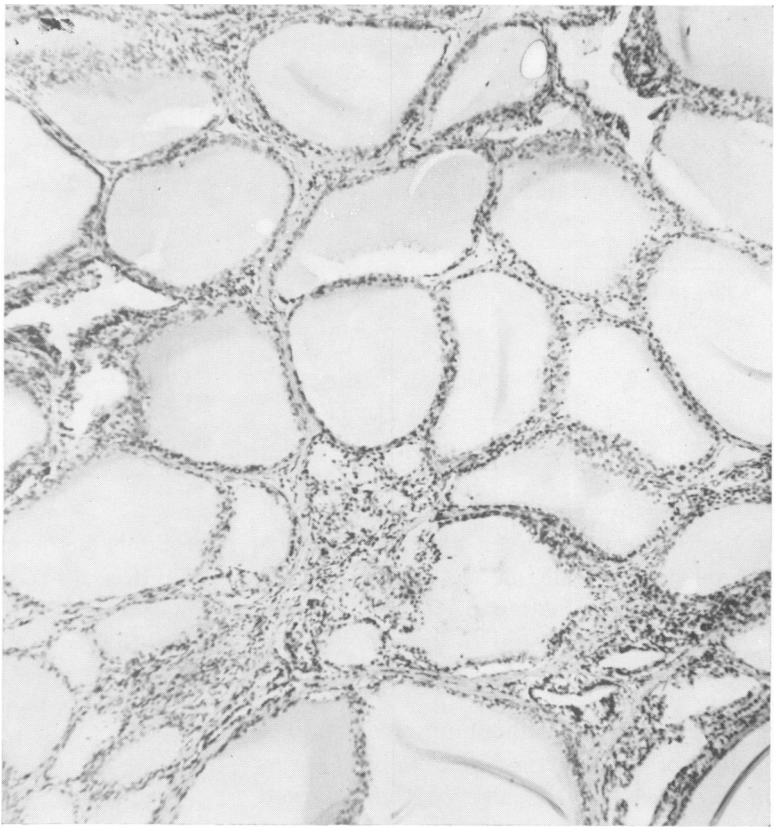

FIG. 2. Photomicrograph obtained 1 year from the start of radioactive iodine therapy. Note papillary projection. Patient was not euthyroid. Cause of death was bronchopneumonia and pulmonary abscess.

state (Fig. 2). It appears that once the euthyroid state has been established accurately by clinical and laboratory studies, no recurrences have followed. I^{131} therapy uniformly has induced euthyroidism for a period ranging from 60 days to 2,095 days (Table 4).

Comment. Recurrent hyperthyroidism occurs in 5.8 per cent of surgically treated patients and 0 per cent of medically treated patients. But persistent toxicity is much more common medically than surgically in our experience (Table 5).

Treatment of Recurrent Hyperthyroidism. Of six patients with recurrent hyperthyroidism, three were successfully controlled by surgery. There was one transient hypoparathyroid patient and no significant nerve injuries, the scars not too ugly and infection and hemorrhage nil.

Medically, once the patient has become euthyroid a recurrence has not been found.

Mild Hyperthyroidism. As well as can be determined, I^{131} therapy was far superior to operation in this group. Here, "one-shot" therapy is believed to have well controlled the toxicity in a relatively short time with no recurrences, and the patients were uniformly happy with their fate. Most of these cases were so mild that they would not have been treated surgically anyhow. In the surgically treated mild case, myxedema was a problem, not too difficult to control, but this had not been a significant finding in the I^{131} treated patients as yet, presumably because small doses did not damage the cells enough to induce pertinent hypoactivity.

TABLE 4. *Results of Medical Therapy with I^{131}**

Patients		81
Euthyroid at time of survey	56	
Hyperthyroid at time of survey	16	
Myxedema at time of survey	2	
Euthyroidism difficult to determine because of associated conditions	3	
Lost to follow up	4	

* Two patients had antithyroid drugs, Tapazole and Propylthiouracil.

Malignant Exophthalmos. Euthyroidism has been obtained easily by I^{131} in the three patients with malignant exophthalmos because they were in the group of mild hyperthyroidism which responds well to I^{131} therapy. However, the exophthalmos has persisted in all but has not progressed materially in two patients. The third patient required a supraorbital decompressive operation for relief of extensive exophthalmos.

Treatment. The effect upon exophthalmos is practically the same in both forms of therapy, but the size of the enlarged gland is more completely erased by operation. However, irradiated patients have not complained of the subsequent gland enlargement. The exophthalmos in the so-called "malignant exophthalmos" patient is probably better managed by medical therapy. It is our opinion that operation should never be employed in this condition, as the exophthalmos state often worsens after operation. Ostensibily, the disease is manifested by marked exophthalmos, diffuse enlargement of the thyroid and low-grade hyperthyroidism. The diminution of the exophthalmos in the ordinary hyperthyroid patient is much better than anticipated following both methods of therapy, but accurate measurements are not available.

TABLE 5. *Recurrent Hyperthyroidism*

Operations for recurrent hyperthyroidism		11
Recurrences following thyroidectomy at Kennedy Hospital		6
Reoperated	3	
Iodine^{131}	3	
Recurrences following thyroidectomy at other institutions		10
Reoperated	8	
Iodine^{131}	2	
Complications following thyroidectomy at Kennedy for recurrent hyperthyroidism		2
Permanent and mild hypoparathyroidism, easily controlled	1	
Transient hypoparathyroidism, no therapy 6 months p.o.	1	
Nerve injuries		0
Still hyperthyroid (Iodine^{131})	1	

TABLE 6. *Condition of Patients Following Surgical Therapy*

Operations		102
Hypoparathyroidism		2
Mild, controlled	1	
Died, uremia	1	
Myxedema		10
Taking 2 Gr. thyroid extract daily	1	
Taking 1 Gr. thyroid extract daily	2	
Taking ½ Gr. thyroid extract daily	7	
Recurrences from thyroidectomy at Kennedy Hospital		6 (5.8%)
Controlled by operation	3	
Controlled by Iodine^{131}	3	
Hoarseness		0

Myxedema. Customarily, the surgeon must leave very small remnants of thyroid tissue if he hopes to achieve control without future recurrent or persistent hyperthyroidism. The size of the remnant and recurrence rate, studied many years ago, established this fact.[1] Routinely, the patients receive iodine for 3 months postoperatively, then no therapy until myxedema clinically follows. If myxedema follows, the patients are placed on varying amounts of thyroid extract, ranging from ½ to 2 grains daily. Most take 1 grain daily and one or two the higher dosages (Table 6). Weight gain above the preoperative normal high weight was noticed on a few occasions; cessation of smoking and compulsive eating were more prominent causes than lack of thyroid hormone. All surgically treated

myxedema patients in this group were easily controlled and the condition tended to disappear with time. There were a few instances (2.4%) of myxedema in medically treated patients in this series. Due to destruction of thyroid cells, one can expect the number of medically treated myxedemas to increase, a matter of common knowledge in the critical literature of this method of therapy. The author reviewed the follow-up findings and believes that the paucity of myxedema in the medically treated group is the result of the conservative dosage and management. But this low myxedema incidence is gained by inducing a long period of invalidism in very many patients, unfortunately perhaps in the thyrocardiac.

Internists view the control of myxedema to be an easy medical problem. Dunn [3] and Stanbury [5] reported the difficulty in management of postradiation myxedema and experienced great difficulty because the myxedemic state is not stabilized. It demands ever-changing medication and observation, and to the patients this is quite disconcerting, irritating, time-consuming and frustrating at a time when they would have long ago dispersed any thought of disturbance if they had been surgically treated. Apparently if the internist has had no experience in treating this vacillating myxedemic state, he is not really qualified bluntly to erase the difficulties with myxedema in the postradiation state.

Further Penalty. It is possible from the experience of patients treated by large-dosage radiation, after delaying euthyroidism by utilizing small dosages (as in our clinic) for as long as 2 years, that eventually when the radiated cell damage is sufficient to achieve euthyroidism, these slowly-treated, small-dosage patients may be faced with the atrocities of postradiation myxedema, thereby enduring a double penalty.

Definition of a Thyrocardiac. This term does not imply that the heart disease is caused by the hyperthyroidism. This is naturally encountered in the older patients because the likelihood of arteriosclerosis, lues, rheumatic fever and some congenital defects is increased. According to our past and present conception of heart load, hyperthyroidism should cause more work for the heart, normal or diseased, and this added work must be damaging to cardiac physiology, increasing as hyperthyroidism advances and lessening when the toxicity is removed. Therefore, the sooner the extra workload is removed, the sooner the overloaded heart will gain relief. Conversely, improper control of myxedema is exceedingly dangerous to the thyrocardiac patient.

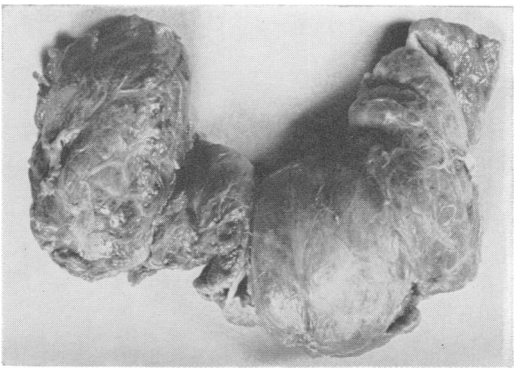

FIG. 3. Photograph demonstrates typical-looking diffuse toxic gland removed one year following inception of radioactive iodine therapy.

There were 12 I^{131} treated thyrocardiacs with average time of 695 days for achievement of euthyroid state (Table 3). There were seven surgically treated thyrocardiac patients with average time of 42 days for achievement of euthyroid state.

Several patients under long-term radioactive iodine therapy became disgusted with the lengthy state of invalidism and sought surgical therapy. No I^{131} treated patient from the Kennedy Hospital Medical Service was treated surgically.

One patient came to Kennedy Hospital begging for operation, stating that his improvement was slight and his goiter no smaller since I^{131} therapy was administered

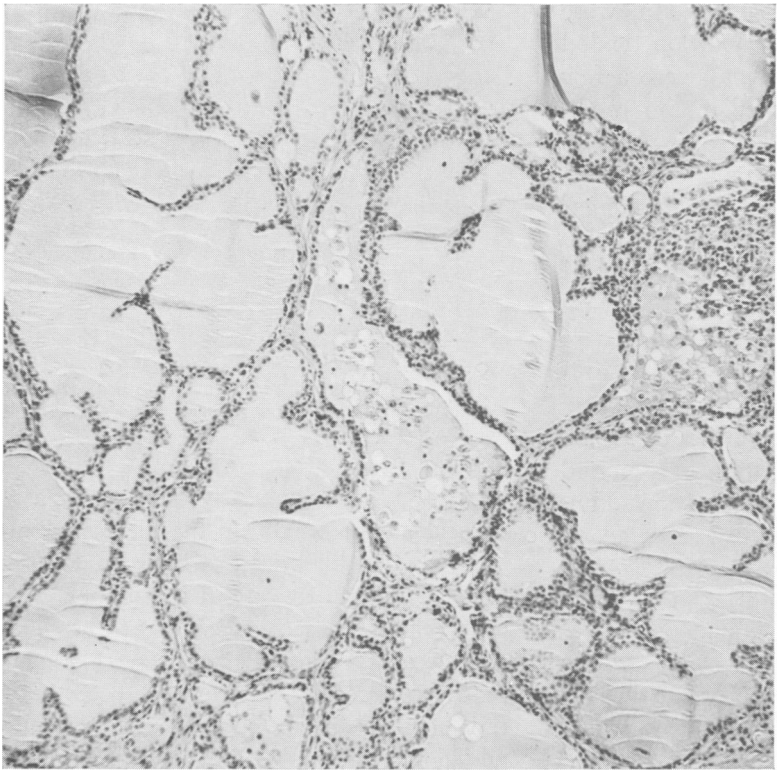

FIG. 4. Photomicrograph obtained from tissue removed at operation 1 year past start of radioactive iodine therapy. Papillary projections and lymphocytosis are present. Colloid deposit varies in acini.

one year previously, that he was nervous, weak, unable to work properly and could not sleep and that he had not regained his weight loss due to hyperthyroidism. Examination revealed moderately severe hyperthyroidism. His request was directed at the time loss and he stated that he would prefer operation if it would provide a quicker way to get back to normal. Diffuse enlargement of the thyroid was marked. One hundred fifteen grams of tissue were removed (Fig. 3). Microscopic slide shows fibrosis, some involution and unmistakable hyperplasia, cellular irregularity and lymphocytosis (Fig. 4). Entire hospital time, including work up, cooling-down process and operation was only 24 days. The patient returned home 1 week after an uncomplicated operation, returned to work 21 days postoperatively and was pleased to be able to feel normal in such a short time. There were no postoperative complications. Surgical observers were quite surprised when he requested surgical treatment.

Case Report. A 46-year-old patient who underwent thyroidectomy in 1959 was quite ill with marked exophthalmos. Prompt improvement to a clinically mild myxedemic state was achieved with some signs of hyperthyroidism, a condition well known to experienced thyroid surgeons. He did well for 3 years and, on his return to the hospital for this follow-up study, it was observed that exophthalmos—which had almost completely disappeared—had returned, with weight loss, nervousness, weakness, palpitation and increased sweating. Protein bound iodine level was 8.7 mg./100 ml., with radioactive uptake in normal range (19% for 6 hours and 30% for 24 hours). There was enlargement of both thyroid lobes to the size of ping-pong balls. Medical and surgical observers agreed that this was mild recurrent hyperthyroidism despite nearly normal results of laboratory studies. The response to iodine administration was quite satisfactory, corroborating this opinion. It was suggested to the patient that he could accept either I^{131} therapy requiring no operation or that he could undergo thyroidectomy. Papers had al-

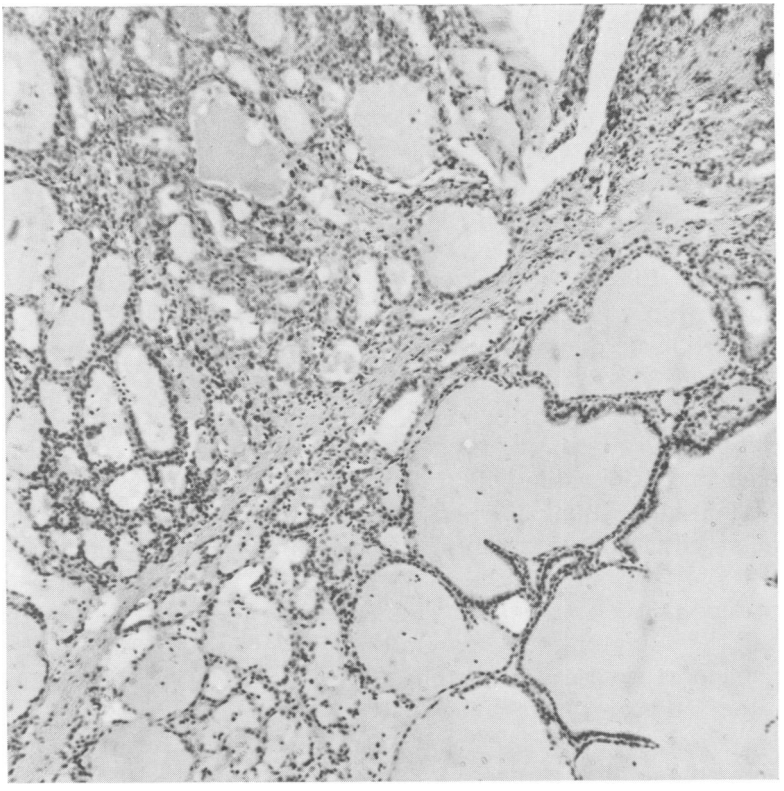

FIG. 5. Example of surgical recurrence 5 years and 10 months following initial operation. No hyperplasia, papillary projections, and scanty colloidal collection in acini.

ready been readied for transfer to Medical Service for the I^{131} treatment, but he emphatically, promptly and steadfastly stated that he would prefer the operation because he did not want to expend the time for medical therapy. This response again shocked the surgeon, who explained that much time would not be lost with medical therapy and that it might be less dangerous than operation. He was "cooled down" in 13 days, went home 6 days postoperatively and returned to work 12 days postoperatively. There were no complications. Sixteen grams of tissue were removed. Microscopic section shows involution, hyperplasia and lymphocytosis with a small amount of fibrosis (Fig. 5).

The first surgeon simply left too much gland, although a large amount of thyroid tissue was removed.

The same complaining chant of time loss and invalidism has been heard from a great number of medically treated patients. Perhaps the impulsive personality of the hyperthyroid patient was responsible. Several medically treated patients refused to return for follow-up studies fearing incarceration for more therapy.

Treatment of Recurrent Hyperthyroidism. There seems to be more mutual agreement for the use of I^{131} in the recurrent hyperthyroid patient who had surgical therapy originally. However, of three of six recurrent cases treated surgically, temporary hypoparathyroidism occurred in a patient who had hypoparathyroidism after the first operation and no complication occurred in the other patients. However, nerve injury, parathyroid removal and hemorrhage should be expected more frequently in the recurrent gland operation, and I^{131} should prove to be superior to operation performed by the average surgeon.

Discussion

The findings suggest that I^{131} therapy is superior to operation in the patient with mild hyperthyroidism, the recurrent thyrotoxic patient and the malignant exophthalmos patient, and in those patients who

do not desire operation or whose associated conditions impose contraindications. The thyrocardiac patient, according to these studies, has responded more favorably to operation than to I^{131} therapy, a situation not believed to be true prior to this study. Until I^{131} therapy improves, subtotal thyroidectomy seems superior in the moderate-to-severe, diffuse toxic goiter in young patients who cannot afford the distressing waste of time due to invalidism. Byrd and associates [2] arrived at a similar conclusion.

One surgical difficulty is in training of the novice surgeon. To leave a very small remnant of thyroid in both lobes, removing isthmus and pyramidal lobes without nerve injury or parathyroid removal, requires skill that only can be obtained by assisting experienced surgeons on many similar cases and the opportunity to perform the operation more than occasionally. The diminution in operations for toxic goiter does not permit this exposure and one is concerned about the resident surgeon's ability to grasp this skill without much personal contact with these technics. However, trainees seem to grasp technics with less difficulty today and this concern may be unfounded. The average resident surgeon today is better instructed in location of parathyroid bodies than were his predecessors because of the increasing number of operations performed for hyperparathyroidism. The recurrent nerve injury has not proved to be too troublesome in our experience.

The surgeon's ability to leave a very small thyroid remnant without interfering with parathyroid bodies or blood supply to them and without causing nerve injury is the crux of safe achievement of permanent euthyroidism.

Summary

A long-term follow-up study has been made on 102 surgically treated patients and 81 medically treated patients (Iodine^{131}).

Significant postoperative complications involve parathyroid deficiency, permanent and serious in one patient, permanent and easily controllable in a second patient, and mild and temporary in a third. Nerve injury, infection and hemorrhage have not proved to be significant complications.

I^{131} therapy has proved to be exceedingly satisfactory in the mild hyperthyroid patient with diffuse toxic goiter.

Radioactive iodine therapy for malignant exophthalmos, far from achieving successful disappearance of exophthalmos, is superior to operation.

Operation appears to be more satisfactory in younger patients with moderate-to-severe toxicity in the diffuse toxic goiter.

Operation achieves euthyroidism with controllable myxedema in the thyrocardiac patient in an average of 42 days. I^{131} treated thyrocardiac patients have achieved euthyroidism, often very slowly, averaging 695 days. This delay is believed to be dangerous.

I^{131} therapy is probably preferable to operation for the recurrent, surgically treated goiter.

Myxedema in patients following radiation has not been a problem in this series but may appear later if cell destruction, finally inducing euthyroidism, is more extensive.

I^{131} is a proper method of therapy for the patient refusing operation and for those patients whose associated conditions will not permit operation.

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