

Evaluation of Potassium Iodide as a Thyroid Suppressive Agent and Its Comparison With Triiodothyronine (Cytomel)^{1,2,3,4}

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Daily ingestion of average doses of desiccated thyroid will temporarily raise the BMR which then returns to normal when thyroid extract is continued. After the ingestion of desiccated thyroid extract is discontinued, the BMR may temporarily fall to hypothyroid levels (1). Greer (2) and Perlmutter, *et al*, (5) obtained a depression of the radioiodine uptake of the thyroid gland in normal subjects after they ingested desiccated thyroid. Morgan and Trotter (3) reported similar findings in both normal subjects and in hyperthyroid patients who were successfully treated with radioiodine. Starr and Liebhold-Shueck (4) showed that the same effect could be produced after ingestion of thyroxine and triiodothyronine. Greer and Smith (6) found that the daily ingestion of desiccated thyroid for two to four weeks will markedly depress the radioiodine uptake of the thyroid gland in normal subjects but not in hyperthyroid patients. Perlmutter and Slater (7) utilized this technique to differentiate their euthyroid from their hyperthyroid subjects. Werner and Spooner (8) obtained the same differentiation by utilizing triiodothyronine instead of desiccated thyroid. Various modifications of this so called Werner test have been reported (9, 10, 21). The majority of the tests used are relatively time consuming and depend on patient cooperation for oral intake of the required medication before a definite diagnosis can be made.

An evaluation of potassium iodide as a thyroid suppressive agent in both euthyroid and hyperthyroid subjects and its comparison with triiodothyronine will be reported. It was found to be the cheapest and simplest thyroid gland suppressive agent to use; required the shortest interval of time to obtain the desired result and very accurately could differentiate the euthyroid from the hyperthyroid state.

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TABLE I
EUTHYROIDS

	<i>Name</i>	<i>Sex</i>	<i>Type</i>	<i>Initial Uptake</i>	<i>Uptake after KI</i>	<i>Diff. in Points</i>	<i>% Supp.</i>
1.	E.K.	F	nodule	45	29	-16	-35.5
2.	B.G.	F		32	12.5	-19.5	-61.0
3.	I.B.	F	cancer of pancreas	31	4.8	-26.3	-85.0
4.	G.R.	F		24	2	-22	-93.0
5.	E.R.	F		24	13.4	-10.5	-43.8
6.	A.S.	M		32	4.5 (24 hr.) 20	-12	-37.5
7.	E.T.	F		44	27	-17	-38.6
8.	J.G.	F	previous surgery for hyper.	56	15.5	-40.5	-72.3
9.	I.S.	F		44	23	-21	-47.7
10.	M.W.	F		70	38	-42	-60
11.	V.T.	F	nodule	*51 **51	2.7 3.0	-48.3 -48	-94.3 -94.1
12.	W.E.	M	unilat. exophth.	43	23	-20	-46.5
13.	J.B.	F	hot nodule	47 36.5	36 24	-11 -11.5	-23.4 -32.4
14.	S.R.	F		79	3 (24 hr.) 45 (72 hr.)	-34	-43.0
15.	I.H.	F		48	25	-23	-48.0
16.	A.W.	F		48	32	-16	-33.0
17.	R.S.	F		*33 **33	6.1 9.8	-26.9 -23.2	-81.5 -70.3
18.	O.M.	F	hot nodule	*42 **42	51.5 37	+9.5 -5	+23.6 -11.9
19.	A.W.	F	hot nodule	43.4	36	-7.4	-17.0
20.	P.S.	F	unil. exophth. pineal tumor	26	10.4	-15.6	-60.0

TABLE I (con't)

	Name	Sex	Type	Initial Uptake	Uptake after KI	Diff. in Points	% Supp.
21.	J.S.	M		55	18	-37	-67
22.	M.C.	F	hot nodule	23.5	25	+1.5	+4
MEAN:				42.8%	22.1%	20.7%	49.7%

*T³ test

**KI test

METHOD

All suppressive tests performed between January, 1959 to June, 1963 were collected and evaluated as to their accuracy is assessing the thyroid status of the patients. There were 161 tests performed in a total of 87 patients who were seen in private practice and the thyroid clinics of the Bronx-Lebanon Hospital Center (Fulton division) and the City Hospital at Elmhurst. These were divided as follows:

Euthyroid

Euthyroid	32
Euthyroid with hot nodules	4
total	36

TABLE IA

<i>Number of patients and diagnosis</i>			
Total 87		Trials 161	
Hyperthyroid	51	Euthyroid	36
a. Graves	34	Normal thyroid	32
b. Nodular	15	Hot nodule	4
c. Recurrent after surgery	1		
d. Undiagnosed	1		
Sex—Females 85 Males 7			
Age—16-71 Thyrotoxics 15-69 Euthyroids			

Hyperthyroid (diagnosis made clinically and confirmed by radioiodine uptake)

Graves	34
Nodular type	15
Recurrence after surg.	1
Goitre type unknown	1
total	<u>51</u>

Age range was 16-71 for the thyrotoxicos and 15-69 for the euthyroids. There were seven males. Seventeen of the thyrotoxicos had the test performed prior to therapy; in five of these the test was performed both before and after treatment (Table IA).

The comparison between the suppressive effects of KI and triiodothyronine was made in both euthyroid and hyperthyroid patients at the City Hospital in Elmhurst. There were twelve hyperthyroids and fourteen euthyroids. One of the hyperthyroids was evaluated before and eleven after therapy. Seven hyperthyroids and three euthyroids who had the comparison made at the Bronx-Lebanon Hospital Center (Fulton division) were added to the series. Thus, a total of nineteen hyperthyroids, three before therapy and seventeen euthyroids were compared. Thirty-five of these patients completed both and one only the potassium iodide trial. An NRD and Baird Atomic scintillation probes were used respectively at the Fulton division and the City Hospital to measure the uptake of the thyroid gland. Air was used as a background for the initial uptake and the thigh when measuring residual activity.

The technique of the KI test was that tried and found to be satisfactory by Rossman (unpublished observations), formerly of our group, and is as follows:

1. Initial I^{131} uptake
2. 100 mg of KI dissolved in water is given to the patient by the technician for oral ingestion.
3. At 48 hours a 15-50 microcurie capsule of I^{131} is given to the patient after the residual radioactivity is measured.
4. At 72 hours a 24 hour RAI uptake is measured.

The per cent depression of the uptake is equal to:

$$\frac{\text{initial uptake} - \text{final uptake}}{\text{initial uptake}} \times 100$$

For a comparison between KI and T^3 the patient serves as his own control. Prior to the KI test T^3 is given as follows:

1. Initial uptake
2. Triiodothyronine 25 micrograms TID for seven days.
3. On the seventh day a 15-50 microcurie capsule of I^{131} is given to the patient after the residual radioactivity is measured.
4. On the eighth day a 24 hour uptake of I^{131} is measured.

$$\% \text{ depression} = \frac{\text{IU} - \text{FU}}{\text{IU}} \times 100$$

5. Wait two weeks.
6. KI 100 mg orally as described.
7. Repeat numbers 3 and 4 as described.

A depression of uptake of I^{131} greater than 25 per cent of the initial uptake was interpreted to be a normal response. In comparing the difference in effectiveness between KI and T^3 a point percentage difference of plus or minus 5 per cent was arbitrarily selected to be significant.

RESULTS

POTASSIUM IODIDE TEST:

1. *Euthyroid patients:* In the twenty-two patients with no evidence of thyroid disease four had hot nodules. The mean initial thyroidal uptake of radioiodine was 42.8 per cent with a range of 26-79 per cent. Seventy-two hours after ingesting a hundred milligrams of KI the mean 24 hour radioiodine uptake was 22.1 per cent; the mean percentage point fall was 20.7 and the mean percentage suppression was 49.7 per cent (Table I).

In the four patients with *hot nodules* the mean initial uptake was 38.9 per cent and the final uptake after one hundred milligrams of KI was 31.6 per cent. The percentage depression of 18.7 per cent is well within the hyperthyroid range (Table I).

2. *Hyperthyroid patients before therapy:* Seventeen patients with proven thyrotoxicosis receiving the hundred milligram dose of KI orally described showed a mean 24 hour I^{131} uptake of 53 per cent before the suppression test and 49.3 per cent after it. The mean percentage points of fall was 3.7 and the percentage depression was 5.5. The range was -22.5 to +26.5 per cent. There was no difference found between the nodular and diffusely enlarged gland (Table II).

3. *Hyperthyroid patients after therapy with radioiodine:* In the twenty-seven patients studied the results of the KI suppression test accurately reflected the status of the thyroid gland. When suppression was less than 25 per cent further treatment was indicated except in those patients in whom the radioiodine uptake was within the normal range, namely 20-40 per cent before the test. In patient Z.W. therapy was given in spite of a suppression test of 28 per cent because she was clinically hyperthyroid (Table III).

In a few preliminary studies in which the radioiodine uptake was performed daily for three days after KI was given to hyperthyroid patients, it was found that suppression of uptake after 24 hours fell to euthyroid levels and then by 72 hours rose to the hyperthyroid range. (In patient J.G. the initial uptake was 53.6 per cent, then fell to 8.3 per cent after 24 hours and rose to 56 per cent in 72 hours. Patient T.R. had an initial uptake of 39.6 per cent which fell to 4 per cent in 24 hours, rose to 24 per cent in 48 hours, and to 50 per cent in 72 hours.) This type of finding is being investigated further (Table II).

TABLE II
HYPERTHYROIDISM BEFORE THERAPY BRONX

	Name	Sex	Type of Disease	% Initial RI Uptake	% Uptake After KI	Diff. in Points	% Supp.
** 1.	S.C.	F	G	51.7	48.3	-3.4	-6.5
2.	M.F.	F	G	*62 62.0	49 48	-13 -14.0	-21.0 -22.5
** 3.	D.S.	M	G	83.0	67.6	-15.4	-18.6
4.	S.B.	F	G	55	56.0	+1.0	+1.8
*** 5.	M.G.	F	N	40	36.8 (200 mg. 24 hr.)	-3.2	-8
6.	J.G.	F	N	56.3	8.3 (24 hrs.) 56 (72 hrs.)	-0.3	-0.5
** 7.	T.R.	F	G	39.6 50.6	24 hr. 48 hr. 72 hr.	+10.4 -8.2	+26.5 -16.2
					4 24 50 10 40.5 42		
8.	R.H.	F	Recurrence after RAI	49	41	-8	-16.4
9.	L.S.	F	G	46.4	41	-5.4	-11.5
**10.	L.L.	F	N	51	46	-5	-9.8
11.	M.C.	F	G	58.7	56.3	-2.4	-4.1
12.	D.M.	F	G	50	44	-6	-12
13.	F.P.	M	G	44.6	50.5	+5.9	+13.2
**14.	L.G.	M	G	46	39	-7	-15.2
15.	R.S.	F	G	46.5	57	+10.5	+21.7
16.	R.M.	F	G	*59 59	69 54	+10 -4	+17 -6.1
				65	54.5	-10.5	-16.1
17.	C.O.	F	G	65	54.5	-10.5	-16.1

Mean—53.0%

49.3%

3.7%

5.5%

*T³ test

**KI test before and after treatment

***Patient No. 5 previously had a non-toxic adenoma removed

G Graves disease

N Nodular hyperthyroidism

TABLE III
 HYPERTHYROIDISM AFTER THERAPY BRONX

	Name	Sex	Type of Disease	% Initial RI Uptake	% Uptake After KI	Diff. in Points	% Supp.
** 1.	S.C.	F	G	*32.4 32.4	20.8 20.0	-11.6 -12.4	-35.5 -38.2
2	V.T.	F	N	43 44 52	28 46.4 32	-15 +2.4 -20	-35 +5 -38.4
** 3.	D.S.	M	G	54.5 73	48 67	-6.5 -6	-12 -8.2
4.	G.I.	F	N	50.7	41.3	-9.4	-18.6
5.	A.R.	F	G	*23 23	24.4 25.4	+1.4 +2.4	+6.5 +10.4
6.	J.T.	F	G	56 68.5 50.4	43 31 13.7	-13 -37.5 -36.7	-23.2 -54.7 -72.8
7.	R.K.	F	N	52	2.3 (after 24 hrs.); 16.6 (after 72 hrs.)	-35.4	-66.1
** 8.	T.R.	F	G	20	9	-11	-55
9.	I.C.	F	N	48.7 71	27.2 71	-21.5 0	-44 0
10.	Z.W.	F	G	47 65	33.6 44.4	-13.4 -20.6	-28.5 -31.7
**11.	L.L.	F	N	31	25	-6	-19.3
12.	F.V.	F	G	61.5 47	55.4 58	-6.1 +11	-9.6 +23.4
13.	E.S.	F	G	32.8	28	-4.8	-11.6
14.	S.S.	F	N	47.6 65.6 68	63 65.4 63	+15.4 0.2 -5	+32.3 0 -7.3
**15.	L.G.	M	G	26	29	+3	+11.5
16.	E.F.	F	N	*43 43	42 40	-1 -3	-2.3 -7.0
17.	T.S.	F	G	40.6	30.8	-9.8	-24

TABLE III (cont'd)

	Name	Sex	Type of Disease	% Initial RI Uptake	% Uptake After KI	Diff. in Points	% Supp.
18.	V.V.	F	N	*51 51.7 42	60 67 36	+9 +15.3 -6	+17.4 +29.6 -14.3
19.	A.O.	F	G	*30.5 30.5	26.2 26	-4.3 -4.5	-14.1 -14.4
20.	R.M.	M	G	67	68	+1	+1.5
21.	J.P.	F	G	43	40.6	-2.4	-5.6
22.	R.K.	F	undetermined	44	49	+5	+11.4
23.	F.M.	F	G	53	48	-5	-9.4
24.	M.M.	F	N	53	52	-1	-1.9
25.	J.R.	F	G	32	28	-4.8	-11.6
26.	R.K.	F	G	53.4	31	-22.4	-42
27.	R.B.	F	G	67	12	-55	-82

* T³ test

** KI test before and after treatment

G Graves disease

N nodular hyperthyroidism

COMPARISON OF KI WITH TRIIODOTHYRONINE (T³)

1. Euthyroid patients: There were nineteen trials in seventeen patients (Table IV). The mean initial I¹³¹ uptake was 41.5 per cent with a range of 15.7 to 70.4 per cent. After the oral ingestion of T³ and KI as described under method the mean final uptake was 17.4 per cent and 10.3 per cent respectively. The percentage suppression was 59.8 per cent and 72.7 per cent for T³ and KI respectively. In four patients, J.L., W.R., A.A., and O.M., after T³ and in two, M.F. and O.M., after KI, the percentage depression fell within the hyperthyroid range. However, in patients J.L., W.R., and A.A. the percentage suppression after KI was within the normal range and in patient M.F. the percentage suppression after T³ was also normal. Patient O.M. had a hot nodule. Her initial uptake was 42 per cent, but percentage suppression after T³ and KI was within the hyperthyroid range. Continuous observation of this patient for the past four years reveals no evidence of the presence of hyperthyroidism (Table IV).

In comparing the suppressive effects of T³ and KI, it was found that thirteen or 68.4 per cent of the trials favored KI; four or 21 per cent of the trials favored T³, and in two, or 10.5 per cent of the trials there was no difference. Thus, in

TABLE IV
EUTHYROIDS ELMHURST

	Name	Sex	Initial RI Uptake	EI Uptake After T ³ & KI	Diff. in Points	Percentage of Suppression	Most Suppressive
1.	I.L.	F	*37.4	34.1	-3.1	-8.5	KI
			**37.4	3.03	-34.4	-92.0	
			*15.7	10.2	-5.2	-33.1	KI
			**15.7	6.5	-9.2	-58.6	
2.	R.B.	F	*43.8	4.37	-39.5	-80.2	SAME
			**43.8	3.15	-40.7	-82.8	
3.	C.T.	F	*54.3	10.65	-43.7	-80.4	T ³
			**54.3	17.9	-36.4	-67.0	
4.	D.O.	F	*18.8	2.96	-15.9	-84.6	T ³
			**18.8	4.03	-14.8	-78.7	
5.	V.G.	F	*56.8	4.45	-52.4	-92.2	KI (nodule removed 5 yrs. before)
			**56.8	0.48	-56.4	-99.3	
6.	I.W.	F	*24.7	13.45	-11.3	-45.3	KI
			**24.7	5.56	-19.2	-80.9	
			*33.4	4.3	-29.1	-87.0	T ³
			**33.4	12.1	-21.3	-63.0	
7.	M.F.	F	*36.0	4.36	-31.7	-88.0	T ³
			**36.0	31.6	-4.4	-13.0	
8.	J.C.	M	*36.8	16.1	-22.7	-61.6	KI
			**36.8	6.1	-30.7	-83.4	
9.	J.M.	F	*70.4	26.3	-54.1	-76.8	KI
			**70.4	1.35	-69.1	-98.1	
10.	T.G.	F	*40.8	9.43	-31.4	-77.0	KI
			**40.8	1.75	-39.1	-95.6	
11.	W.R.	F	*53.7	42.1	-11.6	-21.6	KI
			**53.7	27.5	-26.2	-49.0	
12.	K.K.	F	*47.3	5.52	-41.8	-88.3	KI
			**47.3	1.3	-46.0	-97.0	
13.	A.T.	F	*52.5	23.2	-29.3	-55.8	KI
			**52.5	11.0	-41.5	-79.0	

TABLE IV (con't)

	Name	Sex	Initial RI Uptake	EI Uptake After T - KI	Diff. in Points	Percentage of Suppression	Most Suppressive
14.	A.A.	F	*41.25 **41.25	39.8 13.4	-1.4 -27.8	-3.4 -67.4	KI
15.	R.S.	F	*33.0 **33.0	6.1 9.8	-26.9 -23.2	-81.5 -70.3	KI
16.	O.M.	F	*42.0 **42.0	51.5 37	+9.5 -5	+23.6 -11.9	KI
17.	V.T.	F	*51.0 **51.0	2.7 3.0	-48.3 -48	-94.3 -94.1	SAME

*T³ test ** KI test

fifteen, or 79 per cent of the trials KI was more or equally as suppressive as T³ (Table IVA).

2. *In the three hyperthyroid patients* compared prior to the tests the initial uptake averaged 65.5 per cent and it fell to 60.2 and 51.1 per cent after the ingestion of T³ and KI, respectively. The respective percentage suppressions were 7 and 19.7 per cent. These figures are within our accepted hyperthyroid range. In one patient KI suppressed the uptake to a euthyroid level while T³ did not. In two out of the three patients KI suppressed the radioiodine uptake to a greater degree than T³ and in one patient suppression by both drugs was approximately equal (Table V).

3. *Hyperthyroid patients after therapy with radioiodine:* Sixteen patients had the comparison made. Five of these were from the KI series at the Fulton Division, Bronx-Lebanon Hospital Center. Fourteen completed both series of tests. All the tests accurately reflected the thyroid status of the patient (Table VI). When the initial uptake was within the normal range and suppression less than 25 per cent it was assumed that continued hyperactivity of the thyroid gland was present even though the uptake was normal, but no treatment was required. When the uptake was in the abnormal range and suppression was less than 25 per cent it was felt that the patient was hyperactive and therapy was indicated.

Out of the twenty-three trials in the fourteen treated hyperthyroid patients KI gave a greater suppression of the I¹³¹ uptake than T³ in eleven, or 47.9 per cent; T³ gave a greater suppression than KI in six, or 26 per cent, and KI and T³ gave equal suppression in six, or 26 per cent.

Although KI suppressed the radioiodine uptake to a greater extent than T³ in 66 per cent of the pretreated hyperthyroids the number of patients studied was too small for any valid conclusion. However, KI suppressed the radioiodine uptake of the thyroid gland to an equal or greater extent in 74 per cent of the 23 trials in the hyperthyroid patients after they had received therapy.

TABLE IVA

KI vs. T³: % Suppressibility
Euthyroids: 17 patients, 19 trials

KI > T ³	13 or 68.4%
T ³ > KI	4 or 21%
KI = T ³	2 or 10.5%
KI same or > T ³	15 or 79%

DISCUSSION

Since Farquharson and Squires (1) showed that withdrawal of desiccated thyroid after its administration can cause a depression of the BMR in normal subjects, studies have been in progress to elucidate the mechanism of the action of iodine on the thyroid gland. Stanley (11) reported that in acute experiments the serum iodide levels with which inhibition could be produced in thyrotoxic subjects was 5 $\mu\text{g}/100$ ml or less and in euthyroid subjects between 6-12 $\mu\text{g}/100$ ml. Similar results were obtained by Childs, *et al.* (12) in patients with exophthalmic goitre. Ansell and Miller (13) concluded that in patients with thyrotoxicosis iodide as sodium iodide (130-390 mg daily) not only suppresses the reaccumulation of radioiodine but also slows the release from the thyroid gland of preformed radioactive thyroid hormone thereby preventing any increase in the rate of fall of gland radioactivity. Greer (2) felt that the greater part of the decrease in endogenous thyroid activity observed during the administration of exogenous hormone was due to an inhibition of thyrotropin secretion by the pituitary gland. Perlmutter, *et al.* (5), Goldsmith and Eisle (14), and Solomon (15) came to essentially the same conclusion. Milne, Greer, and Scott (16) reported that high concentrations of inorganic iodide depress the concentration gradient of iodide in the thyroid gland of rats. At a concentration of 10^7M iodide depressed organic binding and at a concentration of 10^5M it completely inhibited it.

Morgans, Oldham and Trotter (3) showed that 4.4 mg of L thyroxin daily for two weeks can reduce thyroidal radioiodine uptake. Starr and Liebhold-Shueck (4) pointed out that 4 mcg of triiodothyronine has no effect and 8 mcg daily has a maximal effect on suppression of the thyroidal radioiodine uptake. Some effect was obtained with 2.1 mg and a definite one with 4.2 mg of KI daily for one week in reducing thyroidal uptake of radioiodine. At least 5-10 times as much iodine in inorganic form as in hormonal combination is needed to depress the radioiodine uptake of the thyroid gland.

McConahey and Owen (17) suggested that 25 mcg of triiodothyronine daily is the minimal effective suppressive dose. Hales, *et al.* (21), found that a minimum of seven days of ingestion of T³ was necessary before suppression was observed in the euthyroid patient. Feingold (18) and Paris (24) and their co-

TABLE V
 HYPERTHYROIDS ELMHURST
 BEFORE THERAPY

	Name	Sex	Type	Initial RI Uptake	RI Uptake After T ³ & KI	Diff. in Points	Percentage of Suppression	Most Suppressive
1.	M.F.	F	G	*62 **62	49 49	-13 -13	-21 -21	SAME
2.	R.M.	F	G	*59 **59	69 54	+10 -4	+17 -6.1	KI
3.	C.M.	F	G	*75.5 **75.5	62.7 50.3	-12.8 -25.2	-17 -32	KI

* T³ test ** KI test
 G Graves

workers at the Mayo Clinic reported effective suppression of the radioiodine uptake when at least 2-3 mg of potassium iodide was the carrier for the radioactive iodine. Greer and DeGroot (19) obtained slowing of the secretion rate of thyroid hormone for 3-8 days in thyrotoxic patients after they received one dose of 100-300 mg of sodium iodide. The response to the iodide took one to two days before any effect could be seen. The effect could always be overcome by the exogenous administration of thyrotropin.

The suppressive action of triiodo-thyronine is thought to be due to its localization in the hypothalamus and presumably this results in a depression of the pituitary output of TSH (20). Iodine, on the other hand, suppresses organic binding of iodine and also thyroxine release.

With these thoughts in mind it was felt that a simple test for thyroid suppression was needed in order to be able to differentiate the euthyroid from the hyperthyroid especially in borderline cases. In the technique of the test described the findings of Greer and DeGroot (19) attest to the correctness of the assumption of the 72 hour waiting period. A few preliminary observations of my own on patients J.R. and T.R. (Table II) have also borne out the validity of the 72 hour waiting period. The amount of elemental iodine in 100 mg of KI is 72 mg and in the total amount of T³ used in our experiment was 600 mcg.

It has been shown that T³ has a half life of 2-3 days in single dose experiments (25). Following the discontinuence of the ingestion of T³ the I¹³¹ uptake is depressed for a few days. Normal function was found to return during the third to fourth week (20). These facts were taken into account in the experimental design of our study when KI and T³ were compared. The two weeks waiting period before KI was given was to allow the uptake to return to normal after T³ was discontinued. It was assumed that it did. Thus, only an initial uptake was performed in each experiment in which KI and T³ were compared.

TABLE VI
 HYPERTHYROIDS ELMHURST
 AFTER THERAPY

	<i>Name</i>	<i>Sex</i>	<i>Type</i>	<i>Initial RI Uptake</i>	<i>RI Uptake After T³ & KI</i>	<i>Diff. in Points</i>	<i>Percentage of Suppression</i>	<i>Most Suppressive</i>
1.	S.C.	F	G	*32.4 **32.4	20.8 20.0	-11.6 -12.4	-35.5 -38.2	SAME
2.	A.R.	F	G	*23.0 **23.0	24.4 25.4	+1.4 +2.4	+6.5 +10.4	SAME
3.	E.F.	F	N	*43.0 **43.0	42.0 40.0	-1 -3	-2.3 -7.0	SAME
4.	V.V.	F	N	*51.0 **51.7	60 67	+9 +15.3	+17.4 +29.6	KI
5.	A.O.	F	G	*30.5 **30.5	26.2 26.0	-4.3 -4.5	-14.1 -14.4	SAME
6.	F.C.	F	G	*47.2 **47.2	47.9 44.4	+0.7 -2.8	+1.4 -6.0	KI
				*37.5 **37.5	32.9 23.35	-4.6 -14.2	-12.2 -38.1	KI
				*25.8 **25.8	33.3 47.7	+7.5 +21.9	+29.0 +84.8	T ³
7.	A.P.	F	G	*35.5 **42.0	6.8 3.5	-28.7 -38.5	-80.8 -91.1	KI
				*47.5 **47.5	13.1 4.8	-34.4 -32.7	-72.4 -68.8	SAME
8.	S.W.	F	G	*42.6 **42.6	8.4	-34.2	-80.2	
				*22.6 **22.6	15.05 4.64	-7.5 -18.0	-33.1 -79.6	KI
9.	M.L.	F	G	*56.1 **34.45	49.7 9.11	-6.4 -25.3	-11.4 -7.34	KI
				*70.7 **70.7	34.6 7.8	-36.1 -62.9	-51.07 -88.9	KI
				*46.4 **46.4	24.6 1.99	-21.8 -44.5	-46.7 -96	KI

TABLE VI (con't)

	Name	Sex	Type	Initial RI Uptake	RI Uptake After T - KI	Diff. in Points	Percentage of Suppression	Most Suppressive
				*30.2 **30.2	7.5 22.0	-22.7 -8.2	-75.1 -27.1	T ³
10.	A.A.	F	N	*22.6 **22.6	9.6 14.5	-13.0 -8.1	-57.5 -35.8	T ³
				*41.6 **41.6	7.1 0.25	-34.5 -41.35	-85 -99	KI
11.	A.K.	F	N	*37.9 **37.9	50.25 12.20	+12.3 -25.7	+32.4 -67.8	KI
12.	A.V.	F	G	*15.25 **15.25	39.9 37.0	+24.7 +21.8	+162.0 +143.0	SAME
13.	E.F.	F	N	*29.7 **29.7	20.4 44.0	-9.3 +14.3	-31.3 +48.15	T ³
14.	M.F.	F	G	*10.8 **10.8	4.4 27.1	-6.4 +16.3	-60.0 +150.9	T ³
15.	M.S.	F	N	*34.7 **34.7	36.4 34.1	+2.3 -0.6	+6.3 -1.7	KI
				*35.3 **35.3	24.0 28.5	-11.3 -6.8	-31.7 -19.2	T ³
16.	C.O.	F	G	**53.0	7.88	-45.2	-85.3	

* T³ test ** KI test

G Graves

N nodular

The high mean initial radioiodine uptakes in the euthyroid patients are inexplicable to me. The fact that these patients were all normal was proven beyond doubt by the degree of suppression after the ingestion of KI.

Potassium iodide was found to be a very effective thyroid suppressive agent. It predicted the clinical status of the patient accurately in 100% of the thyrotoxic patients before treatment and in all the euthyroid patients. In the four euthyroid patients with hot nodules suppression after KI was in the hyperthyroid range. To date, follow up of these patients revealed no evidence of the development of thyrotoxicosis. In the hyperthyroid patient who had received treatment, the KI suppression test adequately reflected the clinical assessment of the thyroid status in the majority of the patients. In a number of the latter patients the percentage depression of the uptake was in the hyperthyroid range. However, in those in whom initial uptake was in the hyperthyroid range further treatment was indi-

cated; in those in whom the initial uptake was in the normal range no therapy was indicated. The latter were considered to be manifesting mild hyperactivity in conformity with the findings of Hales and his coworkers (22). This was first expressed by Werner (23) who stated "that in the majority of the patients with thyrotoxicosis treated with RAI the thyroid could not be suppressed up to five years later whereas in those who had surgery suppression was evident within one year after operation."

Potassium iodide was shown to be more suppressive than T^3 in both euthyroid and hyperthyroid subjects and accurately reflected the thyroid status of the patient. It is felt that this difference is presumably due to the presence of more elemental iodine in KI than in T^3 and to the site of action of each drug. The only presumed action of T^3 is to suppress the pituitary and indirectly TSH. The pituitary cannot be suppressed completely. Beyond a maximal dose of T^3 more will not suppress the pituitary further. Iodine, on the other hand, can completely inhibit the organic binding of iodine in the thyroid gland provided the concentration of iodine in the gland is sufficiently high. Secondly, either directly or indirectly, it can inhibit the pituitary. Thus, we have a reasonable explanation for the difference in the suppressive action between KI and T^3 . Further investigation to relate the level of serum iodide to the suppressive effect of KI on a day to day basis is presently under study.

CONCLUSION

Potassium iodide was evaluated as a thyroid suppressive agent in 87 patients, 36 euthyroids and 51 hyperthyroids. In the hyperthyroids it was evaluated before and after therapy. It accurately reflected the clinical state of the thyroid gland in 100 per cent of the hyperthyroid patients before therapy, in all of the euthyroid patients and in the majority of the hyperthyroid patients after receiving therapy.

In comparing it with triiodothyronine, it was found to be equally as or more suppressive in 79 per cent of the euthyroid and in 74 per cent of the hyperthyroid patients.

KI is the cheapest and simplest of the thyroid suppressive agents to use. It requires the shortest interval of any of the presently used suppressive agents to obtain the required result and very accurately can differentiate the euthyroid from the hyperthyroid state in both the obvious and borderline cases.

As a result of this experiment, it is felt to be the drug of choice as a thyroid suppressive agent.

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