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Ioduria in patients treated long time with Hyiodine®

Methods

We studied the effect of Hyiodine in 16 patients with 18 various wounds. We selected the patients who were treated for 20-210 days (74±52.8 days; median 68 days). The purpose of study was to measure concentration of iodine in urine, ioduria and thyroid hormones during the treatment.

Five patients were treated with povidone-iodide before and during treatment. This allowed us to compare ioduria with Hyiodine dressing and after application of standard iodine wound dressing – povidone iodide - Betadine. We studied ioduria in patients treated with daily dosages of high amount of Hyiodine (up to 40 ml per day). Hyiodine was applied to: abdominal wounds – 3 patients; hepatic abscess – 1 patient; abscess cavities in legs – 3 patients; large wounds on lower extremities (crural ulcers, diabetic wounds) – 9 patients.

Wound dressing (gauze or non-cotton dressing was immersed various amount of Hyiodine and put to the wound. In the cases of cavities immersed dressing was given into the cavity. One patient received Hyiodine into abscess cavity (standard treatment of abscess cavities in our department) see table 1.

Wound	Initials of patients	Age	Wound description	Wound diameter	Comment
1	H.V.	39	Big wound on right foot	10 x 0.5 cm	At the beginning 30 ml Hyiodine per day
2	L.V.	61	Cavity after amputation	10 x 3 cm	
3	J.M.	69	Big wound on right calf	25 x 4 cm	Wound rinsed with 0.5% Betadine daily
4	B.H.	85	Lateral site on left calf	4 x 4 cm	
5	K.R.	82	Right calf and 2 cavities	10 x 10 cm	
6	W.Z.	69	Abdominal wound dehiscence + cavity	10 x 6 cm	
7	K.L.	75	Crural ulcers both legs	10 x 10 cm	Wound rinsed with 0.5% Betadine daily + Inadine
8	J.M.(1)	50	Abdominal wound dehiscence	15 x 10 cm	
9	J.M.(2)	50	Abdominal wound dehiscence	10 x 10 cm	
10	B.R.	63	Crural ulcers both legs	5 x 7 cm 3 x 5 cm	20 years treated or hypothyroidism
11	N.A.(1)	76	Abdominal wound dehiscence	30 x 17 cm	
12	N.A.(2)	76	Abdominal wound dehiscence	10 x 5 cm	
13	Z.D.	63	Crural ulcers both legs	10 x 6 cm 7 x 4 cm	Wound rinsed with 0.5% Betadine daily
14	H.V.	53	Crural ulcers both legs	20 x 15 cm	Wound rinsed with 0.5% Betadine daily
15	K.F.	55	Hepatic abscess, Abdominal cavity	10 x 10 cm	Wound rinsed with 0.5% Betadine daily
16	D.M.	81	Crural ulcers both legs	20 x 10 cm 24 x 12 cm	Wound rinsed with 0.5% Betadine daily
17	S.I.	66	Crural ulcers both legs	10 x 7 cm 8 x 3 cm	
18	M.M.	58	Multiple defects and fistulas on both legs- cavities		Hyiodine put into the abscess cavities

Table 1: Study group



Ioduria was measured independently in The Institute of Endocrinology, Czech Academy of Science, Narodni, Prague – assoc. Prof Radovan Bílek. Concentrations of thyroid hormones were measured in Isotopic Laboratory, Faculty Hospital Hradec Králové.

Results

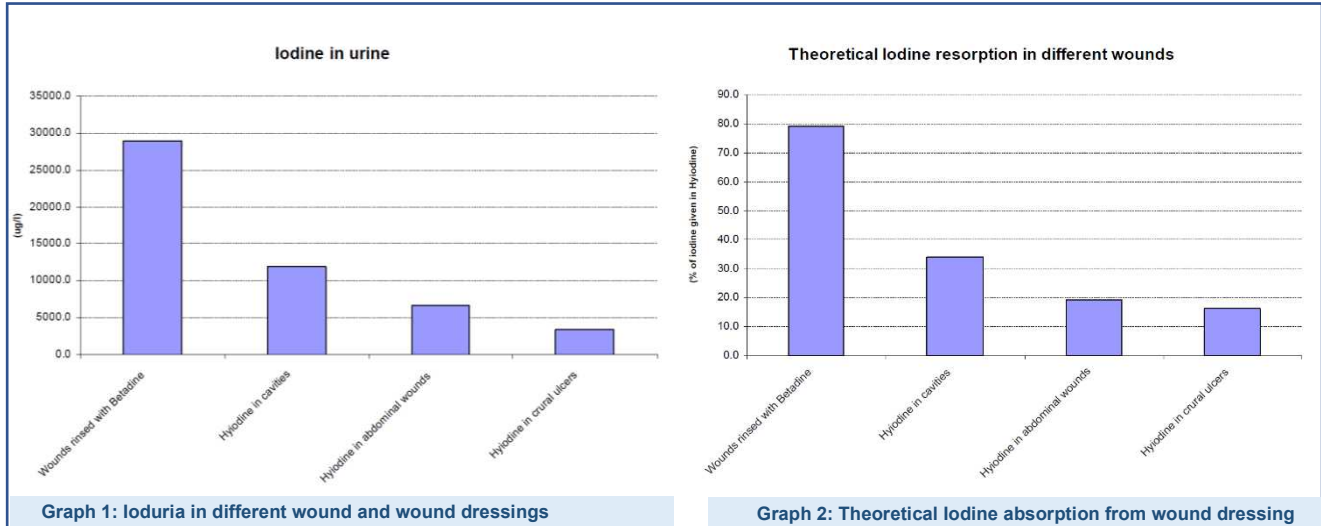
Concentration of iodine in urine was increased in all patients. The biggest concentration was apparent in subjects whose wounds were rinsed in Betadine (see table 2, graph 1 and 2).

Wounds	Iodine concentration in urine (ug/l)	Ioduria (ug/24h)	Daily dosage of Hyiodine (ml/day)	Dosage of I (ug)	Resorption of I (%)	Length of treatment (days)	F-T3 (2.5-5.8)	F-T4 (11-25)	TSH (0.15-5)
1	941	1882	8	1680	11.2	75	3.5	15.4	4.1
2	3160	4740	10	21000	22.6	72	5.7	14.6	0.68
3	35740	25018	30	63000	39.7	210	2.8	18.6	2.39
4	1013	1620.8	6	12600	12.9	20	3.5	14.2	5.39
5	11230	16845	20	42000	40.1	40	3.4	15.5	2.3
6	2430	3645	15	31500	11.6	50	3.9	17.1	1.25
7	48880	73320	50	105000	69.8	20	3.8	13.9	4.22
8	3030	4545	20	42000	10.8	90	The patient is identical with No. 9		
9	6450	5160	20	42000	12.3	100	3.99	12.1	0.78
10*	2854	3424.8	10	21000	16.3	200	4.3	18.5	0.14
11	11165	15631	25	52500	29.8	65	The patient is identical with No. 12		
12	10100	13130	20	42000	31.3	75	3.45	14.3	2.45
13	6350	8890	15	31500	28.2	90	3.37	13.82	4.81
14	39040	58560	30	63000	93.0	30	3.9	15.4	3.4
15	11530	19601	5	10500	186.7	90	3.54	14.5	2.45
16	32100	48150	40	84000	57.3	45	3.31	16.28	5.71
17	6200	8060	20	42000	19.2	30	3.87	17.8	0.3
18	32220	32220	25	52500	61.4	30	3.44	12.3	4.4
Mean	14690.7	19135.7	20.5	43050.0	41.9	74.0	3.74	15.27	2.8
STD	14936.5	20447.8	11.5	24048.3	41.8	52.8	0.61	1.91	1.78
Median	8275.0	11010.0	20.0	42000.0	29.0	68.5	3.52	15.00	2.45

* Patient with wound No. 10 is treated 20 years for hypothyroidism - 100 ug Euthyrox per day. The treatment started 15 years before Hyiodine application.

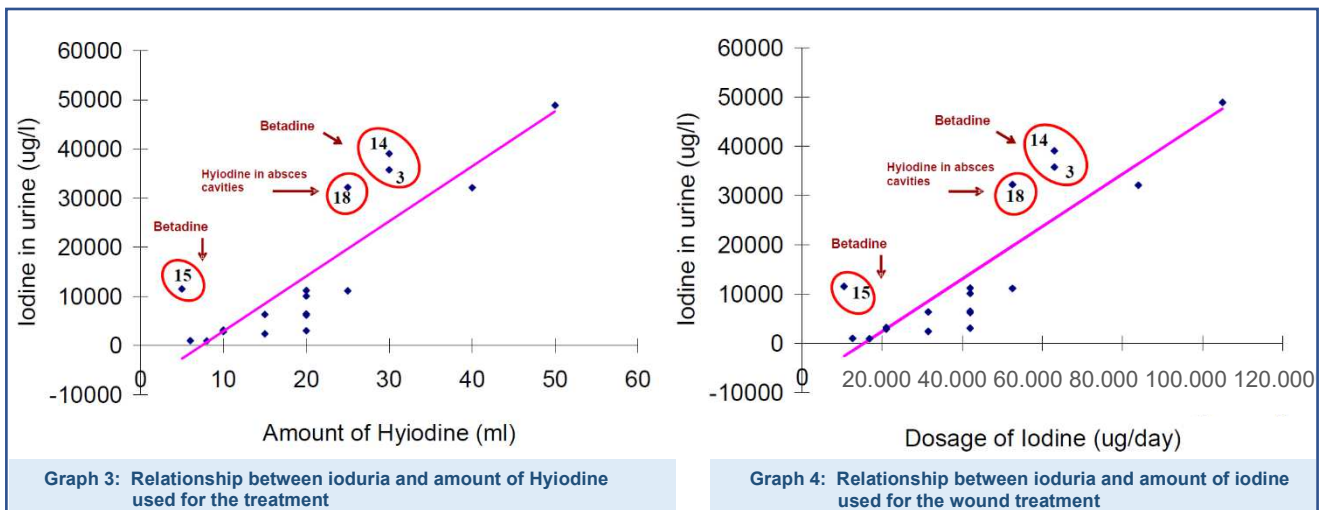
Table 2: Ioduria, dosage of Hyiodine and plasma free T3, T4 and TSH

Graph 2 shows theoretical absorption of iodine from wound dressing. This graph expresses ioduria (per 24 hours) as percentage of iodine dosage applied to the wound. As this is only theoretical calculation – as ioduria is dependent on body stores and intake in food, it is clearly apparent that this parameter was higher after application of povidone-iodine (Betadine), which is widely used in wound dressing and abscess treatment for more than 50 years.

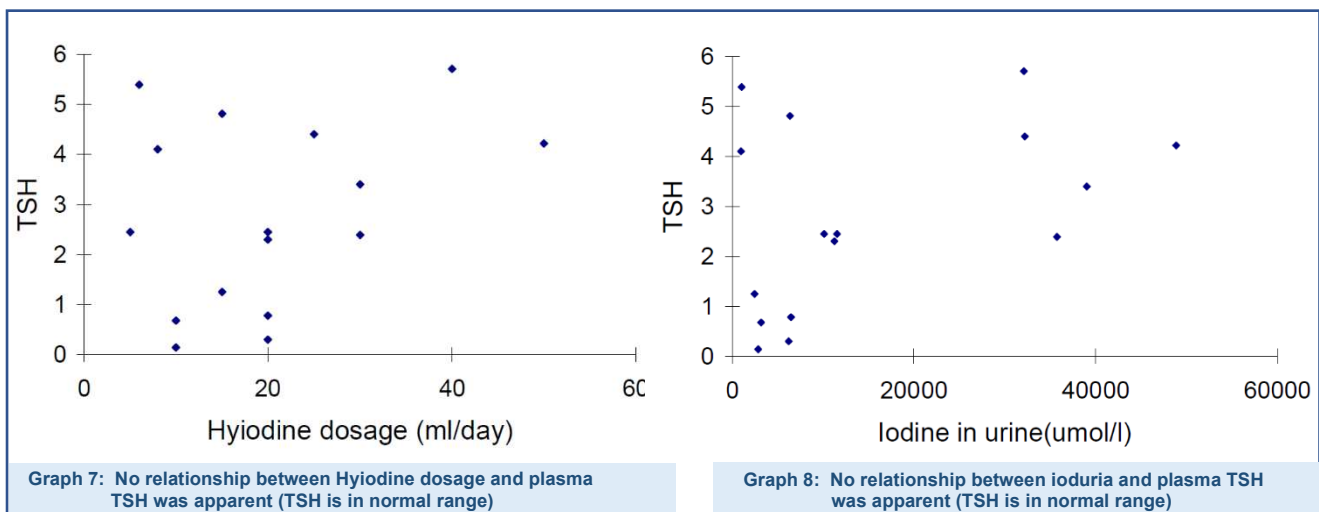
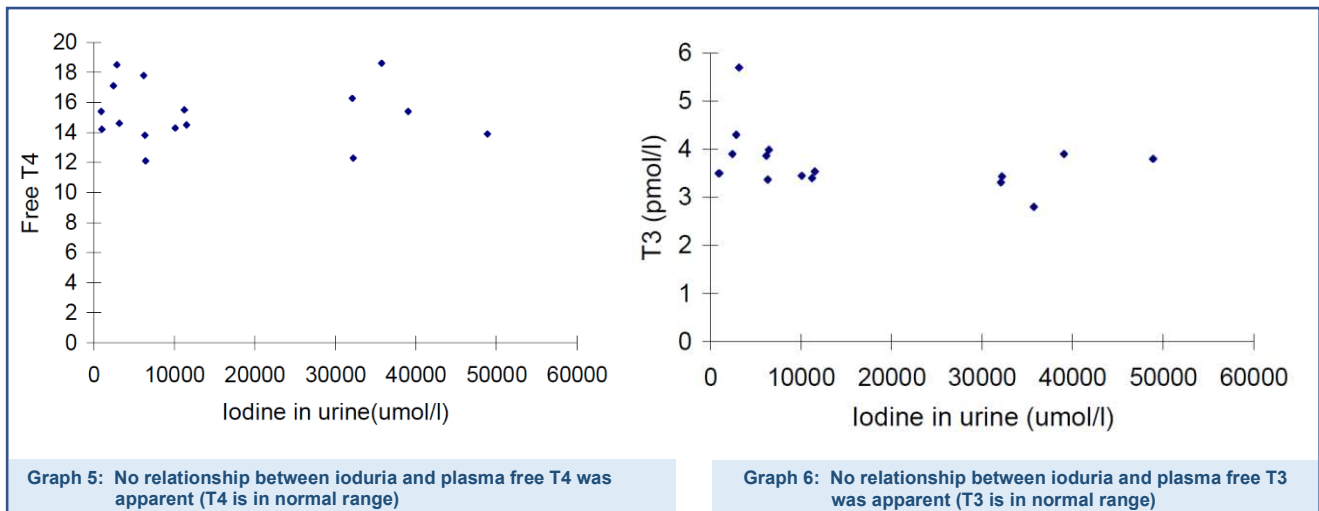


Absorption of iodine from Hyiodine was three times lower in comparison with Betadine when Hyiodine was applied to cavities and 4 and 5 times lower in large abdominal wounds and large wounds in lower extremities.

Ioduria was proportional to the amount of iodine, which was used for wound dressing - graph 3 and 4.



No adverse effect of Hyiodine on thyroid function was apparent. There were normal plasma levels of thyroxin and triiodothyronine as well as TSH even after long-term treatment with high amount of Hyiodine. No relationships were apparent between ioduria and T3, T4 and TSH respectively (see graphs 5,6,7,8).



Conclusion

In comparison with povidone-iodide (Betadine) the excretion of iodine in urine was much lower when Hyiodine was used for wound bandage. Moreover, long-term use of both dressings did not change thyroid function in our patients. This corresponds to our previous results. In these results we did not find any change of thyroid function even so Hyiodine was used for more than 6 years.

This is in accord with result of study, which measured ioduria in 93 infant patients with sternal dehiscence. These children were treated with povidone-iodine adhesive drapes with single povidone-iodine mediastinal irrigation. Despite increased iodine excretion in urine in these children (1600-15000 ug/l), no significant thyroid dysfunction was apparent (Kovacikova 2005).

We conclude that iodine absorption is below 20% when Hyiodine is used in open wounds. This can increase when used in large abdominal wounds and closed abscess cavities. However, physiological effect of this is not clear.



In this aspect higher urinary iodine concentration was seen with Betadine and even with iodine supplementation in various food items and multivitamin tablets. Despite this we advocate control of thyroid functions in patients with large wounds, closed cavities or in patients with known thyroid disease.

Reference:

Kovacikova L. et al. (2005): Thyroid function and ioduria in infants after cardiac surgery: comparison of patients with primary and delayed sternal closure. *Pediatr Crit Care Med.* 2005;6:154-9.