

6. A short quick tap caused a localized contraction of a few muscle fiber bundles, raising a definite nodule about the size of a pecan nut. The latter gradually receded. This phenomenon was independent of the general tendency toward muscular contraction mentioned above.

7. Muscular contractions were obtained on tapping numerous places about the wrist in an attempt to elicit the periosteal reflexes. There was, however, in all cases muscle tissue beneath the part tapped.

8. These findings were present in all the cases.

#### CONCLUSIONS

1. The tendon and superficial reflexes disappear at death.

2. Muscular irritability, that is, to mechanical stimulation, is increased immediately following death, continues to increase to a maximum and then to decrease, disappearing at about sixty minutes post mortem.

3. Since similar increase in muscular irritability is observed in certain organic diseases of the nervous system, these reflex studies and similar studies of the electrical reactions of muscle and nerve following death should lead to new aids in the diagnosis of nervous disease.

4. In eliciting tendon reflexes, one must be careful that he taps only muscle-free tendon.

5. The instrument must be made to stroke and not dig into the sole in eliciting the plantar reflex.

6. The persistence post mortem of many reflexes about the wrist warns us not to confuse them with the periosteal reflexes in life.

209 Post Street.

### THE ELIMINATION OF POTASSIUM IODID IN THE URINE

AN EXPERIMENTAL COMPARATIVE STUDY OF ITS  
ADMINISTRATION BY MOUTH OR RECTUM \*

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This work was entirely confined to the study of the urinary elimination of potassium iodid after oral or rectal administration. The patients of the general ward type were given 1 gram of potassium iodid and the urine was subsequently examined to determine the total amount of potassium iodid excreted day after day, until the last traces had disappeared. For comparison, whenever possible, the same patient was given a similar quantity of potassium iodid per rectum (by proctoclysis) and the urine was treated in the same

\* From the Chemical Department of the Pathological Laboratory of the Lebanon Hospital.

TABLE OF RESULTS OF DETERMINATION OF POTASSIUM IODID ELIMINATION IN URINE \*

Name	Clinical Diagnosis	Blood Pressure		1 gm. of Potassium Iodid given by					
				Mouth			Rectum		
				Day			Day		
		Mm.	Hg.	1st	2d	3d	1st	2d	3d
A. E. ....	Cardio-nephritic .....	S. 200	0.25	0.01	—	—	0.32	0.1	—
L. C. ....	Influenza .....	D. 50	0.51	0.1	Trace	—	0.3	0.05	—
H. R. ....	Emphysema .....	S. 115	0.4	—	—	—	0.6	0.06	Trace
Ch. G. ....	Bronchial asthma .....	D. 80	0.32	0.01	—	—	0.52	0.08	Trace
A. H. ....	Rheumatic endocarditis.	S. 160	0.5	0.15	—	—	0.65	0.02	—
A. K. ....	Carcinoma of intestines	D. 75	Not given	Not given	....	—	0.75	0.15	—
Ch. E. ....	Typhoid abscess of lung	S. 120	0.29	0.01	—	—	0.45	0.1	—
M. A. ....	Peliosis rheumatica ....	D. 80	0.75	—	—	—	Not given	Not given	..
I. S. ....	Nephritis .....	S. 120	0.3	0.03	—	—	0.28	0.08	—
M. A. ....	Nephritis .....	D. 80	0.2	—	—	—	0.32	0.06	—
I. W. ....	Nephritis .....	S. 145	0.39	0.01	—	—	0.45	0.06	Trace
R. ....	Nephritis .....	D. 85	0.18	0.04	—	—	Not retained	Not retained	..
I. Sh. ....	Uremia .....	S. 155	0.1	—	—	—	0.24	0.1	—
M. W. ....	Uremia .....	D. 155	0.2	—	—	—	0.35	0.06	—
M. K. ....	Nephritis .....	S. 185	0.09	—	—	—	0.28	Trace	—
S. S. ....	Acute nephritis .....	D. 90	0.36	0.15	—	—	Not retained	Not retained	..
G. B. ....	Arteriosclerosis .....	S. 120	0.35	0.02	—	—	0.45	0.06	—
S. R. ....	Rheumatic endocarditis.	D. 85	0.65	0.09	—	—	Not retained	Not retained	..
A. P. ....	Pneumonia .....	S. 130	0.5	—	—	—	Not given	Not given	..
A. N. ....	Pneumonia .....	D. 80	0.32	—	—	—	Not given	Not given	..
A. B. ....	Pneumonia .....	S. 140	0.3	—	—	—	Not given	Not given	..
G. G. ....	Pneumonia .....	D. 95	0.42	—	—	—	Not given	Not given	..
A. F. ....	Influenza .....	S. 135	0.52	0.04	—	—	0.48	0.09	—
B. F. ....	Auricular fibrillation of heart	D. 90	0.5	0.2	—	—	0.42	0.08	Trace

\* Twenty-four hour specimens of urine were used.

manner as before. It is not the intention of this paper to discuss the action, uses and polytherapy of iodids in medicine.

The technic employed for the quantitative analysis was the following:

1. A fiftieth normal solution of sodium thiosulphate ( $\text{Na}_2\text{S}_2\text{O}_3$ ) was prepared and carefully standardized against a definite quantity of potassium iodid. The standardization was performed as follows:

An exact 10 per cent. solution of potassium iodid is used. One c.c. of this 10 per cent. solution is diluted up to 100 c.c. with distilled water and introduced into a separating funnel. To this is added 5 c.c. of a mixture composed of strong nitric acid plus 5 per cent. of nitrous acid, and well shaken. Allow to stand five minutes and then add 10 c.c. of chloroform. Agitate well to wash out the liberated iodine. Let stand for five or ten minutes and drain off the purple colored chloroform from the bottom of the separating funnel into a beaker. The iodine extraction is continued and repeated with several fresh, smaller portions of chloroform and the whole of the chloroform used for the washing is collected in the same beaker. The washings should be continued until the returning chloroform is colorless.

2. Next carefully titrate the chloroform-iodine contents with the fiftieth normal sodium thiosulphate solution until the purple chloroform becomes completely colorless. Having thus determined the amount of sodium thiosulphate solution necessary to decolorize the iodine of 1 decigram of potassium iodid, calculate its equivalent for 1 c.c. of  $\text{Na}_2\text{S}_2\text{O}_3$  and use

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the obtained figure as the standard.

For the urine determination, 100 c.c. of a twenty-four-hour specimen of urine is used and treated exactly as described above in the standardization. Having determined the potassium iodid elimination per 100 c.c. of urine, calculate therefrom the total excretion in the twenty-four-hour specimen.

#### REMARKS

It is to be noted that the major portion of the eliminated potassium iodid is excreted in the first twenty-four hours, from 5 to 10 per cent. is given off in the second twenty-four hours and by the third day only a trace or no potassium iodid is excreted.

As is to be expected, the amount of potassium iodid recovered never equaled or even approximated the amount introduced, indicating that other avenues of elimination (skin, saliva, etc.) excreted a considerable portion, and perhaps part may be utilized in thyroid-protein molecularization.

Patients who spit up a great deal excreted less potassium iodid in the urine.

The total elimination of potassium iodid in nephritic cases, as compared with other diseases in the chart, is the lowest and serves as a hint of poor renal function.

When the potassium iodid was given per rectum in the nephritic cases there was a more notable elimination, due probably to slower absorption and the proctoclysis acting as a renal stimulus.

Observe the peculiarity of the four pneumonia cases in excreting in the first day all excretable potassium iodid with no traces on subsequent days. Possibly this fact bears some relation to the low total chlorine elimination in pneumonia, as both are halogens.

The blood pressure seemingly has no material relation to the excretion index.

Potassium iodid can be given by rectum to comatose patients with the same result as when given by mouth (Patient A. E. being in coma when brought to the hospital, later regaining consciousness).

On the same case a lumbar puncture was made and a trace of potassium iodid was found in the spinal

fluid. In two other instances, however, no potassium iodid could be discovered in the spinal fluid.

Whether those that excrete little through the urine are the ones that suffer from toxic and skin symptoms could not be ascertained, as experiments on the same patients were limited. Some patients could not retain proctoclysis and therefore only mouth determinations were possible.

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## QUININ AND UREA INJECTIONS IN HYPERTHYROIDISM

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Since my preliminary report,<sup>1</sup> I have used quinin and urea injections over two hundred times in fifty cases of goiter, with no unpleasant effects.

I recommend the method only to relieve hyperthyroidism and not to remove the goiter. It is often true that in small toxic and atoxic goiter the inflammatory reaction following the injection is sufficient to cause the disappearance of the tumor; but the process is slow, usually covering several months, and when used for this purpose alone, the results are liable to be disappointing.

The injection must be employed with discretion; I have used it two years; the length of time being too short, and the number of cases too limited to draw final conclusions. It is suitable for use only in a hospital by men skilled in goiter work. One inexperienced is liable to inject too deeply, or to make the injection within the trachea. The indiscriminate use of quinin and urea, in the hands of one not familiar with the low threshold to stimuli possessed by the average case of toxic goiter, is liable to produce alarming symptoms of hyperthyroidism which might result disastrously.

In all cases of hyperthyroidism, I have obtained the best results by keeping the patient in bed in a hospital several weeks while giving the injections, the length of time depending on the severity of the symptoms and response to treatment.

#### PRELIMINARY TREATMENT

The necessity of minimizing pain from any injection by the use of local anesthesia cannot be too strongly emphasized.

To raise the patient's threshold to stimuli, thereby preventing an acute attack of hyperthyroidism which might otherwise follow the slight pain of the first quinin and urea infiltration, all cases of toxic goiter receive at one to three day intervals, preliminary injections into the most prominent portion of the goiter, of a few minims of sterile salt solution followed by injections of sterile water.

After two to four preliminary injections, the nervous reaction is so diminished that the quinin and urea can be given with only slight discomfort and no increase in symptoms; as soon as there is no hyperthyroidal reaction following the water injections, their usefulness is at an end.

I have observed in giving these injections that if the same point is always used, the reaction is less

1. Watson, L. F.: Quinin and Urea Hydrochlorid Injections in Hyperthyroidism, THE JOURNAL A. M. A., Jan. 10, 1914, p. 126.