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INTRACUTANEOUS SEROTONIN TEST IN DYSTHYROID AND NORMAL PERSONS

By

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It is well known that 5-hydroxytryptamine (serotonin) plays an important role under various physiological and pathological conditions, and an increased serotonin activity has been related to a number of clinical symptoms (1, 2, 3).

Many symptoms in thyrotoxicosis, such as flushing, palpitations, tachycardia, perspiration, and increased intestinal peristalsis resemble the manifestations found in the carcinoid syndrome when an excess of serotonin is released (4, 5).

In a preliminary experiment we therefore treated five thyrotoxic patients with an antiserotonin agent (Deseril®), 1 mg three times daily in periods of 5 to 10 days alternating with control periods of one week.

The pulse rate and defecation frequency were distinctly decreased in the treatment periods, whereas the thyrogenic symptoms, as evidenced by protein-bound iodine and basal metabolic rate remained unaffected.

In principle, two possible mechanisms for this observation might be suggested: Either an increased production and release of serotonin in thyrotoxicosis, or an increased sensitivity to normal amounts of circulating serotonin.

In order to investigate the latter possibility an intracutaneous test with serotonin was performed in 9 thyrotoxic and 8 myxedematous patients, and a normal material examined for comparison.

Distribution of dysthyroid and normal persons

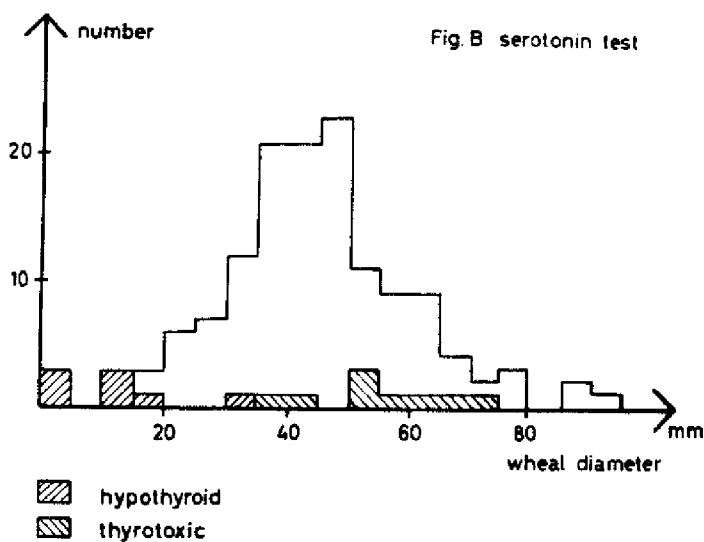
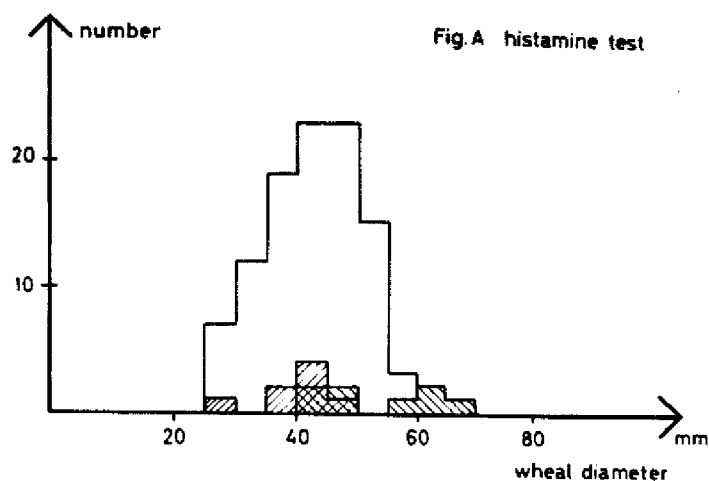


Fig. 1.

A: Local histamine reaction (wheal measurement) in 8 myxedematous, 8 thyrotoxic and 105 euthyroid persons.

B: Local serotonin reaction in 8 myxedematous, 9 thyrotoxic and 134 euthyroid persons.

METHOD

0.1 ml of a solution containing 1 per mille serotonin in isotonic saline was injected on the dorsal side of the antebrium. Following the injection a rapid local response occurred, consisting of an urticarial wheal, a red coloring of the skin, and a burning sensation. 15 minutes after the injection, when the wheal and its surrounding erythema had attained its maximum size and was fairly well demarcated, its size was measured as the mean of two diameters at right angles to each other.

RESULTS

The normal material consisted of hospital personnel and euthyroid patients, 53 men and 81 women of ages ranging from 22 to 81 years, totalling 134.

The results of the normal group could be analysed in a normal distribution with a mean value of 45.1 mm and a standard deviation of 13.7 (Fig. B).

The values of 8 myxedematous patients were distinctly lower, the mean being 11.1 and the range from 33 to zero. By contrast, elevated values from 73–37 mm and a mean of 54.8 were found in 9 thyrotoxic patients. These figures differ significantly from those of the normal material: For the thyrotoxic patients with $0.02 < P < 0.05$, and for the hypothyroid, with $P < 0.001$.

As a control we have tested a comparable material of euthyroid and dysthyroid patients with a cutaneous injection of 0.1 ml of a 0.1 per mille histamine solution. The results of this study were as follows:

In 105 patients with no evidence of thyroid dysfunction we found a mean value of 42.4 mm, and a standard deviation of 8.3 (Fig. A).

In 8 myxedematous patients the mean value was 39.5 mm and the standard deviation 5.9. These values did not differ from those of the normal material.

In 8 thyrotoxic patients we found a mean value of 53.3 mm and a standard deviation of 9.9. These values differ significantly from our normal material ($P < 0.001$).

DISCUSSION

The fact that not only serotonin but also histamine provoked an increased local reaction in the hyperthyroid patients seems to suggest that our findings in this group are of an unspecific nature, caused by differences in cutaneous perfusion.

On the other hand, for the myxedematous patients, the distinct difference in reactivity to the two agents lend some support to the theory that a changed sensitivity to serotonin might explain some of the symptoms in dysthyroid patients.

SUMMARY

An intracutaneous test with serotonin was made in 8 myxedematous and 9 thyrotoxic patients and compared with a normal material of 134 euthyroid persons.

The wheal reaction proved to be significantly reduced in the myxedematous group and increased in the thyrotoxic group.

In a control study with histamine, we found a normal reaction in 8 myxedematous patients, and an increased reaction in 8 patients with thyrotoxicosis.

The possibility is suggested that some of the symptoms in myxedema may be explained by a decreased sensitivity to serotonin.

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