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CLINICAL ARTICLES

THERMO-STIMULATOR A DEVICE TO INVESTIGATE CASES OF PHYSICAL URTICARIA

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Since the description of cases of physical urticaria by Duke in 1924, various means of reproducing an urticarial response have been described (Grant et al, 1936; Peters and Silverman, 1946; Hursh, 1950; Sherman and Seebohm, 1950; Kierland, 1953; Morgan, 1953; Juhlin and Shelley, 1961 and Harber and Fine, 1965). But for comparing the reactivity of different individuals so as to pick up those with an abnormal reactivity, standardisation of the stimulus is of utmost importance. This report concerns a simple instrument which was devised to give a measured stimulus of heat or cold. The reactivity of an individual could thus be recorded in absolute terms.

DESCRIPTION

The instrument (Fig. 1) consists of an inner tube (I. T.) of 30 mm diameter made of aluminium. The base of this tube, also 30 mm diameter constitutes the exposure surface (E.S.) which is applied to the skin while testing The top is covered by a removable screw cap (S.C.). This is perforated and a thermometer (T.) can be inserted through this hole to record the temperature of the 'Exposure Surface.' The main length of the inner tube is surrounded by another tube (O. T.) of a larger diameter leaving a length of 5 mm adjoining the 'Exposure Surface,' to avoid contact with the skin. The space between the two tubes is filled with a material of low heat conductivity (I.M.) to slow down the rate of heat exchange with the environment and thus maintain the temperature of the exposure surface.

PROCEDURE

The tests are done on flexor surface of the forearm. The inner tube is filled with hot water for 'Heat-Stimulus' or crushed ice for 'Cold-Stimulus' and the screw cap with the thermometer replaced. The 'Exposure Surface' is wiped dry and its

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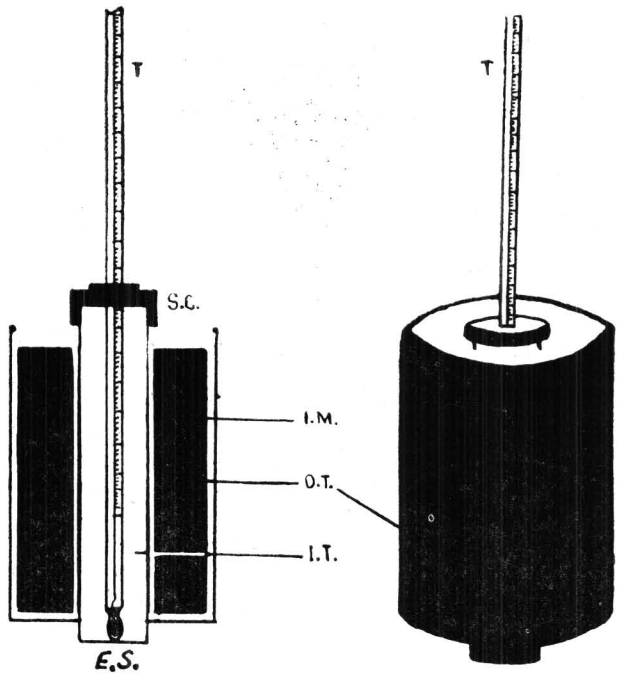
temperature adjusted at the desired level. The instrument is placed on the forearm skin so that only the 'Exposure Surface' touches the skin under the pressure of its own weight (150 g). After a specified period of time, the instrument is removed and the reaction of the stimulated skin recorded.



THERMOSTIMULATOR

Fig. No. 1

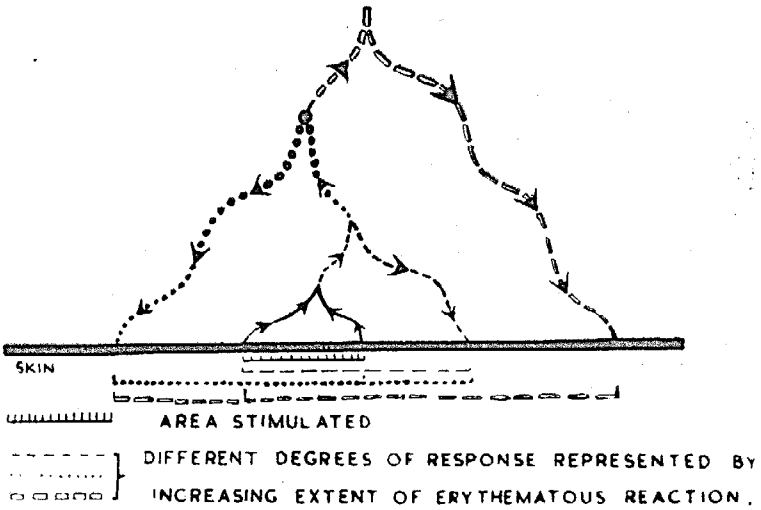
Under the 'Cold-Stimulus' the stimulated area of skin undergoes a brief vasoconstriction, followed by reactive vasodilatation while under the 'Heat-Stimulus' the area shows only vasodilatation. In some cases, the erythema remains limited to the area stimulated, while in others it spreads to a variable extent beyond the area. In still others, a local or a generalised whealing reaction follows.

Reactivity of an individual is recorded in terms of (1) whether the erythema spreads beyond the stimulated area; (2) the maximum diameter of the erythematous reaction; (3) the time taken for this reaction; (4) local or generalised whealing and (5) any symptoms.

COMMENTS

Vasoconstriction and vasodilatation at the site of contact represent a direct effect of the cold and heat on blood vessels, but spread of the erythema beyond the stimulated site indicates that the stimulus has been adequate enough to excite an axon reflex. The area covered by the erythematous reaction is directly proportional to the depth to which the axon is stimulated (Fig. 2). The period for which the reaction lasts is indicative of the persistence of activity in the axon.

Formation of a local wheal or generalised urticaria indicate still severer responses. When the stimulus is the same, the response can be regarded as representative



DEVELOPMENT OF AXON REFLEX

Fig. No. 2

of the excitability of the individual. The greater the excitability, the severer will be the reaction.

REFERENCES

1. Duke, W. W. : Urticaria caused specifically by the action of physical agents. J. A. M. A., 83 : 3, 1924.
2. Grant. R.T.; Pearson, R.S.B. and Comeau, W.J. : Observations on urticaria provoked by emotion, by exercise and by warming the body. Clin. Sci., 2 : 253, 1936.
3. Harber, L.C. and Fine, H.L. : Cold urticaria. Arch. Derm., 92 : 334, 1965.
4. Hursh, L M. : Human sensitivity to a standardised cold test. J. Applied Physiol., 2 . 425, 1950.
5. Juhlin, L. and Shelley, W.B. : Role of mast cells and basophils in cold urticaria with associated systemic reactions. J. A. M. A., 177 : 371, 1961.
6. Kierland, R. R. : Physical allergies. Arch. Derm., 68 : 61, 1953.
7. Morgan, J.K. : Observations on cholinergic urticaria. J. Invest. Derm., 21 : 173, 1953,
8. Peters, G. A. and Silverman, J. J. : Role of histamine and acetylcholine in the mechanism of heat allergy. Arch. Int. Med., 77 : 526, 1946.
9. Sherman, W.B. and Seebohm, P.M : Passive transfer of cold urticaria. J. Allergy, 21 : 414, 1950.