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Skin Vascular Reactions to the Cold Pressor Test.

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The detection of the presence or absence of hyperreactivity of the vasomotor system by the standard cold stimulus used by Hines and Brown and others,[1] depends on statistically significant differences in the arterial blood pressure responses. Although the conclusions of Hines and Brown have been challenged,[2] a systematic study of the vasomotor reactions involved would seem to be desirable for a more complete analysis of the significance and mechanism of the test.

The development of the skin photoelectric plethysmograph[3] offered opportunity to explore the participation of the skin vessels in the responses to the immersion of one hand in ice-cold water. Responses in the finger (recorded with a mechanical plethysmograph), ear and forehead (recorded photoelectrically) have been observed in a random group of 9 normal male subjects (6 whites, 2 Negroes, 1 Chinese) in 24 experiments. The number of observations is too few to bear on the significance of the cold pressor test. They are not offered for that purpose.

Constriction in the finger of the opposite hand was observed in all trials in all subjects. This is a well-known and frequently demonstrated response to the immersion of a limb in cold water. In contrast to the behavior of the finger vessels, the responses in the ear and forehead varied from a slight decrease in blood volume through no effect to an increase in blood volume. Similar changes were observed in the amplitude of the volume pulse. In some cases, a decreased volume pulse was recorded when no decrease in blood volume occurred.

The interpretation of these skin changes as of vasomotor origin is complicated by the fact that the blood content of the skin of the head is readily altered by changes in intrathoracic pressure. The

[1] Hines, E. A., Jr., and Brown, G. E., *Ann. Int. Med.*, 1933, **7**, 209; *Am. Heart J.*, 1936, **11**, 1; White, B. V., and Gildea, E. F., *Arch. Neurol. and Psychiat.*, 1937, **38**, 964.

[2] Yates, M. R., and Wood, J. E., Jr., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 560.

[3] Hertzman, A. B., PROC. SOC. EXP. BIOL. AND MED., 1938, **38**, 562.

respirations often change considerably as a result of the pain of the test. More prolonged or "active" expirations or shift of the chest to a more expiratory position tend to engorge the venous vessels of the head skin. These effects will obscure a simultaneous slight constriction in this area. Decrease in the amplitude of the volume pulse may result from increased intrathoracic pressure as well as from arterial constriction so that in those instances where the pulse decreased (the changes were slight) this cannot be considered as evidence of constriction. It is, therefore, suggested that in normal subjects the skin vessels of the head participate only slightly (if they do at all) and to a much less extent than is true for the finger vessels, in the vasoconstrictor response to the cold pressor test.

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Effect of Potassium Chloride on the Normal and Denervated Iris.

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Camp and Higgins[1] have called attention to the similarity of the actions of epinephrin and the potassium salts on various organs and have advanced the hypothesis that epinephrin acts by liberating potassium; no reference was made by them to the action of potassium on the iris.

Experiments were carried out using intact and excised bulbi of frogs and intact normal and denervated eyes of living rabbits. Forty-four excised frog bulbi placed in 0.6% KCl, and observed 90 to 150 minutes, resulted in 32 constrictions, 1 dilation, and 11 showing no change. Control eyes placed in 0.6% NaCl gave similar results.

In another sseries of experiments, the cerebra of frogs were pithed or lightly crushed and 0.25 to 1 cc 0.6% KCl injected intracardially or into the aorta. Of 66 eyes observed, 18 showed no change; 41 constricted and 7 dilated. The dilatations were slight or moderate, the maximum being 1 mm. Control injections of 0.6% NaCl produced constriction or no change.

Large doses of KCl, *i. e.*, 1 to 2 cc of a 4.0% solution injected intraärterially into 12 frogs produced constriction in all cases. During the constricted state 0.25 to 0.5 cc epinephrin 1:10,000 was in-

[1] Camp, W. J. R., and Higgins, J. A., *J. Pharm. Exp. Therap.*, 1936, **57**, 376.