SCIENTIFIC NOTE

Interference by Formaldehyde-forming Drugs in the Determination of Urinary Catecholamines

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SOBEL AND HENRY (*1*) have listed a number of drugs which do not interfere in the determination of catecholamines. In "*Standard Methods of Clinical Chemistry*," Vol. 3, p. 74, J. R. Crout also names drugs which are known not to interfere with the determination of catecholamines. R. W. Gifford and D. C. Tweed (*2*) mention some antibiotics as leading to spuriously high values for urinary catecholamines because of interfering fluorescence, which we have also observed in the case of a patient receiving Declomycin. Gifford and Tweed prove the same for the antihypertensive agent l-alpha-methyl-dopa (alpha-methyl-3,4-dihydroxy-L-phenylalanine), which forms a condensation product with ethylenediamine, giving a fluorescence similar to that produced by the catecholamines in their method.

We would like to add to this list drugs which produce formaldehyde in the urine, such as Mandelamine (Methenamine mandelate) and Uritone (Urotropine, Methenamine). These are preparations given to patients with infection of the urinary tract, and although they do not give falsely high results through an increase in fluorescence, they inhibit the formation of fluorescent substances from the added recovery standard (Arterenol, Noradrenalin) on which the calculation of the catecholamines is based (*3, 4*). (Adsorption of the catechols on alumina, condensation with ethylenediamine, and measuring the fluorescence of the corresponding lutins.) We found that the degree of inhibition depends on the amount of formaldehyde present in the urine. No recovery of added catecholamines was obtained with 0.1% CHOH. With smaller quantities of formaldehyde in the urine, catecholamines

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Received for publication Mar. 1, 1963.

were partially recovered, with variations from one specimen to another.

There is evidence that formaldehyde to some extent also depresses the formation of fluorescent substances from the catecholamines originally present in the urine. Mandelamine is decomposed into mandelic acid (C_6H_5 CHOH-COOH) and methenamine, $(CH_2)_6 N_4$; and the latter releases formaldehyde at an acid pH: $(CH_2)_6 N_4 + 6H_2O \rightarrow 4NH_3 + 6CHOH$. The optimal dosage of Mandelamine is 4–6 gm. daily, which forms a sufficient quantity of formaldehyde in the urine to inhibit completely the recovery of added adrenaline and noradrenaline, resulting in erroneously high values for the catecholamines. The vanilmandelic acid (VMA) determination on such urine specimens give normal values.

In order to protect ourselves against misleading results in our catecholamines estimations, we check each urine routinely for the presence of formaldehyde using the color reaction with chromotropic acid. Needless to say, urinary preservatives evolving formaldehyde should not be used.

References

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