

Clinical and Experimental Studies on the Significance of the Forms of the Polarographic Protein Double Wave. (II)

Clinical Analysis on the Filtrate Wave (Brdicka)

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As was reported in our previous paper¹⁾, we presumed the first maximum of filtrate double waves, for which the blood mucoprotein is responsible, might be attributed to the proteinbound polysaccharides.

The main reason for this assumption is that, during the process of alkaline (KOH) denaturation of serum mucoprotein, there has been found the evidence that the decrease in the polysaccharide content of mucoprotein occurs in parallel to the relative lowering of the 1st maximum.

Similar conclusions were also obtained from the results of their model experiments by De Heleers²⁾, Shinagawa and his coworkers³⁾.

With such a recent advance in the elucidation of the 1st and 2nd maxima, the significance of the filtrate reaction became more evident, and the reaction can be used for the evaluation of serum protein qualitatively as well as quantitatively.

It is well known that mucoprotein plays an important role in the filtrate reaction. Besides cancer, most of the acute exsudative infection such as tuberculosis and the like, shows almost in a same way, the high polysaccharide content both in serum and mucoprotein.

The purpose of our investigation was to find out a probability by means of the filtrate reaction to differentiate one of the above described diseases from another.

PROCEDURE

Concentrations of each component of the test solution used in the experiment are as follows :

- $1 \times 10^{-3}M$ of hexaminc cobaltic chloride,
- 0.1N of ammonium chloride,
- 0.8N of ammonium hydroxide.

Polarography was performed on the admixture of 5 ml. of this solution and 0.5 ml. of serum sulfosalicylic acid filtrate, starting from under 0.8 voltage.

The polarographic technique used was in general the same as previously reported, with special caution to keep the constant temperature (20°C) throughout the procedure.

Since alkaline denaturation of mucoprotein influences not only upon the magnitude of the polarographic wave, but upon the form, as was previously reported, only the native sample was used (without being undergone the alkaline

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NOTE

denaturation) for the calculation of the 1st maximum /2nd maximum ratio, which was taken as a criterion.

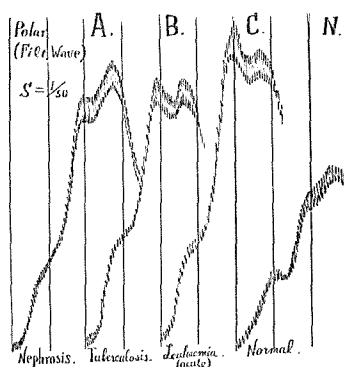
RESULTS

Discussion was made on 242 serum samples, which showed more higher peak of polarographic wave obtained fell into three types :

Type A : The peak of 2nd wave is higher than that of the 1st.

Type B : The peaks of both waves are found to be almost at the same height.

Type C : The opposite of Type A. (The peak of the 1st wave is higher than that of the 2nd wave.)



Most of the samples, e. g., 208 out of 242 samples (82%) presented type A, while 22 (10.5%) type B and only as few as 12 (5.0%) showed type C.

Interrelations between the types and various diseases should be mentioned.

Most cases of cancer and tuberculosis showed type A, but the latter presented type B or rarely type C, when the samples were taken in acute exsudative phase.

Accordingly, we presume the differentiation of both diseases from the types obtained seems to be not so quite successful as De Helears described.

Besides, of the most interest was the results in acute hematological impairment such as acute leukaemia, lymphsarcomatosis and so on.

These diseases showed a quite opposite attitude in the distribution of these types of serum filtrate wave : that is, among all the 11 cases, 6 was identified to be type C, 4 type B, and only one case showed type A. In addition, the wave pattern of type C in these diseases was exceedingly characteristic, so that it could readily be distinguished from the cases of type C observed in tuberculosis (see Figure).

Further investigation should be made in the future to elucidate the clinical significance of the increased polysaccharide content in mucoprotein, since 1st wave may be due to the polysaccharide portion in mucoprotein.

We have also experienced that the constituent of mucoprotein in human blood is not quite homogenous and varies from disease to disease.⁵⁾

A report has recently been made that a striking variability of serum mucoproteins was found in neoplastic hematological diseases⁶⁾.

NOTE

It is likely that the characteristic result in the form of polarographic waves we obtained leads us to the confirmation of this fact.

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