A Modified Quick's One-stage Test for the Control of Out-patients on Anticoagulant Therapy

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(RECEIVED FOR PUBLICATION NOVEMBER 5, 1959)

In Quick's one-stage test, stage 1 is probably "short-circuited," tissue thromboplastin taking over the function of blood thromboplastin. As a consequence the modified test consists simply of performing the test on fresh whole blood instead of on plasma. The advantage is particularly applicable to out-patients, as the prothrombin time can be estimated straight away and the follow-up dose of the anticoagulant drug prescribed there and then. In a controlled series of 200 tests run in parallel with the standard Quick's method, the incidence of variation of more than two seconds is about 1.2%.

Method

It is essential to have a 37° C. water-bath close at hand, so that the venepuncture specimen does not lose too much heat. A small portable electric water-bath (37° C.) is ideal for this purpose (Fig. 1).

Approximately 0.5 ml. of blood is taken from a vein, and, without delay and with the needle still *in situ*, 0.2 ml. of the specimen is delivered into each of two 3 × $\frac{1}{4}$ in. tubes (pre-heated). The water-bath is fitted with a 0.2 ml. line for convenience. At least a minute is then allowed for the specimen to reach 37° C., and 0.2 ml. of brain thromboplastin (in a pre-heated tube) is added to the first tube, and the time* determined for clotting. The end-point is easier to determine if the tubes are plugged and then gently rocked over an opaque light source. When a clot forms and the specimen ceases to move is the end-point. The test is repeated on the second tube, and the average of the two readings taken. This time is the prothrombin time of the sample.

It is advisable, in colder weather, to use pre-heated (37° C.) syringes and needles to take the blood specimen.

A Manometric Micro-apparatus for Estimating Oxygen

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(RECEIVED FOR PUBLICATION AUGUST 27, 1959)

In previous communications (Rappaport, Eichhorn, and Nutman, 1956a and b) an apparatus for manometric determination of CO₂ in 0.1 ml. and 0.05 ml. of plasma was described. The problem of examining oxygen in the same apparatus was still unsolved, but now a method for oxygen determination in 0.1 ml. blood samples using the same apparatus has been devised.

Certain precautions must be observed in constructing the apparatus (Fig. 1). Stopcock A should have a capillary bore not more than 1 mm. This is important when introducing sodium hydroxide for CO₂ absorption, so that NaOH enters easily without mixing with hydrargyrum, which is used as a seal immediately afterwards. If the bore is wider, the remains of NaOH, together with the mercury inside, hinder a constant reading as NaOH continues to flow inside the chamber. The neck of cup M should also be exactly formed. It should be short enough to allow the micro Oswald pipette to touch the opening of the stopcock when introducing the blood into the extraction chamber and also facilitate the sealing with Hg. Each drop of Hg should fall directly on the bottom of the neck, without air or fluid bubbles. The jacket of the chamber (Fig. 2) should be attached in such a way that the 0.1 ml. mark of the reaction chamber should be easily legible.

The micro Oswald pipette should preferably be made out of a part of a 0.2 ml. pipette graduated in 0.001 ml. so that any quantity of blood introduced into the chamber can be easily calculated. For example, if 0.105 ml. blood is introduced by mistake, the calculation can easily be corrected and the examination need not be repeated.

Reagents

(1) Extraction Solution (Modified) (Rappaport and Köck-Molnar, 1934).

- A. 125 g. urea
- 2 g. saponin alb. Merck
- 1.5 ml. octyl alcohol
- 3 ml. concentrated lactic acid
- 125 ml. distilled water

B. 28% potassium ferricyanide kept on ice

* The work was completed before Professor Rappaport's illness and subsequent death on July 17, 1959.