THE DETECTION OF ANAEMIA IN GENERAL PRACTICE

Using the Van Slyke method of screening

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THE object of the present investigation was to determine the suitability or otherwise of the copper sulphate screening test as used by the National Blood Transfusion Service, for use in general practice in detecting anaemia.

Anaemia in general practice is a common disease (Fry, 1961) and is difficult, clinically, to diagnose accurately. A method of haemoglobin estimation which is both rapid and accurate is required by the general practitioner. Accurate haemoglobinometers (Grey Wedge M.R.C., E.E.L.) are expensive (£40-60) and are not designed to be portable. The Sahli and Talquist haemoglobinometers are dangerously inaccurate and misleading.

The present investigation consisted of determining the haemoglobin level (using finger-tip blood with the M.R.C. Grey Wedge haemoglobinometer) of 100 consecutive patients taken at random and comparing this with a copper sulphate screening test (Phillips *et al.* (1943). This consists of taking a drop of blood from the finger-tip or ear into a capillary tube. It must be free from air bubbles and introduced into a standard solution of copper sulphate (S.G. 1053) without force from a height of about one centimeter. The drop must penetrate the surface film without splattering and should immediately sink some 2–3 centimeters below the surface. Momentum will then be lost and during the next ten seconds whether the drop rises, remains stationary or falls, will indicate whether its S.G. is greater or less than the test solution. A S.G. of 1053 corresponds to a haemoglobin level of 85 per cent provided the serum

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proteins are normal. It was found convenient to drop the blood from a capillary tube into which it had been drawn, directly into a standard blood group and Rh bottle filled with the copper sulphate solution. This solution was changed every 12 estimations as it became cloudy and could become diluted eventually. Most of the patients in the series investigated were women (94 per cent).

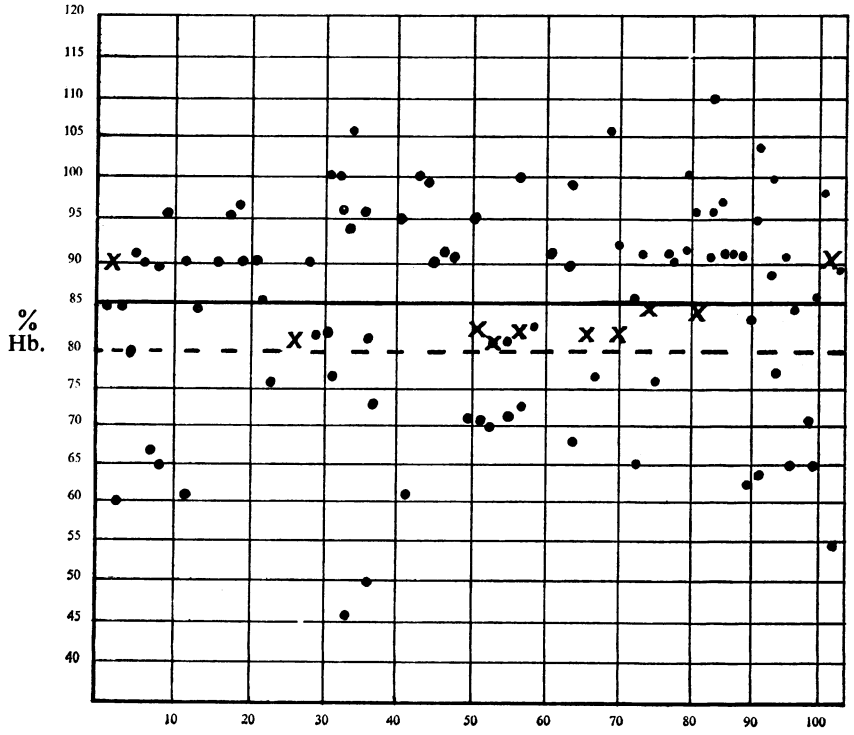

Figure 1

HAEMOGLOBIN LEVELS IN 100 PREGNANCIES

The dots represent haemoglobin estimations which are 'correct' as judged by the copper sulphate test and the crosses are those which are 'incorrect'.

Results

The two incorrect results with haemoglobin levels above 85 per cent were both pregnant women. Haemodilution was probably the reason for this.

The eight incorrect results below 85 per cent were actually between

85 and 80 per cent haemoglobin and in fact were " failed safe " if the criterion of anaemia is taken to be a haemoglobin level of less than 80 per cent. No incorrect results were obtained below this level. The accuracy of the M.R.C. Grey Wedge haemoglobinometer is claimed to be within 2 per cent.

Discussion

An investigation using the Van Slyke screening test was performed in general practice in Australia (Spooner, 1960) when 3,708 patients were investigated. The reliability of the test was not considered high as many 'incorrect' results were obtained which later were found to have a different haemoglobin level from that indicated by the screening test. Doubts were also expressed as to the numbers of true anaemias missed. But in this series, the actual haemoglobin level was not determined in each case, so conclusions could not be drawn with accuracy. A large series such as this would have been worth investigating, provided that accurate haemoglobin levels had been determined at the time when the screening test was performed.

Iron-deficiency anaemia is commonly encountered in general practice and it is towards the discovery of this that the screening test might prove most useful. A disturbance of plasma proteins would influence the reliability of the test but as this is relatively rare in general practice, and iron-deficiency anaemia is common, it does not seem sufficient reason to vitiate the test completely. Also, lowering of haemoglobin level would be associated most commonly with a lowering of plasma proteins as for instance in malignancy.

Conclusions

The Van Slyke copper sulphate test is reliable as a rough screening method in general practice, i.e. it could be used as an indicator as to whether a patient's blood requires further investigation. It is not a reliable method of detecting anaemia in pregnancy.

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