An assessment of Sickledex as an alternative to the sickling test

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Sickle-cell disease is a collective term for the disorders resulting from the presence of sickle haemoglobin. The sickle-cell trait is present at a level of 20% or higher in many parts of Africa and at a level of 8% in American and West Indian negroes. The sickle trait is relatively benign. Nevertheless laboratories will be increasingly requested to carry out tests to detect the presence of sickle haemoglobin (HbS) on immigrant patients, particularly before any form of surgery (Konotey-Ahulu, 1969). Sickle-cell thalassaemia and sickle-cell haemoglobin C disease have an intermediate severity. Sickle-cell anaemia, the homozygous state for sickle haemoglobin, varies in its severity according to its geographical location (Serjeant, Richards, Barber, and Milner, 1969) but is commonly associated with childhood death.

The sickle test is positive in all these conditions but is unable to distinguish between them. The orthodox sickling test is simple to perform but, despite this, false negative and false postive results are not uncommon (Schneider, Alperin, and Lehmann, 1967). A new technique (Sickledex) capable of detecting the presence of haemoglobin S has been assessed. Like the sickling test itself, Sickledex does not distinguish between the patient with sickle trait and sickle-cell anaemia.

Method

Sickledex was provided by Ortho Diagnostics. Before testing the dried powder is dissolved in the test solution. This working solution is stable for four weeks stored at 2 to 8°C. The test is performed by adding 0·02 ml whole blood (any anticoagulated or fingerprick sample) to 2 ml of the working solution in the 12 × 75 mm tube provided. With packed cell volumes below 25% double the quantity of blood is added. Haemolysates appear satisfactory provided that the concentration of haemoglobin is equivalent to 10 g/100 ml and that 0·04 ml is added to 2 ml of the working solution. The tubes are left for two to five minutes at room temperature and the test is read against a printed background. A cloudy, turbid suspension indicates the presence of haemoglobin S. A negative test is shown by a clear, transparent pink solution. Positive and negative controls may be included but our experience suggests that this is not necessary if the observer has previously seen a positive result.

Blood specimens were obtained from immigrant patients.

All specimens were tested in parallel by the standard metabisulphite sickling preparation (Daland and Castle, 1948) and an electrophoretic technique, which included as a screening procedure a Tris buffer paper system (Cradock-Watson, Fenton, and Lehmann, 1959). The results of these tests are recorded in the Table.

Haemoglobin Type	*No. of Specimens*	*Positive*	
		Sickledex	*Sickling Preparation*
AA	359	0	0
AS	134	134	134
SS	2	2	2
SC	13	9	9
AC	8	0	0
CC	1	0	0
AD Punjab	3	0	0
SD[1]	1	1	—
AG Norfolk[1]	1	0	—
Cord blood with γ^{A} [1]	1	0	—
H disease[1]	2	0	—
E Thalassaemia[1]	1	0	—
O Arab thalassaemia[1]	1	0	—
β Thalassaemia minor	7	0	0
β Thalassaemia major[1]	1	0	—

Table *Results with Sickledex*

[1]Liquid nitrogen stored haemolysate.

The test was not sensitive enough to detect sickle haemoglobin in cord blood even in neonates subsequently demonstrated to have sickle cell anaemia.

One false positive test was recorded in Epsom District Hospital and the blood specimen was subsequently referred to us. The blood of this patient, a West Indian Negress suffering from disseminated lupus erythematosis, gave a positive Sickledex result but a negative sickling test and a normal haemoglobin electrophoretic strip. Further investigation demonstrated that the false positive result was due to her plasma, which became opaque during Sickledex testing. A native English patient with myelomatosis was selected for Sickledex testing. This gave a false positive Sickledex test, again due to opacity of the plasma.

Comment

Our experience of Sickledex is in agreement with previous assessments in America (Diggs, Schorr, Arcari, and Reiss, 1968; Wei-Ping Loh, 1969). It is of interest that Diggs *et al* recorded a coarse flocculation but not a false positive result in patients with large amounts of myeloma proteins.

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Because Sickledex, like the sickling test, only detects sickle haemoglobin it is imperative that electrophoresis is performed on all positive results. At the same time the rare false positive results due to a dysproteinaemia will be detected. This test is valuable, particularly in the laboratory, where occasional sickling tests are performed and positive control cells are difficult to obtain. Laboratories performing large numbers of sickling tests may find the Sickledex test too costly but in our opinion Sickledex is quicker to perform than the orthodox sickling test and is more reliable in inexperienced hands.

We are grateful to Ortho Diagnostics for supplying Sickledex.

We are indebted to Dr N. E. G. Richardson for referring the case mentioned in the text.

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Notice

The Pathology of Trauma

The volume entitled 'The Pathology of Trauma' which contains papers delivered at the symposium organized by the Royal College of Pathologists in the spring of this year will be shortly available. The price is £2·00, and there is a concessionary price of 35s. (£1·75) for all members of the Royal College, members of the Association of Clinical Pathologists, and regular subscribers to the *Journal of Clinical Pathology*. (Both of these prices include postage for orders received before 30 January 1971). Please send orders to the Publishing Manager, *Journal of Clinical Pathology*, BMA House, Tavistock Square, London WC1H 9JR.

A report form for the serial display of laboratory results in small hospitals

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Serial display of the laboratory results in the patient's case notes makes it possible for the clinical staff to assimilate the data at a glance. The many advantages of cumulative report forms were described in this journal in the report of the Working Party of the Association of Clinical Pathologists (ACP Report, 1968). Cumulative report forms can be produced in larger hospitals by computer-based systems (eg, College of American Pathologists, 1965) or by photographic reproduction (eg, Whitby and Owen, 1965), but these systems are too expensive for use in small hospitals.

This paper describes a cheap laboratory report form designed for use in small hospitals to produce a cumulative report in the patient's case notes. The design is similar to the report forms used in larger laboratories (ACP Report, 1968) but this report form takes advantage of the smaller range of investigations performed in small hospitals to display the laboratory information in the correct time sequence on a single page of the case notes.

The Report Form

The report form measures $8\frac{1}{4} \times 3$ inches (210 × 79 mm) and fits the 11 × $8\frac{1}{2}$ inch (280 × 216 mm) page used for patients' case notes in this hospital. This width utilizes the full width of the page for the display of laboratory data. It would require alteration for use in some hospitals where different page sizes are used, such as the 10 × 8 inch size (254 × 203 mm) or the $11\frac{3}{4} \times 8\frac{1}{4}$ inch size (299 × 210 mm) recommended in two recent reports (Ministry of Health, 1965; Scottish Health Services Council, 1967). The form is a 'no-carbon-required' combined request and report form. It consists of two sheets of paper with identical printing, glued together by a thin strip along the top margin. The top sheet can be torn off along the line of perforations $\frac{1}{4}$ inch (6 mm) below the top edge. Just below the line of perforations, the top copy has a strip of transfer tape across the back, which peels off to expose an adhesive surface which is used to stick the form onto the mount page in the case notes. Subsequent forms are added in shingle fashion, from below upwards on the mount page.

The paper is coloured to identify the various kinds of laboratory report forms. As recommended in the Scottish Health Services Council report (1967), bacteriology is blue, chemical