Reliability and Modification of Sickledex Test*

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THE Sickledex test (a tube test for hemoglobin-S) has been tested by a number of investigators.[1, 2] Sickledex test[3] (Ortho Diagnostics, Raritan, N.J.) is a proprietary preparation which detects hemoglobin-S by precipitation. This test is simple, rapid, and the results are generally reliable; but it is expensive, and this may be prohibitive to its application for large numbers in routine screening. The ingredients of this test have not been given by the producer.

There is an increasing demand by the public and the clinician that black persons should be screened for sickle cell hemoglobin prior to surgery or at the time of routine clinic visits.

During the past 18 months we have screened 522 children and adults for hemoglobin-S by means of the Sickledex test. Hemoglobin electrophoretic analysis of hemolyzate using cellulose acetate strips were also carried out simultaneously.

Out of 522 cases screened, we have encountered the following two cases of false positive Sickledex tests (Table 1).

TABLE 1.—RESULTS BY ELECTROPHORESIS OF POSITIVE SICKLEDEX SCREENING

Number of Patients Screened	*Hemoglobin Types by Electrophoresis*	*Positive Sickledex Tests*
45	SA	45
14	SS	14
1	SC	1
3	AC	0
1	S-Thal	1
458	A	2
Total 522	—	63

CASE REPORTS

A 14-year-old black female, who has severe microcytic hypochromic anemia with chronic renal failure, pyelonephritis and renal hyperparathyroidism, had a hemoglobin of 4.2 gm.%. The packed cell volume was 11%. The peripheral blood smear showed marked poikilocytosis, anisocytosis and polychromasia as well as fragmented erythrocytes.

The second patient was an 8-month-old black female with pneumonia who had microcytic hypochromic anemia. Her hemoglobin was 7.6 gm.%, and her packed cell volume was 17%. Her peripheral blood smear revealed hypochromia and poikilocytosis and anisocytosis.

DISCUSSION

In both cases, Sickledex tests were positive, and the hemoglobin electrophoretic mobilities were consistent with hemoglobin-A. In the latter case there was a small amount of hemoglobin-F along with hemoglobin-A.

At the time, a preliminary report of this observation was presented to the Tennessee Blood Club meeting in October 1971. We were told that similar erroneous positive Sickledex tests had been observed by others.[4, 5] It appears that either polycythemic or markedly anemic specimens tend to cause false positive tests. Diggs[2] pointed out that cases of plasma cell myeloma, macroglobulinemia, and cryoglobulinemia may cause false positive tests and that an increase in concentration of globulin in the whole blood shows a tendency to flocculation rather than homogenous dispersion in the test tube. Kraus[4] indicated that the presence of diminished amounts of hemoglobin-S, as in newborn infants, may also result in erroneously negative tests. We have observed that an increased concentration of cholesterol as high as 620 mg.% in children with idiopathic nephrotic syndrome, failed to produce false positive results.

We have made the following modification on the Sickledex test reagents according to the procedure which was described by Ortho Diagnostics:

In addition, 0.2 ml. of 4 M. urea solution was added to the above test system. After standing about one half hour at room temperature, there is a formation of a band of erythrocyte-gel, overlying a mildly, yellow-brown colored, clear fluid. The thickness of the band appears

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asymptomatic patients. Israel[5] has reported a trial of daily prednisone therapy in a small number of patients with disease restricted to the mediastinal and hilar nodes, and has found preliminary evidence that therapy in these early localized cases may minimize dissemination and progression. One of the major concerns in these initial studies was a reluctance to use prednisone and accept its attendant side effects in asymptomatic patients with "a disease from which a majority will recover without treatment." [5] The use of alternate-day prednisone should permit a controlled study to be undertaken with fewer side effects.

SUMMARY

Treatment of patients with sarcoidosis was initiated with alternate-day prednisone. Responses were generally favorable. Five patients had complete regression of disease, two had excellent responses, and three had only slight regression. Side effects of alternate-day prednisone were minimal, with weight gain and slight facial rounding being the primary manifestations of toxicity. Thus, it is the opinion of the authors that the patient with uncomplicated sarcoidosis who requires therapy can be started directly on alternate-day prednisone.

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to be proportionally related to the amount of hemoglobin-S present in the test samples. Blood from individuals with homozygous hemoglobin-S showed at least twice the thickness of the band formed by those of individuals with homozygous hemoglobin-A. Heterozygous hemoglobin-S states in association with other types of hemoglobins (SC, SA, S-Thal) formed a band of intermediate thickness.

Huntsman and associates[6] recently reported that centrifugation of their tube test method also showed an improvement in differential diagnostic capability. It was gratifying to note that they have given details of the test reagents.

SUMMARY

The Sickledex test and hemoglobin electrophoresis by means of cellulose acetate strip have been used for screening of 522 individuals for hemoglobin-S.

Two individuals have shown false positive Sickledex test results. Both of these patients had marked anisocytosis and poikilocytosis associated with microcytic hypochromic anemia.

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