A BANTU FAMILY WITH HEREDITARY SPHEROCYTOSIS

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Although hereditary spherocytosis is best known as a disease affecting people of European origin, it is not confined to any particular race. The disease has been reported by Salah[1] in Egyptians and by Stransky[2] in the Phillipines. Kline and Holman[3] reported 6 cases in an American Negro family, and stated that up to the time of their report only 42 cases had been described in Negroes. There is to our knowledge only 1 recorded Bantu family with hereditary spherocytosis.[4] In view of the apparent rarity of the condition in this racial group, we describe here a further example, where it was possible to examine 13 members of the family.

CASE REPORT

D.M., a Bantu male aged 48, was admitted to hospital in September 1961, complaining of a sharp pain over the left lower lateral side of the chest, of 2 months' duration. With the onset of the pain the passage of dark urine had been noted, but the colour of the stool was normal. He had noticed 'yellowness' of the eyes. There had been no episodes of fever in the previous 2 months and he had not experienced a similar episode previously. There was no history of leg ulcers. The patient had known of a mass in his left side since the age of about 8, and attributed it to a kick received in that region.

Physical examination showed a slightly malnourished Bantu male with pallor of the conjunctivae. There was a non-tender, hard, notched splenomegaly extending 6 cm. below the costal margin. Neither hepatomegaly nor lymphadenopathy was noted and further examination revealed no abnormalities.

The relevant laboratory data are shown in Tables I and II. The haematologic methods employed were standard.[5] There

TABLE I. HAEMATOLOGICAL FINDINGS

	Before splenectomy	*After splenectomy*
Haemoglobin (G./100 ml.)	10·4	14·8*
Haematocrit (%)	24	42
Spherocytosis	++++	++++
Reticulocytes (%)	9	1
Serum bilirubin (mg./100 ml.)		
Direct	0·2	0·2
Total	2·0	0·4
Malarial parasites were not found		
Antibody tests:		
(*a*) Direct antiglobulin (Coombs') test	— negative	
(*b*) Indirect Coombs' test	— negative	
(*c*) Donath—Landsteiner test	— negative	
(*d*) Cold agglutinins were not present		
Ham's acid-serum test	— negative	
Modified Ide test for syphilis	— negative	
Treponema pallidum immobilization test	— positive	
Schumm's test for intravascular haemolysis	— negative	
Haemoglobin electrophoresis	= Hb A	
Alkali-resistant haemoglobin	= less than 2%	

* Patient was given 3 pints of blood after splenectomy.

was normochromic anaemia with spherocytosis, hyperbilirubinaemia and reticulocytosis. The red-cell osmotic fragility and autohaemolysis were markedly increased both before and after incubation (Table II). The bone-marrow aspirate showed marked erythroid hyperplasia and iron stores were adequate. The urine contained urobilin, but no bilirubin.

Red-cell survival was measured with radioactive chromium. Following labelling and re-injection of the patient's own erythrocytes, the time taken for half the radioactivity to disappear from the blood ($T\frac{1}{2}$ chromium) was 11·5 days (normal 28 $\pm$ 2 days). Mean cell life after correction for elution was 23 days (Fig. 1), and red-cell destruction was thus

TABLE II. RED-CELL OSMOTIC FRAGILITY AND AUTOHAEMOLYSIS, EXPRESSED AS % HAEMOLYSIS

	Osmotic fragility			
	Pre-incubation		*After incubation at 37° C. for 24 hours*	
% NaCl	*Patient*	*Normal range*	*Patient*	*Normal range*
0·85	—	—	47	—
0·75	2	—	62	0—2
0·70	5	—	74	0—9
0·65	6	—	88	0—19
0·60	7	—	92	0—40
0·55	27	—	93	5—70
0·50	95	0—5	95	36—88
0·45	99	5—45	97	54—96
0·40	99	50—90	97	65—100
0·35	100	90—99	97	72—100
0·30	100	97—100	99	80—100
0·25	100	—	100	—
0·20	100	—	100	91—100
0·15	100	—	100	—
0·10	100	—	100	—

	Autohaemolysis			
	24 hours		*48 hours*	
	Patient	*Normal range*	*Patient*	*Normal range*
	2·4	0—0·5	15·4	0·4—3·5

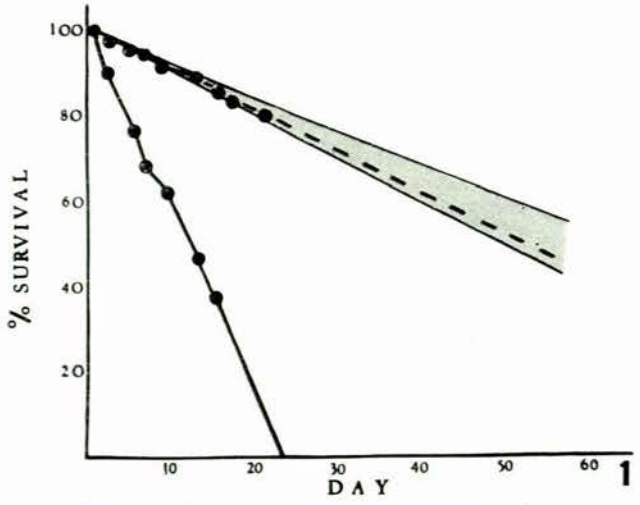

Fig. 1. Red-cell survival (—●—●— = pre-splenectomy; - - ●- - ●- - = post-splenectomy; the shaded area indicates the normal range).

taking place at approximately 5 times the normal rate. The surface counting pattern (Fig. 2) indicated that this excessive destruction was taking place in the spleen.

Splenectomy was then performed. The spleen was enlarged, weighing 625 G. Histological examination showed marked congestion of the red pulp and dilatation of the sinuses with prominence of the sinus-lining cells. Abundant deposition of haemosiderin, both in the red pulp and the fibrous trabeculae and capsule, was present.

The post-splenectomy course was uneventful. The red-cell survival study was repeated (Fig. 1), and the red-cell life-span was now within normal limits ($T\frac{1}{2}$ chromium 29 days; mean cell life 106 days).

Family Study

Including the patient, 13 members of the family were examined (Fig. 3). The patient's mother was alive, he had 4 siblings, 6 children and 1 grandchild. One son, aged 9, had no history of jaundice, but had a hard, painless, non-tender, notched splenomegaly 2 cm. below the costal margin as well as a hepatomegaly 2 cm. below the costal margin. Numerous spherocytes were present in the peripheral blood and the serum bilirubin was 1·6 mg. per 100 ml., the direct reacting fraction being 0·2 mg. per 100 ml.

The only other affected member was another son, who gave a history of 'yellowness' about 1 year before examination, the episode lasting about 2 weeks. On examination there was a hard, non-tender, notched splenomegaly 2 cm. below the costal margin, but no hepatomegaly. Numerous spherocytes were present in the peripheral blood and the total serum bilirubin was 1·4 mg. per 100 ml., the direct reacting fraction being 0·2 mg. per 100 ml. There was no history of jaundice in any other members of the family; their spleens were not palpable, and spherocytes were not detected in the peripheral blood.

DISCUSSION

There can be no doubt that the Bantu family described represents an example of hereditary spherocytosis. All the

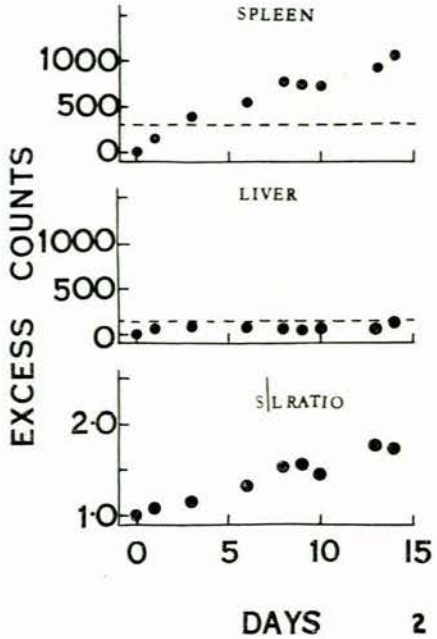

Fig. 2. Surface counting pattern. The dotted lines indicate the upper limit of normal. There is marked accumulation of radioactivity over the spleen, and a rise in the spleen/liver ratio.

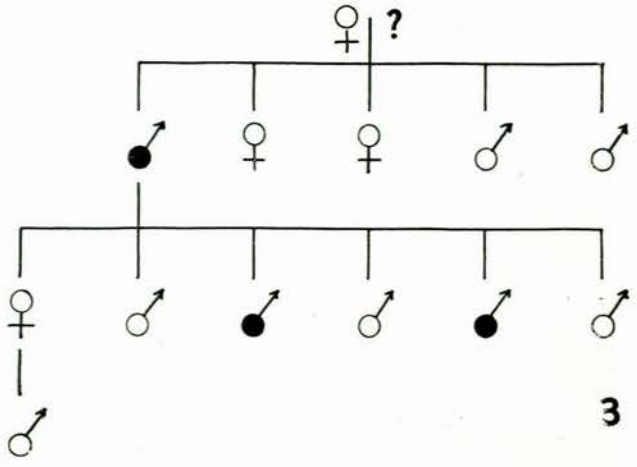

Fig. 3. Family study of the 13 subjects examined. Closed circles = affected members. Open circles = unaffected members.

clinical and haematologic criteria (splenomegaly, spherocytosis, reticulocytosis, hyperbilirubinaemia, increased osmotic fragility and autohaemolysis, and increased splenic sequestration of red cells with response to splenectomy) were present, and the hereditary nature of the disease was demonstrated. The difficulty in obtaining corroborative familial evidence in Bantu patients may exaggerate the apparent rarity of hereditary spherocytosis in this group. Thus the Bantu cases of haemolytic anaemia reported by Merskey and Baskind,[6] and Gon,[7] may well be examples of hereditary spherocytosis were it possible to establish the hereditary nature of the condition.

Hereditary spherocytosis is a form of haemolytic anaemia most amenable to treatment, in that splenectomy is almost invariably followed by restoration of the erythrocyte life-span to normal. In the present case, radioactive chromium studies demonstrated excessive splenic sequestration of erythrocytes and return to normal life-span after splenectomy. The association of splenomegaly and anaemia is common in the Bantu, and the possibility of hereditary spherocytosis should be considered. There are unfortunately no pathognomonic haematologic features of the disease, and the diagnosis is proved unequivocally only by the demonstration of other affected members of the family who, in the Bantu, are often not available for examination.

It is suggested that the association of splenomegaly with anaemia, reticulocytosis, hyperbilirubinaemia, conspicuous spherocytosis, markedly increased osmotic fragility and autohaemolysis, and negative Coombs' test, is sufficient indication for splenectomy. Much information of diagnostic value may be obtained from the blood smear; the spherocytosis which may occur in acquired haemolytic anaemia is usually associated with red-cell fragmentation and/or autoagglutination, features that are not usually prominent in hereditary spherocytosis.

The inheritance of the disorder follows a Mendelian dominant pattern, although there is a deficiency in the expected number of affected siblings,[8] a fact demonstrated in the present family.

SUMMARY

A Bantu family, in which 3 members have hereditary spherocytosis, is described.

The difficulties of establishing the diagnosis of the disease in the Bantu are discussed.

It is suggested that the association of anaemia and splenomegaly with hyperbilirubinaemia, reticulocytosis, conspicuous spherocytosis without fragmentation or autoagglutination, and markedly increased osmotic fragility and autohaemolysis, is sufficient indication for splenectomy.

The apparent rarity of hereditary spherocytosis in the Bantu is noted, as well as the deficiency in the expected number of affected siblings.

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