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SALISBURY : RHODESIA

The Problem of Exact Diagnosis of Anaemia in the African

A STUDY IN A MEDICAL UNIT IN RHODESIA

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This study was undertaken to determine the causes of a moderately severe anaemia i.e. a haemoglobin level of 9,5 G/100 ml. (65 per cent.) or less in the cases admitted to the University Medical Unit of Harare Hospital in 1970. It was similar in many respects to a previous investigation made in the same unit in 1968 (Gelfand).

Patients and Procedure

Patients are admitted to the Medical Unit from the ages of 7 onwards. The majority of patients were from Rhodesia although a fair number originated from Malawi and Mocambique.

All patients had on admission a haemoglobin and red cell count and packed cell volume estimation as well as the cytology of the peripheral blood cell and differential count. Specimens of urine and stool were examined for parasites. In those patients suspected of having malaria, thick as well as thin films were prepared and examined. When indicated, bone marrow biopsies were performed.

The total number of discharges and deaths from the unit was 1410 and of these 127 had a haemoglobin level of less than 9,5 gms. G/100 ml or 65 per cent. (normal range 14,5 gm per cent — W.H.O. 1958 Techn. Rep. Series). The majority had a haemoglobin of less than 7 G/100 ml (50 per cent.).

Of the 127 cases 80 were male and 47 female. The reason for the greater male preponderance is that in general there are more male admissions than female. During the year there were 963 males and 447 females admitted.

It was difficult to determine the number in this series who resided permanently in rural areas and those in towns; as in many cases patients from rural areas give the address of a relative or friend with whom they had been residing prior to admission. More than 69 (54 per cent.) of the cases gave their present address as rural.

Results

Table I gives the types of anaemia according to the blood picture.

Table I

Types of Anaemia in the Series of 127 Cases.

Hypochromic	84
Megaloblastic	7
Haemolytic	10
Aplastic	3
Leukaemia and Others	6
Macrocytic Hypochromic	2
Unknown	19

Hypochromic Anaemias.

From Table I it can be seen that the majority (66 per cent.) were of the iron deficiency type with a hypochromic picture.

Megaloblastic Anaemias

There were seven patients (5 per cent.) with megaloblastic anaemia. Four of them were due to folic acid deficiency related to pregnancy. Of the others one had a vitamin B_{12} deficiency due to malabsorption. This patient was a 50 year old female who was found to have on jejunal biopsy, villous atrophy. The third patient was also female and 60 years old. A first attempt at jejunal biopsy was unsuccessful and she refused a second attempt. Faecal fats and xylose absorption studies were normal.

Haemolytic Anaemia

There were 10 patients (8 per cent.) with haemolytic anaemia. Four patients presented with sickle cell anaemia. One patient was a known case having first presented at the age of five. The other three presented at a later age, 12, 22 and 24 years respectively. Bell and Gelfand (1971) found the average age at which patients presented to hospital was 5,75 years. Electrophonetic studies showed three to be homozygous S/S. (In the fourth no record was found). None of these patients had malaria and their average haemoglobin level was 6 gms 9/100 ml. Of the other patients with haemolytic anaemia, two had malaria, two typhoid fever, one chronic idiopathic haemolytic anaemia, one acute haemolytic anaemia the cause of which was not determined. This patient responded well to blood transfusion and steroids.

Aplastic Anaemia.

Three patients suffered with aplastic anaemia. No history of drug taking was noted in them. One patient had tuberculous lymph-adenopathy but in the other no other disorder was found.

Myeloproliferative disorders

Of the myeloproliferative disorders, one had acute lymphoblastic leukaemia, two had chronic myeloid leukaemia and two lymphadenoma.

Table II

CONDITIONS TO WHICH THE ANAEMIA WAS ATTRIBUTED.

Malaria	20	
Sickle Cell Anaemia	4	
Typhoid Fever	12	
Renal Disease	19	
Chronic Renal failure		10
Acute renal failure		3
Nephrotic Syndrome		3
Glomerulonephritis		1
Hydronephrosis		2
Blood Loss	16	
Duodenal ulcer		4
Oesophageal varices		4
Epistaxis		2
Non specific proctitis		1
Pregnancy (Antepartum haemorrhage		1
Fibroid (menorrhagia)		3
Liver Disease	16	
Cirrhosis		7
Hepatoma		3
Bilharzial fibrosis		5
Haemosiderosis		1
Chronic Infection	7	
Pulmonary T.B.		4
Lung Abcess		2
Emphysema		1
Miscellaneous	33	
Rheumatic fever		6
Subacute bacterial endocarditis		1
Rheumatoid Arthritis		1
Scurvy		1
Protein malnutrition		2
Arthritis		1
Carcinoma of stomach		1
Anaemia associated with parasitic infestations as incidental finding *only*		20

Table III

ACUTE MALARIA — PERIOD OF OCCURRENCE IN 20 CASES.

Month	*Number*
January	1
February	6
March	6
April	4
May	0
June	1
July, August, September	0
October	1
November	0
December	1

Acute Malaria.

From Table II it can be seen that 20 (16 per cent.) patients suffered from malaria. In all cases *P. falciparum* was found in the blood slide. In 16 cases the parasite was the main cause of the anaemia. In four, the patients also had typhoid fever. From Table III it is noted that most of the cases appeared in the malarial season i.e. between December and May (Gelfand, 1968). There were two exceptions, one each in June and October.

Typhoid Fever.

The significance of typhoid fever in the causation of anaemia is not clear (Wicks *et al.* 1971). In this series of 12 patients, four had malaria also while another had bilharzial cirrhosis of the liver with viable *S. mansoni* in the faeces. The mean haemoglobin level in this group was 7,5 gm. Two of the 12 patients developed acute haemolytic anaemia, one of whom was dialysed three times for acute renal failure.

Bilharziasis.

Bilharziasis was present in 29 patients (24 per cent.): of these 17 were found to have *S. mansoni* in their stool and 12 *S. haematobium* in their urine. Four of these had both species present. What part this parasite plays in the causation of anaemia is not known. Forsyth (1970) found that S. *haematobium* could not be incriminated as a cause of anaemia. However, in cases with heavy infestation much blood can be lost in the urine. (Mahmood, 1966).

Hookworm Disease.

Hookworm infestation was found in 10 patients (8 per cent.) As this disease is only found in its mild form in Rhodesia it does not appear to be a major cause of anaemia. (Gelfand and Warburton, 1967), Gelfand and Garnett (1965). In contrast to Nigeria and Uganda where the hookworm load is heavy.

Anaemia from blood loss.

There were 16 patients (13 per cent.) in this group; four had duodenal ulcers and in a fifth patient a tentative diagnosis of peptic ulcer was made, but was not proven. Another patient bled from non specific proctitis. In two there was severe epistaxis with hypertension. Both required blood transfusion. Excessive bleeding from fibroids was found in two, another had an abortion, and a final patient presented four weeks post partum with a history of having had excessive post partum haemorrhage.

Liver disease.

The association between liver disease and anaemia is probably far more important in Africa, than one is given to understand. However, Gelfand (1968), considers that it is not unimportant. There were 16 patients (13 per cent.) who fell into this group (Table II). Seven had cirrhosis of which four presented with haema-

temesis while three patients had hepatoma. In five there was bilharzial fibrosis of the liver. One patient was diagnosed as having haemosiderosis of the liver.

Nutritional Anaemia.

Nutritional anaemia was not an important cause of severe anaemia. A severe anaemia should make one suspect other causes e.g. tuberculosis rather than a primary nutritional disorder.

One classical case of scurvy presented with a swollen painful left thigh for one week with generalised body weakness. He also showed perifollicular haemorrhage. This patient responded well to vitamin C and a high protein diet.

Renal Disease.

Table II shows a fairly large group 19 (15 per cent) who suffered from renal disease. The most common being renal failure. A hypochromic blood picture was noted in all. The cause of the renal failure could not be determined in the majority of cases. Of three patients one had chronic pyelonephritis, another bilharzial stricture of the ureters, a third, long standing severe hypertension.

A splenomegaly was found in 43 patients (33 per cent.) and in Table IV the conditions associated with it are listed. Malaria was the commonest single cause, accounting for 15 cases. It is worth remarking that usually the spleen is only slightly enlarged, 12 of them being under one or two fingers enlarged. In only one case of malaria was it four fingers enlarged.

There were 82 cases (65 per cent.) for whom a definite cause of the anaemia e.g. blood loss, malaria and renal disease was found (Table II). However, in the remaining 45 cases (35 per cent.) it was difficult to determine the exact cause of the anaemia (Table V). Either the precise history of the anaemia could not be given, or there were more than one causative factor.

CONCLUSIONS FROM STUDY

1. Many patients with anaemia are encountered in whom the exact cause remained uncertain, and for the moment it would appear to be reasonable to refer to this group as having "tropical anaemia". The anaemia may be relieved by haematinics and treatment made according to the blood picture but probably few are cured while a number return.

2. Parasitic disease is an important cause, especially malaria (*P. falciparum*). It is difficult to know the exact significance of hookworm. In Rhodesia it does not play an important part except perhaps as an aggravating factor only. In the case of hepatic bilharziasis from *S. mansoni* a significant effect on the blood may ensue and the grosser forms of haematuria due to *S. haematobium* may equally give rise to anaemia.

3. Liver diseases especially its chronic forms must be considered to be an important cause of anaemia (Gelfand, 1968).

Table IV

TOTAL NUMBER OF CASES WITH SPLENOMEGALY — (43).

Up to one finger	2 fingers	3 fingers	4 fingers	5 fingers and greater
Malaria 6	Malaria 6	Malaria 2	Malaria + Bilharzia } 1	Chronic Myeloid Leukaemia 2
			Idiopathic haemolytic anaemia 1	
Typhoid 6	Sub-acute Bacterial Endocarditis 1			
Cirrhosis + Bilharzial Fibrosis } 5	Rheumatic heart disease 1	Bilharzia 2 Septicaemia 1		
Ca Liver with cirrhosis 1				
Bilharzia 4				
Megaloblastic anaemia 1				
Unknown 3				

Table V

List of the 45 cases in whom it was not possible to be certain of the relationship between the severity of the anaemia and the clinical diagnosis.

Rheumatic Fever	5
Pneumonia	6
Urinary Tract Infection	6
Dysentery	7
Tuberculosis Pulm. T.B. (healed lesions)	4
Idiopathic (no cause)	3
Intestinal Bilharziasis and Bilharzial Fibrosis	4
Trypanosomiasis (mild)	1
South African tick bite fever	1
Infertility	1
P.M.O.	2
Encephalitis	1
Peripheral Neuritis	1
Arthritis	1
Isolated Bladder Palsy	1
Abdominal Cyst	1
	45

4. Of the haemolytic anaemias, malaria is important. Sickle cell anaemia is not unimportant in certain regions of Rhodesia. A glucose-6-phosphate deficiency might account for some of the cases with acute haemolytic anaemia.

5. Megaloblastic anaemia is not as common as we anticipated. This may be due to the growing and improving maternity services in the country. Malabsorption is possibly not found infrequently but we could not demonstrate a definite case of tropical sprue. In this series there was no case of pernicious anaemia. Even though no determination of the biossay of B_{12} is done in this unit, we are finding it not easy to determine the cause of a megaloblastic anaemia. A jejunal biopsy may reveal even severe changes in the villi or even their absence and yet there may be no altered fat content of the stool. A number of reports from Africa, notably Nigeria and from S. Africa, refer to the occurrence of tropical sprue in the African, and Dr. David Clain has demonstrated what he has considered to be this type of steatorrhoea in the African living in these parts.

6. Where the source of the blood loss is known the cause of the hypochromasia is not difficult to follow but not uncommonly the reason for the iron deficiency eludes us. Iron deficiency anaemia is said to be rare in South Africa among the Bantu because of the high frequency of siderosis in the population there. In Rhodesia siderosis is equally common but chronic iron anaemia appears to be not uncommon. According to Buchanan those who might develop this form of anaemia in the African population are those 20 per cent. or so of the population who do not develop any degree of siderosis. (Buchanan, 1966). It would appear true at any rate that a hypochromic anaemia developing in a person with hepatic siderosis must be an extremely rare event.

7. The lymphoreticular diseases must always be borne in mind.

8. Malnutrition like parasitic disease is probably more important than the study shows. Further work may reveal that the deficiencies in protein, vitamins especially in B_{12} and folic acid and iron, play a bigger role than we believe.

9. Chronic renal disease is an important cause of anaemia.

In 1968 Gelfand published the results of a similar study in his medical unit. What is interesting is that the findings in the present survey are similar to the earlier one. At that time acute malaria was an important cause of anaemia, but in many cases, as in the present study the exact cause remains obscure. It is for this type of case, that the term "African tropical anaemia" should apply. It might well be there are more than one factor responsible for its development such as poor nutrition and parasitic infestations. As in the previous study difficulty was experienced in explaining the exact cause of some of the cases found to have a hypochromic or megaloblastic anaemia. Chronic liver disease, so common in the African population, would appear to be responsible for a moderate or severe anaemia.

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