The Incidence of Leukaemia in the Rhodesian African — A Five Year Hospital Survey

BY

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Leukaemia was first recognized as a distinctive disease only 128 years ago, but the past few decades have seen changes in its incidence. Most statistics indicate that the disease is increasing and that this increase is real and not due solely to its more accurate recognition. The most striking change is seen in the age incidence and it has been reported that the acute forms of the disease are now more common among the old than the young. These observations have been made in western countries. Reports of leukaemia from Africa have become available only in recent years and although it is generally agreed that the incidence of leukaemia is lower in Africans than in whites, it would appear that the disease is not as uncommon in Africa as was once believed.

This paper reports the incidence of leukaemia in the Rhodesian African according to type, age, sex and tribe.

Patients and Materials

The subjects of this study are patients with leukaemia who were discharged (or died) from Harare Central Hospital, Salisbury, during the five year period from July, 1967 to June, 1972.

Harare Hospital is an African hospital with 1 063 beds which admits patients from the Salisbury urban area (approximately 52 per cent. of admissions) and also from the peri-urban area and rural areas (approximately 48 per cent. of admissions). It is the principal referral centre for 3 million Africans living in the northern part of the country.

The subdivision of the type of leukaemia has been made primarily on the cytological appearances of peripheral blood and bone marrow.

Results

Ninety-five patients with leukaemia were discharged (or died) from the hospital in the five year period of this study. During this time 93 841 patients were discharged from the hospital giving an incidence of leukaemia of 1,01 per 1 000 of hospital discharges.

Figures 1 and 2 show the age, sex, type of leukaemia found in 95 Rhodesian Africans.

Incidence of leukaemia according to type

Acute leukaemia	46 cases	(48,4% of all cases)
Chronic leukaemia	49 cases	(51,6% of all cases)

Subdivision of acute cases

	No.	*% of all acute cases*
Acute (Undifferentiated)	11	23,9
Acute lymphoblastic	14	30,4
Acute myeloblastic	16	34,8
Acute promyelocytic	4	8,7
Acute monocytic	1	2,2
Total	46	100,0

Subdivision of chronic cases

	No.	*% of all cases*
Chronic myelocytic	33	34,7
Chronic lymphocytic	16	16,8
Total	49	—

Included among the chronic myelocytic cases is one case of megakaryocytic leukaemia.

Age Incidence

The age referred to is the age at the time of initial diagnosis, that is, on first admission to hospital.

The ages for acute leukaemias range from three months to 65 years with a mean age of 21,8 years, and with a peak incidence in the 10-14 year age group. The mean age for acute lymphoblastic leukaemia was 20,0 yeors and for acute myeloblastic 22,2 years.

Chronic myelocytic cases range from 12 to 80 years with a pronounced peak between 30 and 39 and a mean age of 38,6 years.

Chronic lymphocytic cases range from 30 to 66 years with a mean age of 51,9 years.

Sex incidence

	Cases		*Ratio*	*% Male*
	Male	*Female*	*M:F*	
All types of leukaemia	64	31	2,1:1	67,4
Acute	30	16	1,9:1	65,2
Chronic myelocytic	23	10	2,3:1	69,7
Chronic lymphocytic	11	5	2,2:1	68,8

Tribal incidence

On admission to hospital all patients were asked their country of origin and their tribe. It will be seen from the results shown in Table I that 29 patients, although resident in Rhodesia, were born in neighbouring countries.

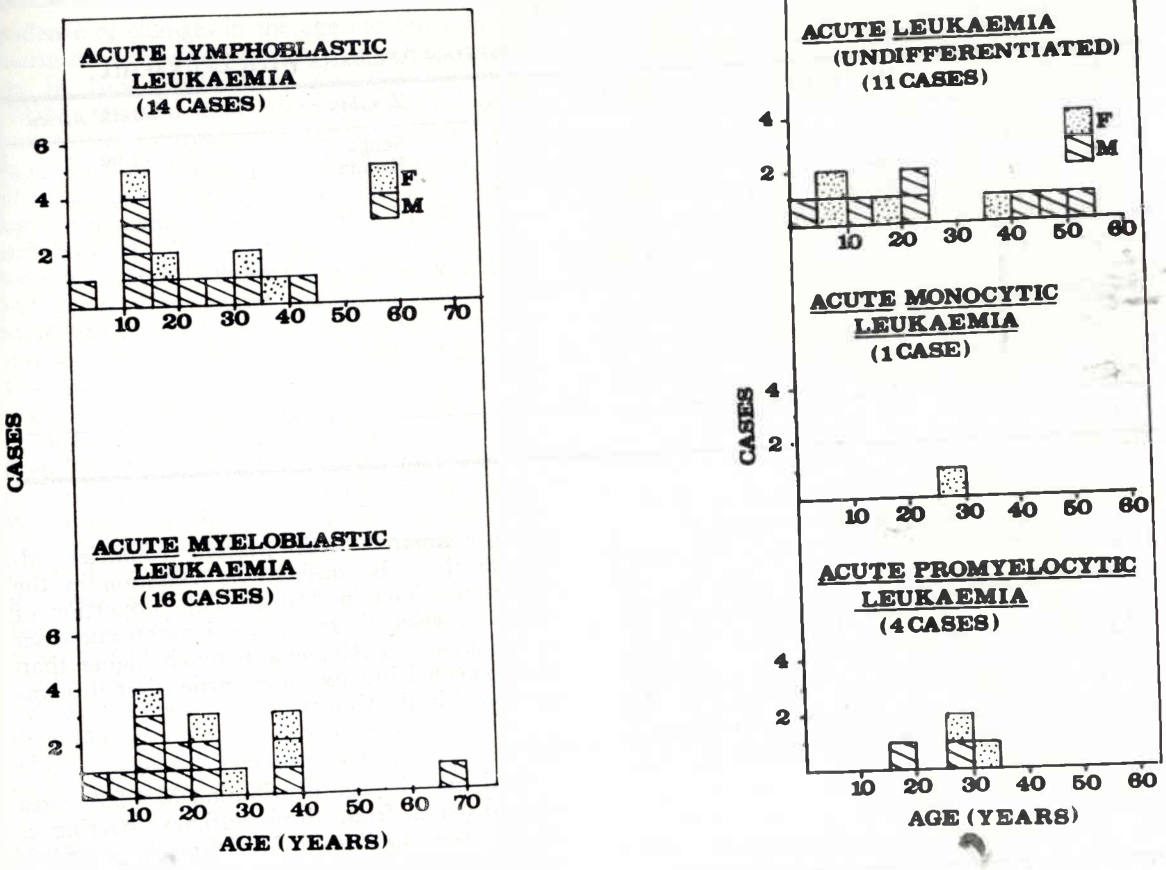

Fig. 1.—Age, Sex and Type in 46 Rhodesian Africans.

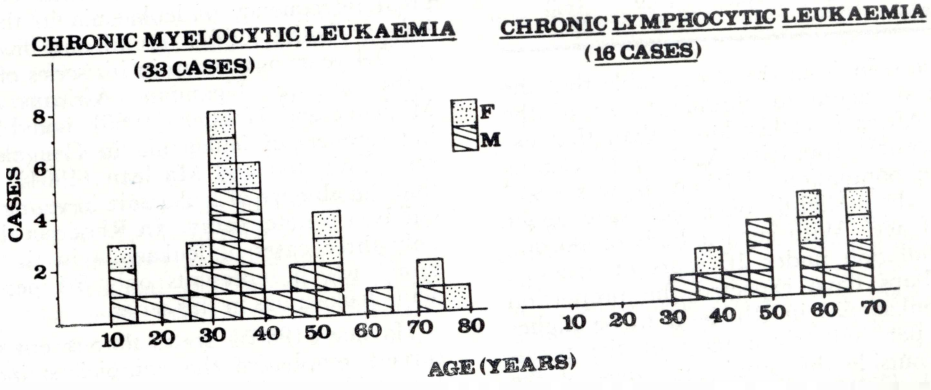

Fig. 2.—Chronic Leukaemia. Age, Sex and Type in 49 Rhodesian Africans.

Table I.

COUNTRY OF ORIGIN AND TRIBE OF 95 RHODESIAN AFRICANS WITH LEUKAEMIA

Rhodesia		*Mocambique*		*Malawi*		*Zambia*		*South Africa*	
Zezuru	31	Sena	3	Chewa	6	Senga	1	Sutho	1
Karanga	11	Chikunda	2	Ngoni	5	Kunda	1		
Maungwe	6	Tawara	1	Manganja	2				
Budya	5	Ndau	1	Nyanja	2				
Korekore	3			Lomwe	1				
Manyika	2			Chawa	1				
Mwesa	2			Tumbuku	1				
Rozvi	1			Unknown	1				
Changani	1								
Tawara	1								
Njanja	1								
Ndebele	1								
Ndau	1								
TOTAL	66		7		19		2		1

Discussion

Type

Dameshek and Gunz (1964a) state that in most western countries about 60 per cent. of all leukaemias are acute, 20 per cent. chronic myelocytic and 20 per cent. chronic lymphocytic. A comparison of these figures with the present study and those obtained in Uganda and in the Congo is shown in Table II.

Table II.

(Expressed as percentages)

	Western countries (Dameshek and Gunz 1964)	Uganda (Lothe 1967)	Congo (Sonnet et al. 1966)	Rhodesia (present series)
Acute	60	52,3	54,3	48,4
Chronic myelocytic	20	29,5	20,0	34,7
Chronic lymphocytic	20	18,2	25,9	16,8
No. of cases	—	88	35	95

It will be seen from the above table that the proportion of acute to chronic forms of the disease in Africa is rather lower than that expected in western countries. At the 1969 Census the African population of Rhodesia was 4,947 million of whom slightly over half were under 16 years of age. With such a high proportion of the population under 16 years of age one would perhaps have expected the proportion of acute leukaemias in Rhodesia to be higher than 48,4 per cent. since most of the population are outside the usual age range of the chronic forms. The incidence of the chronic myelocytic variety is generally higher in Africa when compared with western countries, although there is considerable variation in the figures obtained in Africa. The proportion of chronic myelocytic to chronic lymphocytic cases in Uganda and Rhodesia is much higher than that expected in western countries, but this was not found in the Congo.

Age

Analysing the age distribution of 1 539 cases of leukaemia from three authors covering a period from 1917 to 1951, Wintrobe (1961a) concludes that leukaemia occurs more often in the first five years of life than at almost any other period. There is no record of there ever having been a high incidence of leukaemia in African children under five years of age. On the contrary, published reports from Africa emphasize the rarity of leukaemia in this age group. Gelfand (1967) commented on the great infrequency of leukaemia in the African infant. Lothe (1967) found only five cases in the 0-4 years age group in his series of 46 acute cases among Ugandan Africans. Sonnet, Michaux and Hekster (1966) noted the striking rareness of leukaemia in Congolese children. Edington and Maclean (1964) remarked that the absence of leukaemia in young Nigerian children is noteworthy. In Rhodesia there were only three cases of leukaemia in the 0-4 year group which represents only 6,5 per cent. of acute leukaemias in this series.

Hayhoe (1960a) states that recent statistical surveys emphasize the conspicious increase in the incidence of leukaemia in the older as contrasted with the younger age groups. Dameshek and Gunz (1964b) remark that there is good

evidence of changes in the age incidence in the course of successive decades. An extensive survey in New Zealand by Gunz and Hough (1956) revealed that 46 per cent. of acute leukaemias occurred over the age of 50, and they noted an abrupt rise in the death rate from all leukaemias after the age of 50. This changing age incidence is also recorded by Windeyer and Stewart (1952a) from 359 cases of leukaemia at the Middlesex Hospital between 1931 and 1949. They found the mean age for all acute leukaemias to be 22,2 years which closely agrees with the Rhodesian mean of 21,8 years. The mean age for their acute myeloblastic cases was 38,8 years and Gauld, Innes and Robson (1953) obtained a mean age of 38,9 from 70 cases in Scotland, which contrasts with a mean of 22,2 years found in Rhodesia. Windeyer and Stewart (1952b) found that most of their acute lymphoblastic cases occurred in children under 10 years of age, whereas in Rhodesia all cases except one were over 10. Jeffrey and Gelfand (1972) observed that acute lymphoblastic leukaemia is not uncommon in the adult Rhodesian African. Gauld *et al.* (1953) obtained a mean age of 20,4 years from their 144 cases of acute lymphoblastic leukaemia which is in close agreement with the Rhodesian mean of 20,2 years.

Early published reports from western countries were in agreement on the age incidence of chronic myelocytic leukaemia. For example, Minot, Buckman and Isaacs (1924) found a maximum number of cases between 30 and 39, and at a later date Rosenthal and Harris (1935) also encountered a maximum number of cases between 30 and 39 years. In Rhodesia a peak incidence between 30 and 39 was also found, with a mean age of 38,6 years. The findings in other parts of Africa are similar. Sonnet *et al.* (1966) found a mean age of 37 in the Congolese. Lothe (1967) does not state mean ages for his Ugandan patients but most of them were between 20 and 39 years old. Statistics published more recently from western countries emphasize a shift in the age incidence of chronic myelocytic leukaemia to the older age groups. Gaul *et al.* (1953) in their survey of 169 cases of chronic myelocytic leukaemia in Scotland between 1938 and 1951 noted the mean age to be 49,8 years. Windeyer and Stewart (1952c) found the mean age 45,7 years in their 149 cases from the Middlesex Hospital with this type of the disease. This changing age incidence is well documented by Cooke (1954) who analysed leukaemia cases from the Vital Statistics of the U.S. over a 20 year period (1930-1949).

Although this age shift in chronic myelocytic leukaemia is apparent in the U.S., New Zealand, England, Scotland and other western countries, there is no evidence, from statistics over the past decade, that these higher mean ages exist in Africa.

It will be noted in Figure 2 that three children under 15 years of age suffered from chronic myelocytic leukaemia, whilst there were 16 acute forms in children. This percentage of 18,7 of chronic cases in children is so greatly in excess of the oft reported 1 per cent. - 5 per cent. that it must be considered of questionable significance. These three cases of chronic myelocytic leukaemia in children were the subject of a separate report (Lowe, 1971).

It is generally accepted that chronic lymphocytic leukaemia occurs at significantly greater ages than does any other type. Early reports from Ward (1917) and Minot and Isaacs (1924) determine the decade with the highest incident to be 45 - 54 years. The more recent work of Gauld *et al.* (1953) found the highest incidence to be between 60 and 69 with a mean of 61,5 years. Windeyer and Stewart (1952d) obtained a mean of 55,0 years. Gunz and Hough (1956) state that 95 per cent. of their chronic lymphocytic cases were over 50 and 81 per cent. over 60 years. These findings again indicate a shift to the older age groups for this type of leukaemia. African age incidences for chronic lymphocytic leukaemia, although a little lower than the more recent statistics mentioned above, are somewhat similar. Ugandans showed a peak incidence between 55 and 59 (Lothe, 1967), and in Rhodesians there were two small peaks of 55 and 59, and 65 and 69. The mean age in the Congolese was 56 years (Sonnet *et al.* 1966) and the mean age in Rhodesians was 51,9 years.

Sex

In this series there is a very definite male predominance with a M:F ratio of approximately 2:1 for all types of leukaemia. Lothe (1967) obtained a ratio of 1,7:1 in Uganda and he commented that this was higher than was generally found elsewhere. Sonnet *et al.* (1966) found a M:F ratio of 2,4:1 in the Congo and they also commented on this male predominance of leukaemia among Africans. Reports from western countries are in close agreement with the male predominance seen in chronic lymphocytic leukaemia. Most M:F ratios are about 2:1 and available figures from Africa

show similar ratios. However, the pronounced male predominance in acute leukaemia found in Africa is not seen in western countries which generally show one of lesser degree. Wintrobe (1961b) commented on a change in the sex ratio among cases of chronic myelocytic leukaemia between 1910 and 1948 and said that the preponderance of males has almost disappeared. This is not the case in Rhodesia where there is a very high male preponderance. However, Lothe (1967) found the ratio in Uganda to be in agreement with those found in Europe. A comparison of sex ratios is shown in Table III.

Table III.

A Comparison of M:F Sex Ratios of Leukaemic Patients

	England & Wales (Court Brown & Doll 1959)	Scotland (Gauld *et al.* 1953)	England (Windeyer & Stewart 1952)	Uganda (Lothe 1967)	Congo (Sonnet *et al.* 1966)	Rhodesia (Present series)
Acute	1,4	1,1	1,3	2,1	—	1,9
C.M.L.	1,2	0,9	1,1	1,2	—	2,3
C.L.L.	2,0	1,7	2,0	1,7	—	2,2
All types	—	1,2	1,4	1,7	2,4	2,1

The ratios for all types of leukaemia are substantially higher in Uganda, the Congo and Rhodesia than those reported from Europe. The high Rhodesian ratios cannot be explained on a population basis since at the 1969 Census the M:F ratio of Rhodesian Africans was 1,013:1.

Tribe

The tribal distribution (Table I) shows no predilection for any single tribe. The distribution of cases is approximately proportional to the size of the tribe and to its proximity to Salisbury.

Summary

The incidence of leukaemia in 95 Rhodesian Africans is reported according to type, age, sex and tribe. Comparisons are made with data from western countries and from other parts of Africa.

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