THE INCIDENCE OF CERTAIN STRAINS OF E. COLI, SHIGELLA AND SALMONELLA IN KWASHIORKOR IN THE PRETORIA AREA

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Although many cases of kwashiorkor present with diarrhoea, in a previous investigation[1] of 180 cases only 13 Shigella or Salmonella were isolated. Others[2] have also encountered gastro-entestinal upsets in a large proportion of cases and have been no more successful in isolating recognized pathogens.

It is by no means certain whether the diarrhoea in these cases must be considered a precipitating factor, or whether it is merely a common feature of the disease. Gopalan[2] has given suggestive proof of the causative role of infective diarrhoea by showing that in the South of India the peak incidence of kwashiorkor follows the fly and infective diarrhoea season regularly by a period of 1-2 months.

Because of our failure to isolate intestinal pathogens in more than a small fraction of cases, and in view of our finding 'pathogenic' *E. coli* in about 40% of cases of gastro-enteritis in this area during the summer months,[3] it was decided to investigate the incidence of these organisms in cases of kwashiorkor.

MATERIAL AND METHODS

Rectal swabs were obtained from 106 cases of kwashiorkor and 69 control cases during the summer months of October 1955—April 1956. Apart from 19 cases which were admitted to the wards, the patients were seen in the Out-patient Department, where the swab were obtained. Most of the cases presented with a short history of illness and diarrhoea, and appeared to be mildly affected. The swabs from the 69 control cases were also obtained in the Out-patient Department, from non-kwashiorkor patients with no symptoms referable to the gastro-intestinal tract.

The age-incidence of both groups was between 6 months and 4 years. A second swab was obtained at an interval of 7 days from the 19 admission cases.

According to the history obtained from the mother more than half the kwashiorkor cases had diarrhoea for periods varying from days to months. The difference in the concept of normal bowel action between the Bantu and European makes this history completely unreliable.

The methods of obtaining rectal swabs, delivery to the laboratory, and subsequent bacteriological investigation were precisely the same as in the previous investigation.[3] Apart from the recognized intestinal pathogens (Salmonella and Shigella) the presence of *E. coli* strains 026B6, 055B5, 086B7, 0111B4, 119B? and 128B12 were specifically investigated.

RESULTS

Table I represents the incidence of organisms isolated in the kwashiorkor and control groups and shows that

TABLE I—ORGANISMS ISOLATED

Organisms	*Kwashiorkor Cases* (106)	*Control Cases* (69)
E. coli:		
026B6	6	2
055B5	0	0
086B7	2	2
0111B4	3	3
0119B?	0	4
0128B12	10	1
Salmonella:		
typhi-murium	4	0
paratyphi C		2
Shigella:		
flexneri		
Type 2..	2	1
Type 3..	2	0
boydi Type	1	0
Total	30	15
% Cases in which organisms isolated	28·3%	21·7%

there is no significant difference in the 2 groups as determined by the normal distribution test. The results of the repeat swabs are set out in Table II, and show

TABLE II—REPEAT SWABS OF ADMISSIONS

Case No.	*Organisms present on admission*	*Organisms present after 7 days*
1	086B7	Negative
2	Negative	,,
3	026B6	,,
4	Negative	,,
5	0128B12	,,
6	Negative	,,
7	,,	,,
8	Shigella boydi 2	,,
9	0128B12	,,
10	Shigella flexneri 2	,,
11	S. typhi-murium	,,
12	Negative	Shigella flexneri 3
13	S. typhi-murium	Negative
14	Negative	,,
15	0128B12	,,
16	Negative	0119B?
17	,,	Negative
18	,,	,,
19	,,	,,

that in the majority of cases the organisms initially present were not isolated on the second occassion. These patients were all on sulphadiazine and penicillin therapy for the entire interval period. Two possible ward infections are illustrated in cases 12 and 16.

SUMMARY AND CONCLUSIONS

The majority of kwashiorkor cases have diarrhoea and it is tempting to think that the debilitating effect of a bout of diarrhoea has at least a precipitating effect on the disease. The patients usually presented with a short history of diarrhoea and the chances of detecting pathogens were thus possibly optimal.[4] Despite this, our results indicate no significant difference in the incidence of *E. coli* strains, Salmonella and Shigella organisms in cases of kwashiorkor and a control group of patients. The *E. coli* strains searched for in this investigation are by no means proved pathogens in the gastro-intestinal tract but, assuming that they are, an infective cause for the diarrhoea was found in only 28% of the cases of kwashiorkor.

From this limited investigation it thus appears unlikely that *E. coli* and other pathogens play an important causative role in the diarrhoea of kwashiorkor.

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