The Epidemiology of Tropical Sprue


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Tropical Sprue is a name which means different things to different people. It may perhaps best be defined as a primary malabsorption syndrome occurring among people resident in the tropics. As such it is usually associated with steatorrhea, and other evidence of small intestinal dysfunction such as defective absorption of glucose, xylose, vitamin B₁₂, folic acid and other nutrients, together with radiological changes in the small intestine. It is important to realise that tropical sprue so defined is probably a syndrome of multiple aetiology, and not a single disease entity. In some parts of the tropics primary malabsorption may be due to gluten induced enteropathy but in South India the local population do not eat wheat or wheat products and therefore this possibility can be excluded. At least two other groups may be distinguished—what we have called “endemic sprue” which occurs sporadically and which has been present in South India for many years, and is of unknown aetiology. The other group may be defined as “epidemic sprue” which may well be caused by an infective agent. Whether or not epidemic and endemic sprue are the same or different diseases has yet to be demonstrated.

Epidemics of tropical sprue have occurred in India in the past. Stefanini (1948) reported one among Italian prisoners of war and Walters (1947) and Avery (1948) in British and Indian troops in North India and Burma during the 2nd world war. In Madras State, South India, there have been at least 3 epidemics of chronic diarrhoea of unknown aetiology occurring in the past 30 years. There is evidence to suggest that these epidemics resembled tropical sprue but they were not recognized as such at the time of their occurrence.

We have recently had the opportunity to study a large epidemic of tropical sprue which occurred in North and South Arcot districts
of Madras State beginning in September 1960. The region affected is South West of Madras City and covers an area of approximately 4000 square miles being about 40 miles from east to west and 100 miles from north to south. The epidemic area is bordered on the west by a range of hills, but on the northern, southern and eastern borders there are no particular geographical features limiting the spread of the epidemic.

The area receives maximum rain from the north east monsoon beginning in September and lasting to early December. In 1960 the rainfall during this period was exceptionally high. The tanks filled and the rivers became swollen and there was a large amount of surface water lying on the ground.

There are no big towns in the area, the vast majority of people are agricultural labourers living in small scattered villages ranging in population from 200 to 1000. The main crops grown are rice, sugar cane, several varieties of grains, groundnuts and some vegetables. The majority of families live in mud huts with thatched roofs, ventilation is poor, the floor is of mud and in the rainy season is usually damp. There is no separate kitchen, the cooking being done in one corner of the house and food is not protected from flies or rats. The surroundings of the houses are frequently dirty and there is no attempt at sanitization.

The staple articles of diet are rice and ragi. Dhal may be used once a day, meat or fish very occasionally and milk and milk products hardly ever. Cooking oil is made from locally grown ground-nuts, either made in the house, or purchased from the local store.

A typical village in this region is that of Padiri where cases of diarrhoea first appeared in early October 1960. Fresh cases continued to occur throughout November and December of 1960 and during January and February of 1961. Among the total population of 361, there were 144 individuals affected and 29 deaths. The time of onset among individuals in one house usually varied; rarely a number of people developed symptoms at the same time, but more usually there was a period varying from about 3 days to 2 months between the time of onset of different cases. It is noteworthy that some houses were exceptionally heavily affected while others were completely free. The highest number of cases occurred among the under 10 age group with another peak in the 30 to 40 age group. However when the incidence is analysed on a percentage basis the incidence increased with increasing age.
An analysis of 921 cases and several thousand unaffected individuals in the same area shows that there is no relation between wealth, diet, food habits, and the presence or absence of intestinal parasites and the incidence of the disease.

The aetiology of tropical sprue is as yet unknown. There are however 3 main theories; (1) that it is caused by a food toxin; (2) that it is a dietary deficiency, and (3) that it is an infective agent. These studies have shown no evidence that the disease is caused by a food toxin or dietary deficiency, since there was no difference between the food eaten by the people who got the disease and those who did not get it, likewise there was no apparent difference between the diet eaten by the affected and unaffected individuals—both were equally poorly nourished. The very wide spread nature of this epidemic; the rapid rate in which it spread over the effected area; the fact that 10% of patients complained of fever at the onset of diarrhoea; and the nature of the spread within the village, all suggest that it may be caused by an infective agent. Cultures of stools specimens and rectal swabs have failed to reveal the presence of any bacterial pathogens. It is therefore thought that this epidemic was caused by an infective agent possibly an entero-virus. Further work is in progress on this problem.

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REFERENCES


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Discussion

J. S. LOGAN (Belfast): The speaker should be congratulated on drawing attention to the occurrence of epidemics of tropical sprue. A very severe epidemic of sprue occurred among Indian troops in the Imphal Plain in the course of the operations in 1944. A remarkable feature was that vegetarian troops (who had not received their usual supplement of milk and milk products) were predominant-
ly affected. Indian troops who had received a little goat meat each week seemed to be protected and were able to remain on duty. The nutritional state of the population involved, therefore, seems important.

A. C. Frazer (Birmingham): a) What was the fat intake of the patients studied in the sprue epidemic? If it was very low, this might affect the incidence of steatorrhea. — b) Was there any difference in incidence of sprue in the different socio-economic groups?

K. Lachenmain (Munich): Did your surviving patients later on show symptoms of a permanent intestinal damage?

S. J. Baker (Vellore) to J. S. Logan: In this epidemic both vegetarians and non-vegetarians were affected. Vegetarians have lower reserves of vitamin B₁₂ and are therefore more likely to become B₁₂ deficient more quickly than non-vegetarians. We were not however able to show any difference between the incidence among different people according to their diet. In fact in some cases those living on a poorer diet had a lower incidence of the disease.

Reply to A. C. Frazer: (a) The incidence of steatorrhea will undoubtedly vary with the fat intake at the time the test is undertaken. In our field study fat balances were carried out with the patients on their ordinary diet which probably contained at most 20–30 grams of fat. Therefore the observed incidence of steatorrhea is probably rather lower than the true incidence.

(b) There were a number of differences in the incidence among different socio-economic groups. All these have not yet been analysed but at least in some villages the poorer community, the Harijans, who live on an extremely poor diet, had a lower incidence of the disease.

Reply to K. Lachenmain: The majority of patients who survived appeared to have recovered completely but there is a small proportion who at the present time are still suffering from the disease. Since there is wide spread evidence of intestinal damage in the general population even among those who do not have sprue (e.g. in biopsy findings) it is impossible to assess the late effects of this epidemic on intestinal function.