of smoking in the various populations could affect birth weight differently from mortality.

Finally, there remains the problem of "causation." Yerushalmy (1964, 1971) suggested that smoking is simply an index of a certain type of mother who also tends to have babies of lower than average birth weight. Some relevant facts emerge from the present data. The finding that a change in maternal smoking habits during pregnancy had the effect of putting the baby into a birth weight and perinatal mortality category associated with the new smoking habits points towards some kind of cause-effect relationship and is not compatible with Yerushalmy's hypothesis. This finding is further strengthened by the birth weight analysis which shows that the diminution in birth weight of the offspring of smoking mothers persists and is indeed little changed when allowance has been made for a number of other social and obstetric mediating factors.

These results would seem to have important implications for health education. If we assume that the difference in perinatal mortality between smokers and non-smokers in the U.K. has remained constant and that at least 30% of women currently smoke regularly after the fourth month of pregnancy, an estimate can be made of the potential saving in newborn lives per year if all these women could be persuaded to stop smoking during pregnancy. With the present (1970) overall live fetal and neonatal mortality rates, this might amount to a saving of approximately 1,500 babies each year in England, Scotland, and Wales. If a campaign were mounted along these lines it should also

be possible to monitor the effects of such a campaign on birth weight and mortality rates, and thus provide a test of the causal hypothesis.

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Possible Role of Malaria in the Aetiology of the Nephrotic Syndrome in Nairobi

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Summary

In a study in Nairobi, Kenya, 30 young adults with nephrotic syndrome were investigated in detail and a further 18 were studied less completely. In no case was evidence found to support a possible role for malaria in the aetiology of the syndrome.

Introduction

The nephrotic syndrome is generally held to be more common in the tropics than in temperate climates. A major reason for this has been thought to be the role of quartan malaria, especially in children (Gilles and Hendrickse, 1963). In Uganda quartan malaria has been implicated as an important aetiological factor in the nephrotic syndrome not only in children but also in adults (Kibukamusoke, Hutt, and Wilks, 1967).

No physician could work in Nairobi for long without being impressed by the number of adults presenting with the nephrotic syndrome. In investigating this syndrome it was thought sensible, in view of the findings in neighbouring Uganda, to consider among other things the possible role of quartan malaria.

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Methods and Subjects

A total of 48 consecutive adult patients with the nephrotic syndrome who were seen by us during a 12-month period at the Kenyatta National Hospital, Nairobi, were included in the study. The diagnosis of the nephrotic syndrome was established by means of the usual criteria (Barr *et al.*, 1972).

The possible role of malaria was investigated in three ways. (1) Detailed histories were taken with special reference to residence in a malarious area and to previous illness suggestive of malaria. (2) Thick and thin blood films taken on 10 separate days were searched for malaria parasites. (3) Malaria antibody titres were estimated by using an indirect fluorescent antibody technique with *Plasmodium falciparum* as antigen. This antigen cross-reacts to some extent with the other forms of human malaria. As a precaution 21 sera were also tested with a *Pl. malariae* antigen. On the same sample of blood serum IgG, IgM, and β_{1C} globulin levels were also measured by standard immunological techniques.

Results

Thirty patients with the nephrotic syndrome were examined fully by these methods. Less comprehensive studies were carried out on the remaining 18 patients. Of the 30 fully investigated patients 22 were female and 8 were male. Their ages ranged from 15 to 39 years, 24 of them being aged between 15 and 25 years.

Histories.—Twenty-two of the fully investigated patients were Kikuyu and lived in the central, higher, non-malarious area of Kenya, though six of these had at some time visited an endemic area. Five came from areas of Kenya where there is seasonal transmission of malaria and three came from areas of endemic

malaria. Sixteen thought that they had never had malaria and 11 that they might have had malaria. Three gave a more definite history of malaria, and of these patients one gave a history of tertian fever and one gave a history of quartan fever.

Blood Films.—Both the thick and the thin films from these patients were invariably negative. Not one parasite was found.

Serology.—The results of the malaria serology were also generally negative. With the *Pl. falciparum* antigen 23 patients had no detectable antibody. Five had minimal titres (20 to 80), and it is notable that these five patients had at some time lived in an area of recognized malaria transmission. The remaining two patients had significant titres—one of 320 and one of 1,280. Both of these patients, one a Luo and the other a M'luhya, had spent long periods in an endemic area. One of these two sera was positive at a titre of 20 when using the *Pl. malariae* antigen, but the other was negative, as were the remaining 19 sera tested with this antigen.

In the group of nephrotics the mean IgG level was 788 mg (range 320-1,920)/100 ml. The mean IgM level was 162 mg (range 62-320)/100 ml. The mean values for a control group of 42 Nairobi nurses were IgG 1,750 mg (range 1,140-3,300)/100 ml and IgM 146 mg (range 28-280)/100 ml. The β_{1C} globulin levels, with a mean of 178 mg (range 56-254)/100 ml, were similar to those of the control group of nurses, who had a mean of 156 mg (range 112-204)/100 ml.

Of the 18 patients with the nephrotic syndrome incompletely investigated none showed evidence of active malaria. No malaria parasites were found on any of the films made, and of the 16 sera that were examined all had negative or insignificant malaria antibody titres. The immunoglobulin patterns were similar to those of the group fully investigated.

Discussion

Historically the first suggestion that quartan malaria might cause a nephrotic syndrome was the demonstration of the co-existence of malaria parasitaemia with the syndrome (Manson-Bahr and Maybury, 1927).

More recently epidemiological and immunological evidence, reviewed by Edington and Gilles (1969), was put forward to support the concept that quartan malaria is causally related to many cases of the nephrotic syndrome in the tropics. In our series the findings were the reverse. Most of the patients came from the high central area of Kenya where quartan malaria is rarely, if ever, seen. Few gave a definite history of any previous illness resembling malaria.

The data from the blood slide examination suggest that malaria is not common in nephrotics in Nairobi. The serological tests also support this contention. The low rates of positive seroreactors contrast markedly with the findings of Kibukamusoke and Voller (1970) in quartan malaria nephrotic syndrome in Uganda.

Both IgG and IgM levels in the nephrotics were appreciably lower than other workers have found in the nephrotic syndrome in Uganda (Kibukamusoke and Voller, 1970) and in a malaria endemic area of Tanzania (Voller, Lelijveld, and Matola, 1971).

It can be concluded that the nephrotic syndrome commonly seen in Nairobi is not usually associated with malaria.

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Nephrotic Syndrome in Adult Africans in Nairobi

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Summary

The adult nephrotic syndrome as met with in Nairobi is predominantly encountered in young sophisticated African women, most of whom began to use skin-lightening creams containing mercury before the symptomatic onset of their illness. The particular form of mercury involved is well known to cause the nephrotic syndrome in other circumstances—for example, when applied to the skin in the treatment of psoriasis. In these circumstances the pathogenetic mechanism is thought to be of an idiosyncratic type. The use of mercury-containing skin-lightening creams in the patients studied

seemed to be particularly associated with a "minimal-change" ("light-negative") renal glomerular lesion, this lesion being present in half of the patients. The prognosis in this group of patients seems remarkably good, with 50% entering remission, 77% of these doing so spontaneously on discontinuing the use of the creams.

Introduction

It has been alleged that *Plasmodium malariae* has been shown to be the cause of the African nephrotic syndrome (Kibukamusoke and Voller, 1970). No association between malaria and the nephrotic syndrome has been demonstrable in Nairobi (Rees *et al.*, 1972). It therefore remained to define the various other aetiologies of this clinical entity in patients presenting to the Kenyatta National Hospital. We gained the impression that most of the adult nephrotics seen at this hospital were young, English-speaking, African women, and it was proposed that one factor which might distinguish this group from other patients was the use of cosmetics, and in particular skin-lightening creams. Subsequent inquiry showed that of the numerous products

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