children raises the possibility of respiratory infection, as previously reported in man and birds. The oocyst is small enough to be carried by dust. Much of the inhaled dust (possibly in the form of dried poultry litter) is undoubtedly cleared from the tracheobronchial mucosa by the cilia. It is then swallowed and enters the gastrointestinal tract. Many families in Bangladesh keep their poultry and cattle within their premises. *Cryptosporidium* was recently detected in 14% of calves with diarrhoea and 1% of calves without diarrhoea at a dairy farm in Bangladesh, as well as in 8.5% of their handlers with diarrhoea. *Cryptosporidium* was not, however, found in healthy people.⁵

We are now carrying out more extensive studies.

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Relation between dentition and dyspeptic disorders

There is a dearth of information relating the state of the teeth to dyspepsia. This study examined a theory that a disproportionately high number of patients with gastric ulcer and gastric cancer were edentulous.

Patients, methods, and results

From a consecutive series of 400 patients undergoing endoscopy 291 patients fell into the four categories of normal endoscopic findings, gastric ulcer, duodenal ulcer, and gastric cancer; their ages and dentition were recorded. By a subsequent questionnaire to 100 of the patients selected at random we determined the chronological relation between total loss of natural teeth and onset of dyspepsia and whether the patients wore dentures at meal times. To investigate the association of each category with dentition, allowing for age, we divided the patients into age groups of five years. Within each group we constructed a contingency table of dyspepsia against dentition. From each of these tables the expected number of patients with dentures within each category of dyspepsia was calculated under the null hypothesis that dentition and disease were unrelated. Finally, we summed the expected numbers of patients with dentures within the categories of dyspepsia over all ages and compared them with the observed numbers. We assessed the significance of the association with a χ^2 test based on the expected and observed numbers in this pooled contingency table.¹

The table shows the use of dentures by the patients in the four categories and their mean ages: lack of natural teeth was commonest among the patients with gastric ulcer and gastric cancer. These patients were also older. When the observed numbers of patients with and without dentures were compared with the expected numbers there was no significant

association between dentition and category of dyspepsia after allowing for age ($\chi^2=3.3$, $df=3$, $0.3 < p < 0.4$).

The chronological relation between onset of dyspepsia and total loss of natural teeth could be clearly defined in 89 patients. Sixty three had lost their teeth before the onset of dyspepsia. This was true for all categories. No difference was found in the duration of dyspepsia before endoscopy between patients with only natural teeth and those with dentures. Only six patients admitted to removing their dentures before a meal.

Comment

There have been few reports in the past 50 years of a relation between diseases of the upper alimentary tract and dentition. In 1929 Hurst and Stewart attributed peptic ulcer of the stomach and duodenum to carious teeth and apical abscesses, based on an increased prevalence of caries in patients with ulcers compared with normal controls²: "sound" teeth were present in 19% of patients with ulcers compared with 48% of controls. These observations have not been confirmed. Draper *et al*, from anthropometric measurements, identified a jaw shape and disposition of teeth that they regarded as being of "ulcer type,"³ but they did not provide any data to substantiate this. Differences in the prevalence of peptic ulcer in various regions of India have been attributed to differences in the demand for mastication by the type of food eaten and in the quantity and content of saliva, but the dental state was not reported.⁴ In a survey of dental health in Scotland 45% of subjects aged 35-54 and 83% of those aged 55 plus had lost all their teeth.⁵ The ratio of full to partial dentures in our patients was 4:1, and 67% had no natural teeth. The theory that most patients with gastric ulcer and gastric cancer are edentulous was confirmed, but this would be expected from their age.

In conclusion, loss of teeth generally precedes dyspepsia and was observed in all clinical categories including patients with normal endoscopic findings. Though lack of teeth may have a role in some cases of dyspepsia, it can be only a minimal one.

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Vascular occlusion and disseminated intravascular coagulation in falciparum malaria

Disseminated intravascular coagulation is the probable cause of the renal, pulmonary, and cerebral complications seen in falciparum but not in benign tertian or quartan malaria,¹ but how the abnormality in coagulation is produced is not known. We suspected that the red blood cells containing parasites might be responsible for initiating disseminated intravascular coagulation in falciparum malaria, and so we compared the procoagulant activity in red blood cells from control patients and from patients infected with *Plasmodium falciparum* and *P vivax*.

Patients, methods, and results

Shortening of the one stage plasma recalcification time of normal plasma was taken as an index of red cell procoagulant activity.² The plasma recalcification time of normal pooled plasma (pool of six samples) obtained on each day of the study was taken as 100% in the calculation of the effect

Cross tabulation of endoscopic findings with dentition in patients with dyspepsia, after allowing for age

		Normal findings (n = 85)	Duodenal ulcer (n = 133)	Gastric ulcer (n = 59)	Gastric cancer (n = 14)
With dentures	Observed	38 (45%)	79 (59%)	46 (78%)	12 (86%)
	Expected	43.9	76.7	41.9	12.4
With only natural teeth	Observed	47	54	13	2
	Expected	41.1	56.3	17.1	1.6
Mean (SD) age (years)		52.0 (17.7)	54.2 (15.1)	62.2 (12.8)	75.2 (12.0)

of adding red blood cells; this excluded the influence of daily variation of the normal plasma recalcification time. The fall in plasma recalcification time after the addition of red blood cells washed three times was expressed as a percentage of the plasma recalcification time of the pooled normal plasma obtained that day—that is:

$$\left(1 - \frac{\text{plasma recalcification time after addition of red blood cells}}{\text{plasma recalcification time of pooled normal plasma}}\right) \times 100\%$$

The greater the percentage the greater the procoagulant activity.

The plasma recalcification time was significantly decreased in the washed, packed red blood cells of patients with falciparum malaria (mean (SD) decrease 44.67 (11.97)%; range 27–78%; n=37) compared with that in normal red blood cells (21.66 (7.50)%; 8–36%; n=38) (p<0.005) and those containing *P. vivax* (26.73 (8.28)%; 15–38%; n=7) (p<0.05) with a similar packed cell volume. The proportion of red blood cells containing parasites ranged from 0.1 to 6.5% in patients with falciparum malaria and from 0.2 to 4.0% in patients with vivax malaria.

Subsequently, red cells containing parasites were separated out from the cells of three patients with falciparum malaria using Percoll gradient (Fine Pharmacia) as recommended.³ The increase in procoagulant activity was found to be limited to the erythrocytes containing parasites (decrease in plasma recalcification time 70–75% in red blood cells containing parasites compared with 10–15% in red blood cells not containing parasites from the same patients). Microscopical examination of the red cells containing parasites showed both ring forms and gametocytes.

Comment

After invading red cells *P. falciparum* may produce certain changes in the lipid distribution across the inner and outer surfaces of the erythrocyte membrane that increase the procoagulant activity.⁴ Whatever the mechanism of increase in procoagulant activity, we believe that red cells containing parasites play an important part in initiating intravascular coagulation, which leads to the blockage of small capillaries and disseminated intravascular coagulation in falciparum malaria.

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Atopy after bone marrow transplantation

Adoptive passive transfer experiments are often performed in animals but for ethical reasons cannot be performed in man. It is feasible, however, for the transfer of lymphocytes in bone marrow transplantation to result in clinical manifestations in the recipient that

have previously manifested in the donor. We believe that the following case may be an example of this.

Case report

A 9 year old boy received a bone marrow transplant in July 1982 for acute common lymphoblastic leukaemia (in third remission) from his 7 year old brother, whose HLA type was identical. The mixed lymphocyte reaction was negative. The procedure was successful and without major complication. Cyclosporin A was used to control graft versus host reactions. His leukaemia remained in full remission, and all treatment was stopped.

The donor had a history of atopy from the age of 4 months, when he first developed atopic eczema. By his first birthday he had developed asthma, rhinitis, and food allergy (angio-oedema and vomiting after eating egg, fish, and baked beans). Later he developed bronchospasm after eating peanuts. The table shows results of a radioallergosorbent test (RAST, Pharmacia, Sweden), performed in July 1984.

The recipient had no history of atopy before transplantation. His total serum IgE concentration was within normal limits when measured by the double antibody assay of Merrett and Pantin (upper limit of normal 200 U/ml),¹ and results of radioallergosorbent tests to three inhalants and seven foods before transplantation were negative (table). In January 1983 he developed symptoms of food allergy, with angio-oedema after eating beans; subsequently he developed angio-oedema after eating fish, bananas, and nuts, and angio-oedema and vomiting after eating egg: he had previously eaten all these foods without problem. His total serum IgE concentration in July 1984 had risen to 910 U/ml, and results of radioallergosorbent tests were positive to two of three inhalants and five of seven foods (table). He did not develop asthma, rhinitis, or atopic eczema.

Comment

Most patients with allergy to foods develop symptoms within the first two years of life, though such allergy may develop after virus infections^{2,3} and during pregnancy,⁴ when immunomodulation may result in "allergic breakthrough."⁵

The donor in this case was atopic and had shown both respiratory and food allergy before 1982. The mother was also atopic with allergic rhinitis. The recipient had had no history of atopy before bone marrow transplantation but subsequently developed clinical manifestations of food allergy and positive results of radioallergosorbent tests to several foods and inhalants. The mechanism of this remains to be elucidated, but the most interesting possibility would implicate adoptive passive transfer from the donor lymphocytes, especially as the food allergies in both boys, and the results of their radioallergosorbent tests, were similar. Other possible causative mechanisms must also be considered. The recipient received cyclosporin A, which is likely to cause considerable immunomodulation, and allergies might result, though this has not previously been described. Alternatively, the recipient could have developed late onset food allergy coincidentally, in view of the family history of atopy (though this is unusual without concomitant eczema or asthma); the timing of events, however, suggests that the development of his allergy was related in some way to his transplant.

No clinically manifest adoptive transfer phenomena have occurred previously after bone marrow transplantation (L Lum, Seattle, bone marrow transplant group, personal communication). Theoretically, though, there is no reason why they should not occur. In our case the food allergy may have been transferred in this way, but it is difficult to prove this.

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Scores obtained on radioallergosorbent testing in recipient and donor

	Total IgE (U/ml)	Test substance									
		Grass pollen	House dust mite	Cat epithelium	Hens' egg	Cows' milk	Cod	Wheat	Peanut	Brazil nut	Crab
Recipient											
June 1982	78	0	0	0	0	0	0	0	0	0	0
July 1984	910	0	3	4	2	2	0	1	3	2	0
Donor											
July 1984	1879	3	4	4	2	2	2	2	3	0	2