inflamed mucosa with no parasites. Sections from the mucosa of ileum and caecum and the rectal biopsy specimen, trypsinsised and stained with antisera to immunoglobulins, kappa and lambda chains, and IgA secretor piece, using the immunoperoxidase method, showed similar numbers and distributions of positive lymphocytes to those in normal controls. Peripheral lymphocyte subpopulations showed normal T- and B-cell proportions with a normal distribution of surface immunoglobulin classes on B cells. T-cell transformation was normal after stimulation by phytohaemagglutinin. Serum

IgG concentrations and complement components C3 and C4 were normal, serum IgA was low (400 mg/l; normal 860-3700 mg/l), IgM low (510 mg/l; normal, 700-3700 mg/l), and IgE raised (205 U/ml using paper radio-immunosorbent test; normal adult mean 122 U/ml).

Comment

The ultrastructure of these organisms was sufficiently distinctive for a diagnosis to be made on morphology alone, and in our case the inflammation within the ileal and caecal mucosa was probably due to the organism. The patient’s immune state, with marginally decreased concentrations of serum IgA and IgM, though not fulfilling any of the recognised criteria for general or selective immune deficiency, suggests an element of unexplained immune paresis. The virus-like particles found in the nucleus and cytoplasm of mucosal epithelial cells by Bird and Smith were not found in our case. Increased awareness of cryptosporidial enterocolitis may increase the frequency of detection of such cases.

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Frequency of swallowing in duodenal ulceration and hiatus hernia

There is wide individual variation in the rate of spontaneous swallowing. In the absence of food up to 5 ml of air accompanies saliva to the stomach with each swallow.1 The air that is not eructated moves further along the gastrointestinal tract, eventually being passed as flatus. Aerophagia may be a cause of functional dyspeptic complaints such as belching or bloating. There are rare reports of massive gastric dilatation and even death.2 Excessive air-swallowing has been reported in some patients with hiatus hernia, peptic ulceration, cholelithiasis, or myocardial ischaemia.3

In the past diagnosis of aerophagia has relied on symptomatology and observation during interview. No attempt has been made to measure the rate of air-swallowing.

Patients, methods, and results

Four groups were studied—namely, 20 patients with duodenal ulceration diagnosed by endoscopy (15 men, mean age 38-6 years); 20 patients with hiatus hernia proved by either endoscopy or radiology (11 men, mean age 45-8 years); 20 dyspepsia-free dermatology outpatients (six men, mean age 35-1 years); and 20 dyspepsia-free hospital staff (13 men, mean age 36-1 years).

The frequency of swallowing was measured simultaneously in two ways. (1) A mercury-loop strain gauge was placed around the neck, resting just above the thyroid cartilage, and the change in circumference of the neck associated with movement of the cartilage during swallowing was recorded as a pen deflection on a polygraph. (2) A throat microphone, lightly held in place by a spring clip, recorded a characteristic noise during swallowing. These methods were validated before the study by comparing subjects' self-reported swallows marked by one observer with the records from the above methods that were interpreted over the same period by another observer, blind to the subject. No discrepancies occurred when both methods were used together.

Staff controls

Dermatology controls

Hiatus hernia

Duodenal ulcer

Rate of swallowing in the four groups. Each point represents one subject.

The subjects were seated alone for 15 minutes in an anechoic chamber. Wearing earphones, they listened for 10 minutes to 26 random one-second 90 dB tones followed by five minutes of silence. The number of spontaneous swallows during the 15 minutes was counted. Skin conductance level and responses were measured during the test. Subsequently, salivary output was measured by weighing dental rolls. Anxiety was rated by use of visual analogues and the Spielberger self-evaluation questionnaire. Statistical significance was assessed by the Mann–Whitney U test.

The figure shows the median swallow count in the healthy controls was not significantly different from that in the dermatology outpatients (2-7
and 2-3 per 15 minutes respectively). Swallowing was significantly more frequent in patients with hiatus hernia and in those with duodenal ulcer than in either control group (13-2 and 9-8 per 15 minutes) (p < 0.0005).

There was no correlation between swallow count and age, sex, salivary output, or anxiety as measured by either skin conductance or the self-report questionnaires.

Comment

Why patients with hiatus hernia or duodenal ulcer swallow excessively is unclear. Possibly the gastrointestinal disease provokes the activity—for example, pain or oesophageal reflux may trigger the act of swallowing. Aerophagia might be an aetiologic factor in upper gastrointestinal disease in some patients. Swallowed air must cause distension, which may contribute to the formation of hiatus hernia. Similarly, distension of the stomach will increase acid output, which may encourage duodenal ulcer formation.

Patients with duodenal ulcer usually have a competent gastro-oesophageal sphincter, and the swallowed air would result in excessive flatus per rectum. Flatus was the main discriminant factor for duodenal ulceration in the computer diagnosis of dyspepsia. Small doses of antacid may produce relief of dyspepsia not by neutralising acid but by their peppermint flavouring, which relaxes the gastro-oesophageal sphincter, facilitating easy eructation.

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Pneumoarthropathy in septic arthritis caused by Streptococcus milleri

Pneumoarthropathy is rarely diagnosed clinically and is an unusual radiological sign, particularly in the absence of joint trauma. Streptococcus milleri is increasingly being recognised as an important pathogen, particularly in abscesses, notably liver abscesses. We describe a case of septic monoarthritis in which a gas-forming organism was implicated by the clinical and radiological findings and later confirmed by bacteriological examination.

Case report

A 53-year-old woman presented to her general practitioner in December 1981 with acute monoarthritis of the right knee. Raised uric acid concentration was noted (9-56 mmol/l), and treatment with non-steroidal anti-inflammatory drugs and allopurinol was started with success. A second acute episode was again treated with non-steroidal anti-inflammatory drugs, and when no response was obtained prednisone 5 mg thrice daily was begun. She became increasingly unwell, developed polydipsia and polyuria, and was referred to hospital with heavy glycosuria, still complaining of a painful, swollen knee.

On admission she was febrile (temperature 38.3°C). Examination of the knee showed soft-tissue crepitus and a large effusion in a tender, hot knee. She was mildly dehydrated clinically, but there were no other clinical signs. Investigations showed blood glucose concentration 17-6 mmol/l (317 mg/100 ml); white cell count 5.7 x 10^9/l with normal distribution; erythrocyte sedimentation rate 134 mm in first hour; uric acid concentration 0-18 mmol/l (3 mg/100 ml); and urea, electrolyte, and haemoglobin concentrations normal. X-ray examination of the knee showed gas shadowing in the suprapatellar bursa and retropatellar space (figure (left)). Aspiration of the joint yielded gas and 30 ml purulent fluid, which on Gram staining showed large numbers of Gram-positive streptococci. Culture grew a pure growth of group F streptococci, identified as S milleri. Treatment with intra-articular and parenteral antibiotics—initially ampicillin, but then penicillin when sensitivity was reported—the knee improved and repeat x-ray examination (figure (right)) showed disappearance of the gas shadow. Her diabetes mellitus required insulin and came under good control.

The joint suffered severe damage secondary to the infection and subsequently had a severely limited range of movement.

Comment

Pneumoarthropathy is rare in septic arthritis but has been reported in anaerobic infections and Gram-negative septic arthritis. S milleri is a microaerophilic Gram-positive streptococcus associated particularly with abscess formation; it has been reported only once before as causing septic arthritis in a patient with pre-existing rheumatoid arthritis in whom no other septic focus was found; pneumoarthropathy was not a feature of this case. Undoubtedly the prior joint damage in our patient and the hyperglycaemia were predisposing factors.

This report emphasises the need to consider septic arthritis in all cases of monoarthritis, particularly in the presence of pre-existing joint disease, and also illustrates a rare but important physical sign.

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