Letters to the Editor

Tightly spiral shaped bacteria in gastric antrum: are they urease positive?

Dent et al recently reported the occurrence of long spiral organisms in the gastric antrum of patients attending for upper gastrointestinal endoscopy.1 Of the 1300 patients biopsied, three were found to be infected with this organism which was not recovered by microaerophilic or anaerobic culture.1

We have observed similar organisms in two of 600 patients attending for endoscopy at Middlemore Hospital over the past 18 months. Five antral biopsy specimens were taken from each patient. Two were sent for histological examination and two for Gram-stained tissue smears and microaerophilic culture. One biopsy specimen was inserted into a CLO-test which detects the urease activity of Campylobacter pylori.2 Forty per cent of patients attending for endoscopy at this hospital are infected with C pylori.3

Large numbers of the tightly spiral shaped bacteria were seen in the Gram stained biopsy smears and histological sections in both patients. C pylori was neither cultured nor seen in the Gram stained biopsy smears of the histological sections. In our hands the above tests are reliable methods for detecting C pylori with sensitivities of 92%, 88%, and 93%, respectively. Both patients were also seronegative for C pylori.4 Both patient's CLO-tests, however, were positive when inspected 24 hours after endoscopy. In the absence of C pylori and because of the large numbers of organisms present we feel the positive urease results were due to this newly recognised organism. This observation differs from that of Dent et al, who did not observe positive urease results in their anaerobic broth method.1 Like Dent et al, we did not recover the organism by microaerophilic methods. One patient was rebiopsied but anaerobic and microaerophilic culture on lysed horse blood agar was unsuccessful. This method has been used by Lee et al to isolate spiral organisms from cat stomach.5

Electron microscopic examination showed the organisms to be similar to the ones reported by Dent et al1 (fig 1). The largest organism was 6·2 μm long, average width was 0·95 μm, with one complete turn of the spiral per 0·95 μm length. The organisms also possess up to 12 sheathed flagella which are attached to the dome end of the cells (fig 2). This arrangement is similar to that seen in the spiral organism in baboon stomachs.6 The human and baboon spirals, however, are morphologically different to the cat spiral isolated by Lee et al5 which possesses regular paired projections along the cell wall.

On the basis of the CLO-test results we predict the human spiral will be urease positive when it is eventually cultured.

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References

Sensitivity of Campylobacter pyloridis to colloidal bismuth subcitrate

Exposure of Campylobacter pyloridis to some antibacterial agents has been shown to lead to the development of resistant strains; to metronidazole in vivo and in vitro,1 and to ofloxacin in vivo.2 Colloidal bismuth subcitrate (CBS, De-Nol) has been used widely in attempts to eradicate C pyloridis from the stomach.3 Thus it is important to determine whether, after treatment with CBS, resistant strains can be found, and also whether exposure of C pyloridis to subinhibitory concentrations of CBS can lead to strains with higher minimum inhibitory concentrations (MICs) to CBS.

A clinical study of 100 people with duodenal ulcer was recently undertaken in our hospital: 50 of the patients took four tablets daily of CBS for eight weeks.1 Endoscopic biopsy specimens were obtained before treatment and two, 16, and 42 weeks after treatment, and culture for C pyloridis was by our standard method.4 C pyloridis was isolated before treatment from all patients, and when CBS treatment had finished, from some patients. To determine MICs of CBS for C pyloridis, the active component of De-Nol,

Fig 1 Spiral bacteria from human stomach, bar = 1 μm.

Fig 2 Domed end of spiral bacteria near origin of tuft of sheathed flagella, bar = 0·25 μm.
CBS, was incorporated in brain heart infusion agar plus 7% horse blood plus 1% IsoVitalex to achieve final concentrations from 0.25–64 mg/l, with appropriate controls. The inoculum was 0.1 ml of an undiluted broth culture shaken for 18 hours. MICs of CBS for C pylori have been found to be 8–32 mg/l by 26 and others.6,7

Fifteen isolates of C pylori obtained from patients unsuccessfully treated with CBS were studied and the MICs were found to be 16–32 mg/l. In a pair of isolates before and after treatment, the MIC of CBS seemed to drop from 32 mg/l to 16 mg/l, but this result is within experimental error. Thus all pairs of isolates showed the same MIC before and after treatment. There was no development of resistance to CBS.

C pylori was also inoculated into liquid medium consisting of brain heart infusion broth plus 10% horse serum plus 0.25% yeast extract with final concentrations of CBS of 4, 8, 16 and 32 mg/l. The broth was shaken overnight in a microaerophilic atmosphere. Subcultures to CBS concentrations twofold higher in each case, up to 16 and 32 mg/l, yielded no growth in the latter concentrations. Thus we were unable to train C pylori to become resistant to bismuth.

These results are encouraging for the clinical use of CBS to treat C pylori, but we have already shown that CBS must be combined with at least one other antibacterial agent to achieve more than 30% eradication of C pylori in the stomach.1 This is probably due to the fact that C pylori can be found deep in mucus glands and would often be sequestered from the intraluminal action of CBS.8

References

Enterotoxin production by strains of Staphylococcus aureus isolated from clinical specimens

Certain strains of Staphylococcus aureus are known to produce different enterotoxins designated as A, B, C, D and F (TSST-1).1 These enterotoxins have an important role in the pathogenesis of staphylococcal infections, mainly in food poisoning outbreaks and in the toxic shock syndrome (TSS). Between 15–50% of the population are carriers of S aureus and 15–20% of the strains are enterotoxigenic.3 The incidence of enterotoxigenic strains depends on clinical origin; they predominate in the cutaneous and nasopharynx region.

Table Enterotoxin production by strains of Staphylococcus aureus isolated from patients

<table>
<thead>
<tr>
<th>Enterotoxin type (%)</th>
<th>Site of isolation</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>AC</th>
<th>AD</th>
<th>BC</th>
<th>BD</th>
<th>BCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>7 (11-1)</td>
<td>17 (26-9)</td>
<td>25 (39-6)</td>
<td>4 (6-3)</td>
<td>6 (6-3)</td>
<td>4 (6-3)</td>
<td>1 (1-5)</td>
<td>1 (1-5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiratory tract</td>
<td>3 (14-2)</td>
<td>7 (33-3)</td>
<td>4 (9-0)</td>
<td>6 (28-5)</td>
<td>1 (1-5)</td>
<td>1 (1-5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood</td>
<td>4 (33-3)</td>
<td>6 (50-0)</td>
<td>2 (16-6)</td>
<td>1 (20-0)</td>
<td>1 (50-0)</td>
<td>1 (100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Urine</td>
<td>1 (25-0)</td>
<td>3 (37-5)</td>
<td>2 (25-0)</td>
<td>3 (60-0)</td>
<td>1 (20-0)</td>
<td></td>
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<tr>
<td>Faeces</td>
<td>1 (50-0)</td>
<td>1 (50-0)</td>
<td>1 (50-0)</td>
<td>1 (50-0)</td>
<td>1 (50-0)</td>
<td></td>
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Total 17 (15-1) 32 (28-5) 32 (28-5) 10 (8-9) 6 (5-4) 5 (4-5) 7 (6-2) 2 (1-8) 1 (0-9)
Sensitivity of Campylobacter pylori to colloidal bismuth subcitrate.
C S Goodwin, B Bell, C McCullough and M Turner

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