

Isolation of *Yersinia enterocolitica* and *Y. intermedia* from fatal cases of diarrhoeal illness in Bangladesh

THOMAS BUTLER, M. ISLAM, M. R. ISLAM, A. K. AZAD, M. I. HUQ, P. SPEELMAN AND S. K. ROY
International Centre for Diarrhoeal Disease Research, GPO Box 128, Dhaka-2, Bangladesh

Summary

From three fatal cases of diarrhoeal illness in Bangladesh, *Yersinia* species were isolated from tissues at post-mortem examination. One patient was infected with *Y. enterocolitica* serotype 0:7, 8 and two patients were infected with *Y. intermedia*. These patients were infected also with other enteric pathogens. These findings suggest that *Yersinia* may be important as pathogens in tropical diarrhoea and as co-pathogens in serious disease.

Introduction

The bacterial species *Yersinia intermedia* has been isolated from tissues and fluids of diseased patients (BOTTONE *et al.*, 1974) but has not been associated with the syndromes of gastroenteritis and mesenteric lymphadenitis that *Y. enterocolitica* can cause. Enteric disease, caused by *Yersinia* infections has been reported only once from the Indian subcontinent (SINGH *et al.*, 1983) and a recent survey for *Yersinia* in Bangladesh gave negative results (SAMADI *et al.*, 1982). The following are the first reports of infection with non-plague *Yersinia* species from Bangladesh.

Case Reports

First case

An eight-month-old girl was admitted with a history of diarrhoea for 20 days. The stools were green and mucoid and passed at a frequency of about four times a day. She was breast fed but became anorectic and lost weight during the illness. At the time of admission she appeared underweight and was seriously ill. The temperature was 36.9°C, respirations 50 per min and blood pressure unobtainable. She was severely dehydrated and administration of intravenous fluid caused a return of the radial pulse. Examination of the stool revealed 50 white blood cells per HPF and the stool culture yielded *Shigella boydii*. She was treated with ampicillin but died after two days in the hospital. At post-mortem examination the entire colon was inflamed and showed small haemorrhagic spots. Microscopically there was denudation of almost the entire colonic mucosal surface, and the lamina propria showed a mixed polymorphonuclear and mononuclear infiltration. The terminal ileum showed also acute inflammation with focal ulcerations. The mesenteric lymph nodes were enlarged to 0.8 cm and the spleen showed congestion of the red pulp with an area of recent infarction. Post-mortem cultures of the large bowel contents grew *S. boydii* and of the small bowel contents and spleen *Y. enterocolitica* which belonged to serotype 0:7, 8.

Second case

A four-year-old girl was brought to the hospital with complaints of fever, cough and diarrhoea. Seven days before admission she developed fever which was continuous and persisted to the time of admission. Two days later she developed a non-productive cough

with rapid respirations and noted at the same time the onset of diarrhoea consisting of four to six mucoid, liquid bowel movements every day. She was grossly undernourished with a body weight of 7.2 kg. She had a temperature of 40.3°C, pulse rate 140 per min and respiratory rate 60 per min. Rales were audible over both lungs and the liver was palpable 3 cm below the right costal margin. The chest X-ray showed infiltrates in all lobes of the lungs with lucent areas suggesting cavitation. The sputum smear showed a predominance of Gram-negative rods and a culture yielded *Klebsiella* species and *Proteus* species. The blood culture was negative. After seven days of treatment with ampicillin and gentamicin the patient died. At post-mortem examination the lungs showed large areas of consolidation studded with small abscesses. Microscopically there was suppurative bronchopneumonia with abscess formation. The intestine contained 69 adult *Ascaris lumbricoides*. The post-mortem lung culture grew *Pseudomonas* species and *Proteus* species and the blood culture *Yersinia intermedia* and also *E. coli*, *Klebsiella* species, and *Proteus* species.

Third case

A 30-year-old man presented with a two-week history of fever that was most marked in the evenings and of diarrhoea consisting of dark liquid stools about five times a day. The temperature was 39.6°C, pulse rate 138 per min, and respiratory rate 40 per min. The liver and spleen were palpable. The blood culture yielded growth of *Salmonella typhi*. Treatment was started with chloramphenicol but he died after three days with bleeding per rectum, thrombocytopenia and continuing fever. At post-mortem examination the distal ileum showed raised patches of soft, friable necrotic and haemorrhagic mucosa measuring up to 6 cm in diameter. The colon contained many scattered deep and shallow ulcers up to 1.5 cm in diameter. The spleen was enlarged (430 g) and the mesenteric and paracolic lymph nodes were enlarged up to 2 cm in length. Microscopically the ileal mucosa was necrotic with ulceration and showed infiltration by mononuclear leucocytes extending up to the muscularis. The Peyer's patches were hyperplastic in the areas of ulceration. The colonic ulcers were flask-shaped. Mesenteric lymph nodes showed reactive hyperplasia and typhoid nodules. The spleen

showed congestion of the red pulp and patchy necrosis. The post-mortem culture of a mesenteric lymph node grew both *S. typhi* and *Y. intermedia*.

Discussion

These isolates were identified as genus *Yersinia* by showing positive reactions for urease, indole, methyl red, motility at 22°C but not at 37°C, and acid production from sucrose. The *Y. intermedia* isolates produced acid also from rhamnose, raffinose, melibiose and alphanethyl-glucoside, whereas the *Y. enterocolitica* isolate did not. No plasmid DNA was detected by agarose gel electrophoresis in these *Yersinia* isolates (KAY *et al.*, 1982).

This is the first reported isolation of *Y. intermedia* from tissues of fatal cases of enteric disease and the first documented cases of non-plague *Yersinia* infection from Bangladesh. The only other case of *Y. enterocolitica* infection reported from the Indian sub-continent was an infant with non-fatal diarrhoea from Delhi, India, who was infected with serotype 0:9 (SINGH *et al.*, 1983). The pathogenicity of *Y. enterocolitica* has been established by its association with epidemics of diarrhoea and abdominal pain and confirmed by animal models and *in vitro* tests of virulence (KAY *et al.*, 1982). Although the pathogenicity of *Y. intermedia* has not yet been firmly established, some strains isolated from man penetrated mammalian cells in tissue culture (KAY *et al.*, 1983). Our finding of *Yersinia* in mixed infections, in one case with *Shigella*, in one case with other Enterobacteriaceae in blood, and in one case with *S. typhi* in a mesenteric lymph node, suggests that these

organisms could be either co-pathogens or secondary invaders in the setting of established infection. Further work will be required to determine the importance of *Yersinia* infections in tropical diarrhoeal disease syndromes.

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