Clostridium difficile and acute enterocolitis

E H PRICE,* V M WRIGHT,† J A WALKER-SMITH,‡ AND S TABAQCHALI§

*Departments of Microbiology, †Surgery, and ‡Child Health, Queen Elizabeth Hospital for Children, London, and §Department of Microbiology, St Bartholomew’s Hospital Medical College, London

SUMMARY Clostridium difficile belonging to groups not normally detected in infancy was the only potential pathogen detected in the stools of two infants with severe enterocolitis. Further information regarding the virulence of this organism was obtained by use of a recently introduced typing scheme.

Clostridium difficile is not usually considered to be of clinical importance in stool specimens from infants because this organism can also be found as part of their normal gut flora. In adults, C difficile is rarely isolated from normal faecal specimens and its overgrowth with production of toxin, secondary to antibiotic treatment, can result in the development of pseudomembranous colitis. In infancy there are only occasional reports of this condition. The
The introduction of typing schemes for *C. difficile* has provided evidence for the existence of different types of this organism with variable virulence. The two infants described below presented with severe enterocolitis and *C. difficile* was the only potential pathogen found. It was possible to place the *C. difficile* isolates into two unusual groups, not commonly found in young infants. This was established by the use of the typing scheme primarily used for epidemiological purposes, based on the incorporation of sulphur-35-labelled methionine into the cell proteins and their separation by gel electrophoresis.

**Case reports**

**Case 1.** A 2 month old girl was referred from another hospital with a two day history of refusing feeds and 24 hour history of profuse non-bloody diarrhoea with one episode of vomiting. She was lethargic and tachypnoeic with a temperature of 40°C. No medicines had been given before the symptoms began but she had been started on benzylpenicillin and gentamicin at the referring hospital after the development of a noticeably distended abdomen.

Biochemical investigations gave normal results for urea and electrolytes. Her haemoglobin concentration was 95 g/l, white cell count 4-4×10⁹/l, and platelets normal. A barium study showed no evidence of malrotation. There was no growth from blood culture, and cerebrospinal fluid showed no cells and no growth. Culture of her stools gave negative results for campylobacter, enteropathogenic *Escherichia coli*, salmonella, and shigella species. Five representative *E. coli* cultures from the stool were sent to Dr B Rowe at the Enteric Reference Laboratory, Colindale and these were identified as *E. coli* 013 (a non-enteropathogenic serotype) which did not produce heat stable or labile toxin, or verotoxin. No viruses were seen on electron microscopy or grown from faecal samples. Serology for *Yersinia enterocolitica* and *pseudotuberculosis* did not show raised titres. *C. difficile* was grown from the infant’s stools and was shown to be highly toxicogenic for both the cytotoxin and the enterotoxin and further typing showed that it belonged to group X. Cytotoxin was also detected directly from the stool specimen.

Over the next 24 hours the child’s haemoglobin dropped to 78 g/l and an emergency laparotomy was carried out. Intravenous metronidazole was added to the antibiotic treatment preoperatively. Large quantities of clear yellow peritoneal fluid were found but no organisms were seen on Gram stain and no growth was obtained from culture. Dilated loops of ileum were noted and the distal half of the ileum was oedematous with the terminal 2 cm appearing to be bruised. No evidence of appendicitis or intussusception was found. The patient’s condition improved dramatically after the operation. She was maintained on antibiotics and her diarrhoea diminished gradually over the next few days.

**Case 2.** A 3 week old girl was admitted with a 24 hour history of profuse watery, offensive, but non-bloody diarrhoea. She had no history of vomiting. Four days before admission she had been given an anticholinergic drug, pipenzolate bromide, which was initially prescribed at twice the normal dose for her age and weight. This was given at double the prescribed dose by her parents and the diarrhoea had started 24 hours after stopping this drug.

Biochemical investigations gave normal results for urea and electrolytes. Her haemoglobin was 143 g/l, white cell count 20-5×10⁹/l, neutrophils 28%, platelets 25 000×10⁹/l. There was no growth from blood culture, and cerebrospinal fluid showed no cells and no growth. Numerous stool cultures gave negative results for enteropathogenic *E. coli*, salmonella, shigella, and campylobacter species. No antibodies were detected against *yersinia* species and no stool viruses were seen on electron microscopy or grown from tissue culture. *C. difficile* was cultured from stool specimens and its cytotoxin was also identified directly from one stool. The organism was a potent producer of enterotoxin and cytotoxin and further typing showed that it belonged to group W.

Thirty six hours after admission the child developed abdominal distension. Moderate gaseous distension of large and small bowel was noted with occasional fluid levels apparent. She was given intravenous benzylpenicillin, gentamicin and metronidazole, and oral feeding was completely stopped. Her abdominal wall became distended and oedematous; she passed blood in her stools and ‘coffee ground’ fluid was aspirated through her nasogastric tube. Her white cell count rose to 38 000×10⁹/l (47% neutrophils) and bowel sounds could not be heard. She was given nine days total parenteral nutrition; her general condition slowly improved and the diarrhoea gradually stopped.

**Discussion**

Both these infants were seriously ill and none of the pathogens normally associated with diarrhoea in infancy were found. Neither of the children had been given antibiotics before onset of symptoms but one of them had been given an inappropriate dose of an anticholinergic drug. The advisibility of giving
infants drugs that may interfere with gut motility and indirectly influence the composition of the gut flora should be questioned.

The renal function in both infants remained normal and excluded haemolytic uraemic syndrome. E coli isolates from one of the infant's stools were further investigated for production of toxins, including verotoxin, but these were not detected. Neither child had a colonoscopy performed and biopsy specimens for histological examination were therefore not available.

One of the infants had group X C difficile identified and the organism was a potent producer of both enterotoxin and cytotoxin. This group has caused an outbreak of antibiotic associated colitis in patients on oncology wards. The other infant had a highly toxigenic group W C difficile identified—the usual groups found in newborn infants are A–D. Group W has been isolated from an adult with pseudomembranous colitis (unpublished data) and this organism was also found to be a high producer of toxins A and B.

It seems probable that C difficile had clinical importance in these two infants. Both children appeared to respond to treatment with intravenous antibiotics, including metronidazole, which is effective against the organism. Possible pathogenic significance of C difficile in the gut of infants with severe enterocolitis should not be discounted on the basis that this organism may also be found in stools of normal children in this age group. The use of typing schemes, often used for epidemiological purposes, may help elucidate the potential pathogenic role of C difficile in individual patients and also determine whether specific antimicrobial treatment should be urgently instituted.

References

Correspondence to Dr EH Price, Department of Microbiology, Queen Elizabeth Hospital for Children, Hackney Road, London E2 8PS.

Accepted 10 February 1988

AIDS encephalopathy with response to treatment

J MATTHES,* L A WALKER,† J G WATSON,* AND A G BIRD†

Departments of *Paediatrics and †Immunology, Newcastle General Hospital, Newcastle upon Tyne

SUMMARY A 3 year old boy who had acquired HIV infection transplacentally developed the classical features of AIDS encephalopathy, spastic diplegia and expressive aphasia. His computed tomogram showed cerebral atrophy. Treatment with zidovudine and weekly infusions of gammaglobulin led to considerable clinical improvement and an almost normal computed tomogram nine weeks later.

A boy was identified as HIV antibody positive at the age of 21 months after his mother presented and died of pneumonia due to Pneumocystis carinii. She was HIV antibody positive and had received two units of blood after the birth of her first child. The source of her infection remains unclear. The first child is well at age 6 and has no detectable HIV antibody. Our patient, the second child, is thought to have acquired HIV transplacentally.

The boy was born after a full term normal delivery, birth weight 3150 g, and he received all conventional immunisations, including measles, without problem. His head circumference, weight, and length had grown along the 50th, 10th, and 10th centiles, respectively. His development was normal, and he had been walking normally since age 13 months and, aged 21 months, was starting to join words. The only clinical abnormality was moderate inguinal lymphadenopathy.

Initial investigation showed normal T lymphocyte subsets (fig 1) and a normal number of T helper cells. He had a grossly raised IgG (37 g/l) concentration but no IgG virus antibodies (including measles
Clostridium difficile and acute enterocolitis.

E H Price, V M Wright, J A Walker-Smith and S Tabaqchali

Arch Dis Child 1988 63: 543-545
doi: 10.1136/adc.63.5.543

Updated information and services can be found at:
http://adc.bmj.com/content/63/5/543

Email alerting service

These include:
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/