Bloody diarrhoea: a case of *Escherischia coli* 0157:H-

Karl Bettelheim
Victorian Infectious Diseases Research Laboratory
North Melbourne Vic 3051

Stephen Graves
PathCare
Consulting Pathologists Pty Ltd
Geelong Vic 3220

Geoffrey Harrison
General Practitioner
Geelong Vic 3220

Diane Lightfoot
Microbiological Diagnostic Unit
University of Melbourne
Parkville Vic 3052

A recent edition of *Microbiology Australia* contained two articles on Shiga toxin-producing strains of *Escherichia coli* (STEC)[1,2]. We wish to contribute to the debate on diagnosing these infections by describing a recent case from Geelong, Victoria, which was detected by faecal culture on washed sheep blood agar (WSBA).

A 68-year-old woman presented to her general practitioner in Geelong with a 1-day history of fever, bleeding per rectum and abdominal discomfort. A faecal specimen was sent for microbiological analysis, along with full blood examination, liver function tests and blood cultures. The patient's previous bowel habit had been normal and there had been no recent antibiotic usage or known contact with infective gastroenteritis. Her background medical history included two angioplasties, gastroscopy, open cholecystectomy and appendectomy.

Laboratory test results revealed anaemia consistent with blood loss (Hb 110 g/L: normal range 115-165), normal white cell count, including normal neutrophil count but a lymphopaenia (lymphocytes 0.8 x 10^9/L: normal range 1.0-4.0). Inflammatory markers were raised, with an ESR of 46 mm/L (normal range <20) and a CRP of 81 mg/L (normal range <10). The liver function tests showed a reduced protein of 55 g/L (normal range 60-80) and a reduced albumin of 28 g/L (normal range 32-50). Blood cultures were negative.

The faeces were liquid and microscopic examination showed numerous polymorphs and erythrocytes. No parasites were seen and no *Salmonella*, *Shigella* or *Campylobacter* species grown.

The microbiology laboratory of PathCare Pty Ltd had recently introduced a protocol for routine detection of STEC in faecal specimens. Undertaken on faeces containing polymorphs and erythrocytes and from which no other bacterial pathogens are grown, it involves plating the faecal specimen onto WSBA (Oxoid) and observing the presence of enterohaemolysin producing *E. coli* after 4 and 24 hours of culture at 37°C.

The presence of haemolytic colonies at 4 hours is considered to be non-specific, while the presence of haemolytic colonies of *E. coli* at 24 hours correlates strongly with the synthesis of shiga-like toxin by the *E. coli*[3].

Such strains of *E. coli* are known by the following synonyms:

- STEC – shiga-toxin producing *E. coli*;
- VTEC – vero-toxic *E. coli*;
- EHEC – enterohaemorrhagic *E. coli*.

The faecal specimen from the patient yielded enterohaemolysin-producing colonies on WSBA and they were identified as *E. coli*, serotype 0157:H- (non-motile).

Testing by vero cell assay[4] and enzyme linked immunosorbent assay[5] demonstrated the production of Shiga-like toxin-1 (SLT-1); SLT-2 was not produced. When the E. *coli* was phage-typed[6] it was shown to belong to phage-type 4, which is known to occur in Victoria.

On a worldwide basis STEC are generally serotype 0157:H7, although in Australia other serotypes have been more common; for example, 0111:H-[7]. A range of clinical conditions may result from infection with such bacteria, including haemolytic uraemic syndrome, haemorrhagic colitis and bloody diarrhoea.

Most outbreaks of STEC infection have occurred in children, although the Scottish epidemic in 1996 involved elderly patients such as ours[8]. The source of the patient's STEC was not determined. Her asymptomatic husband's faeces were negative for *E. coli* 0157 and other recognised pathogens; however, *E. coli* 087: H16 (SLT-2 positive and enterohaemolysin positive) was isolated.

From this case it can be concluded that episodic incidents of STEC infection do occur in our community, with diagnosis possible using one extra agar plate (WSBA, Oxoid) for faecal culture. Access to a reference laboratory for confirmation that the isolate is an STEC strain is advantageous. When there has been greater experience with this new medium it may be possible to diagnose STEC infections directly in the routine diagnostic microbiology laboratory, by means of a simple culture technique.

Acknowledgments

Rory Wilby, environmental officer with the Department of Human Services, investigated this case, while it was scientists from PathCare, Microbiology who processed the original faecal specimens.

References

1. Robbins-Browne RM (1997) *Microbiol Aust* 18 (5):8-9.
2. Beers M & Lanser J (1997) *Microbiol Aust* 18 (5):16-17.
3. Bettelheim KA (1995) *J App Bact* 79:178-80.
4. Konowalchuk J, Speirs JL & Stavric S (1997) *Infect Immun* 18:775-79.
5. Acheson DW, Keusch GT, Lightowers M & Donohue-Rolfe A (1990) *J Infect Dis* 127:1145-50.
6. Khakhria R, Duck D & LiorH (1990) *Epidemiol Infect* 105:511-20.
7. Goldwater PN & Bettelheim KA (1995) *Comm Dis Intell* 19:2-4.
8. Liddel KG (1997) *Lancet* 349 (9050): 502-03.