

Please read this bit first

The HPCSA and the Med Tech Society have confirmed that this clinical case study, plus your routine review of your EQA reports from Thistle QA, should be documented as a "Journal Club" activity. This means that you must record those attending for CEU purposes. Thistle will **not** issue a certificate to cover these activities, nor send out "correct" answers to the CEU questions at the end of this case study.

The Thistle QA CEU No is: **MT00025**.

Each attendee should claim **THREE** CEU points for completing this Quality Control Journal Club exercise, and retain a copy of the relevant Thistle QA Participation Certificate as proof of registration on a Thistle QA EQA.

Cycle 20 Organism 12:

Enteropathogenic E. coli

Description of the pathogen

The genus *Escherichia* is a member of the family *Enterobacteriaceae*. Members of the family *Enterobacteriaceae* are Gram-negative, non-spore-forming, facultative anaerobes that ferment glucose and other sugars, reduce nitrate to nitrite, and produce catalase but do not produce oxidase. Most are motile by means of peritrichous flagella. *Escherichia* species are positive for Methyl red, and indole tests, as well as lysine decarboxylase¹.

There are five species of this genus: *E. coli*, *E. fergusonii*, *E. hermannii*, *E. blattiae* and *E. vulneris*¹.

Clinical manifestations

Of the five *Escherichia* species, *E. coli* is the species usually isolated from human specimens. They are part of the bowel flora of healthy individuals, however, certain strains may cause intestinal and extra-intestinal infections in immunocompromised as well as healthy individuals. Urinary tract infections, bacteraemia, meningitis, and diarrhoeal disease are the most frequent infections caused by *E. coli*¹.

E. coli causing diarrhoea

There are at least four categories of recognized diarrhoeal *E. coli*: Enteropathogenic *E. coli* (EPEC), Shiga toxin-producing *E. coli* (STEC) these strains are also referred to as

enterohaemorrhagic *E. coli*, enterotoxigenic *E. coli* (ETEC), and enteroinvasive *E. coli* (EIEC).
The clinical significance of other strains of *E. coli*, including enteroaggregative *E. coli* is unclear².

Enteropathogenic *E. coli* (EPEC)

EPEC strains are defined by the characteristic attachment and effect they elicit upon interaction with epithelial cells, and the fact that they do not produce Shiga toxins³. EPEC remain a leading cause of severe diarrhoeae among very young children in developing countries, where they cause disease principally in those younger than six months of age. EPEC infections appear to be acquired mainly from person-to-person spread, of which hospitals continue to be a source of infection. Symptoms include watery diarrhoeae sometimes accompanied by low-grade fever and vomiting. EPEC infections may be severe and vomiting may make oral rehydration difficult, resulting in life-threatening dehydration⁴.

Identification

Possible EPEC strains may be screened by the use of commercial polyvalent and monovalent antisera to the classical EPEC somatic (O) antigens and further testing with flagellar (H) antisera¹. PCR or DNA probes for *bfp* or *eae* genes, or tissue culture assay for localized adherence may also be employed for the diagnosis of an EPEC infection⁵.

Treatment

Breast-feeding is highly protective against EPEC infection. Breast milk contains factors found in both the lipid and immunoglobulin fractions that inhibit EPEC adherence. The treatment of EPEC infection rests first on fluid replacement. Mild EPEC disease does not require antimicrobial therapy, but antibiotics can shorten the duration of the illness in those with more severe disease⁶.

References

1. Bopp CA, Brenner FW, Fields PI, Wells JG, Strockbine NA. *Escherichia, Shigella, and Salmonella*. In Murray PR, ed. *Manual of Clinical Microbiology*. Washington, DC: ASM Press; 2003: 654-671.
2. Nataro JP, and Kaper JB. Diarrheagenic *Escherichia coli*. *Clin Microbiol Rev*. 1998; **11**:142-201.
3. Kaper JB. Defining EPEC. *Rev Microbiol (Sao Paulo)*1996;**27**(suppl 1):130-133.
4. Clausen CR, Christie DL. Chronic diarrhea in infants caused by adherent Enteropathogenic *Escherichia coli*. *J Pediatr*. 1982;**100**:358-361.
5. Scaletsky IC, et al. Comparison of DNA hybridization and PCR assays for detection of putative pathogenic enteroadherent *Escherichia coli*. *J Clin Microbiol*. 2002;**40**:1254-1258.
6. Thoren A, et al. Antibiotics in the treatment of gastroenteritis caused by Enteropathogenic *Escherichia coli*. *J Infect Dis*. 1980;**141**:27-31.

Questions

1. How would you differentiate between EPEC and *Shigella species*?
2. How would you isolate an EPEC?
3. What characteristics are used to identify EPEC?

4. What infections are caused by EPEC?