

### Please read this section 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: **MT-2015/009**.

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.

## MICROBIOLOGY LEGEND

### CYCLE 37 ORGANISM 4

## **Yersinia enterocolitica**

The genus *Yersinia* includes 11 species: *Y. pestis*, *Y. pseudotuberculosis*, *Y. enterocolitica*, *Y. frederiksenii*, *Y. intermedia*, *Y. kristensenii*, *Y. bercovieri*, *Y. mollaretii*, *Y. rohdei*, *Y. aldovae* and *Y. ruckeri*. Among them, only *Y. pestis*, *Y. pseudotuberculosis*, and certain strains of *Y. enterocolitica* are of pathogenic importance for humans and certain warm-blooded animals, whereas the other species are of environmental origin and may, at best, act as opportunists. *Yersinia* strains can however be isolated from clinical materials, so it does have to be identified at the species level. Because *Yersinia* species are siderophilic (iron-loving) bacteria, people with hereditary hemochromatosis (a disease resulting in high body iron levels) are more susceptible to infection with *Yersinia* (and other siderophilic bacteria). In fact, the most common contaminant of stored blood is *Y. enterocolitica*.

### Morphology and Metabolism

*Yersinia enterocolitica* is a pleomorphic, gram-negative bacillus that belongs to the family Enterobacteriaceae. *Y. enterocolitica* is non-lactose-fermenting, glucose-fermenting, and oxidase-negative facultative anaerobe that is motile at 25°C and nonmotile at 37°C. Most, but not all, *Y. enterocolitica* isolates reduce nitrates. The presence of bile salts in the medium prevents the organism from fermenting lactose. Colonies of *Y. enterocolitica* do not produce hydrogen sulfide in triple sugar iron medium, but the organism is urease positive.



Gram negative *Y. enterocolitica*



*Y. enterocolitica* colonies growing on XLD agar plates

Human yersiniosis is attributed to contaminated pork, milk, water, and tofu consumption, as well as to blood transfusion. Infected individuals may shed *Y. enterocolitica* in stools for 90 days after the symptom resolution, suggesting that early detection of *Y. enterocolitica* from diarrheal stool samples is critical in preventing its transmission and an eventual outbreak. As a human pathogen, *Y. enterocolitica* is most frequently associated with enterocolitis, acute diarrhea, terminal ileitis, mesenteric lymphadenitis, and pseudoappendicitis, with the spectrum of disease ranging from asymptomatic to life-threatening sepsis, especially in infants.

In several countries, *Y. enterocolitica* has eclipsed *Shigella* species and approaches *Salmonella* and *Campylobacter* species as the predominant cause of acute bacterial gastroenteritis. *Y. enterocolitica* most commonly affects young individuals (approximately 75% of patients with *Y. enterocolitica* infection are aged 5-15 years), but whether this represents an increased susceptibility or a greater likelihood of developing symptomatic illness is unclear. Most cases of *Y. enterocolitica* infection are sporadic, but reports have documented large outbreaks centered on a single contaminated source.

### Classification

*Y. enterocolitica* are a heterogeneous group of strains, which are traditionally classified by biotyping into six biogroups on the basis of phenotypic characteristics, and by serotyping into more than 57 O serogroups, on the basis of their O (lipopolysaccharide or LPS) surface antigen. Five of the six biogroups (1B and 2–5) are regarded as pathogens. However, only a few of these serogroups have been associated with disease in either humans or animals. H-antigen typing can be a valuable supplement to O-antigen typing and biochemical characterization in epidemiologic investigations. Accurate identification of pathogenic strains requires consideration of both the biotype and the serotype because some strains can contain multiple cross-reacting O antigens.

### Diagnosis

The following tests can be used in the diagnosis of *Y. enterocolitica* infection:

- Stool culture - this is the best way to confirm a diagnosis of *Y. enterocolitica*; the culture result is usually positive within 2 weeks of onset of disease
- Tube agglutination
- Enzyme-linked immunosorbent assays
- Radioimmunoassay
- Imaging studies - Ultrasonography or computed tomography (CT) scanning may be useful in delineating true appendicitis from pseudoappendicitis
- Colonoscopy - Findings may vary and are relatively nonspecific
- Joint aspiration in cases of *Yersinia* - associated reactive arthropathy

### Management

Care in patients with *Y. enterocolitica* infection is primarily supportive, with good nutrition and hydration being mainstays of treatment. First-line drugs used against the bacterium include the following agents:

- Third-generation cephalosporins
- Trimethoprim-sulfamethoxazole (TMP-SMZ)
- Tetracyclines
- Fluoroquinolones - not approved for use in children under 18 years
- Aminoglycosides

### Prognosis

Yersiniosis is usually either self-limited or is responsive to therapy; however, reinfection is possible. Most patients with *Y. enterocolitica* infection are symptomatic; however, asymptomatic carriage may occur. Death is uncommon, but patients with significant comorbidities are at risk for *Y. enterocolitica* bacteremia, which carries a case fatality rate of 34-50%.

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### References

1. [http://en.wikipedia.org/wiki/Yersinia\\_enterocolitica](http://en.wikipedia.org/wiki/Yersinia_enterocolitica)
2. <http://emedicine.medscape.com/article/232343>

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### Questions

1. Discuss the morphology and metabolism of *Y. enterocolitica*.
  2. Discuss the role of *Y. enterocolitica* in disease.
  3. Discuss the lab diagnosis of *Y. enterocolitica*.
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