Clostridium difficile: Media Factsheet

Clostridium difficile – the leading cause of antibiotic-associated diarrhoea

Clostridium difficile (C. difficile) is a species of bacteria found widely in the environment and in the intestinal tracts of animals.[1] The bacteria are also present naturally in the gut of up to 3% of healthy adults.[2] Normally, *C. difficile* bacteria do not cause any problems in healthy individuals. However, the use of antibiotics can alter the balance of bacteria in the gut, reducing the number of 'good' bacteria and allowing *C. difficile* bacteria to multiply and produce toxins (poisons).[3] These toxins lead to diarrhoea and other intestinal complications, that in some cases can be severe and even life threatening.[2] This condition is known as *C. difficile* infection (CDI) or *C. difficile*-associated diarrhoea (CDAD).[2]

C. difficile bacteria can spread easily. Once overgrowth of *C. difficile* bacteria occurs in the gut, hardy spores (seeds) are produced that are expelled in the faeces. These spores can live outside the human body for weeks, or even months, and can be passed from patient to patient via faecal-oral transmission.[4]

CDI is responsible for:

- 10-25% of antibiotic-associated diarrhoea (ranging from mild to severe)[2]
- 50-75% of antibiotic-associated colitis (inflammation of the colon)[2]
- 90-100% of antibiotic-associated pseudomembranous colitis[2]

Symptoms of CDI include diarrhoea, abdominal cramps and fever[4] and severe cases can require bowel surgery and even lead to death.[5]

A common healthcare-acquired infection (HAI)

CDI is the leading cause of healthcare acquired diarrhoea in adults[5] and has become an increasing problem in hospitals, nursing homes and other long-term care facilities.[2] CDI can spread throughout the hospital or care home environment.[6] Transmission can be from patient to patient via contaminated hands of healthcare workers, or by environmental contamination.[1,7]

C. difficile can be found on most dry surfaces in hospitals (railings, bedpans, walls, floors, sinks etc.) where spores may persist for months.[4] These spores can withstand many chemicals e.g. most disinfectants and alcohol-based hand cleansers.[4,6]

Hospital patients are most at risk

A person's risk of CDI increases with a longer period of hospitalisation.[8] In addition to length of hospital stay, other in-hospital risk factors include:

- Advanced age (≥65)[6]
- Use of broad spectrum antibiotics and/or prolonged exposure to antibiotic therapy[6]
- Immunodeficiency (patients who are immuno-compromised such as transplant patients or those with HIV)[9]
- Renal impairment[10]
- Presence of other severe disease[6]
- Use of enemas and prolonged nasogastric tube insertion[6]

Frail patients with serious underlying conditions such as chronic kidney disease, cancer, or who are immunocompromised are at increased risk of serious complications associated with CDI.[9,11,12,13] In these patients increased clinical suspicion, earlier diagnosis and prompt treatment may be warranted.[13,14]

A recurring problem

Recurrence of CDI occurs in up to 25% of patients within 30 days of initial treatment with current therapies.[15,16,17] The European Society of Clinical Microbiology and Infectious Diseases (ESCMID) has identified recurrence as being the most important problem in the treatment of CDI.[18]

An increasing global problem

An increase in overall incidence of CDI has been highlighted by outbreaks of more severe disease, caused by a specific strain of *C. difficile* bacteria, than was previously observed.[4]

As a result of this increase, the impact of CDI on modern healthcare is significant, with treatment and management costs currently estimated in the European Union at €3,000 million per year.[19] In the US, costs are estimated at between $2,872 and $4,846 per case for primary CDI with a three-fold increase in total costs for recurrent cases.[20]

The increasing rates of CDI recurrence and the high costs of CDI care highlight the need for prompt diagnosis, more effective infection control, and novel treatments to address this important health issue.

References

1 European Centre for Disease Prevention and Control. Basic facts (*Clostridium difficile* infection) [Internet] [Downloaded April 4 2013] Available from http://ecdc.europa.eu/EN/HEALTHTOPICS/CLOSTRIDIUM_DIFFICILE_INFECTION/BASIC_FACTS/Pages/basic_facts.aspx.
2 McMaster-Baxter NL, Musher DM. *Clostridium difficile*: recent epidemiologic findings and advances in therapy. *Pharmacotherapy.* 2007;27:1029-39.
3 Poutanen SM and Simor AE. *Clostridium difficile*-associated diarrhea in adults. *CMAJ*. 2004;171:51-8.
4 Sunenshine R, McDonald L. *Clostridium difficile*-associated disease: new challenges from an established pathogen. *Cleve Clin J Med.* 2006;73:187-197.
5 Ananthakrishnan AN. *Clostridium difficile* infection: epidemiology, risk factors and management. *Nat Rev Gastroenterol Hepatol.* 2011;8:17-26.
6 Barbut F, Petit JC. Epidemiology of *Clostridium Difficile* Associated Infections. *Clin Microbiol Infect*. 2001; 7:405-10
7 Gould CV, McDonald LC. Bench-to-bedside review: *Clostridium difficile* colitis. *Critical Care* 2008;12:1-8.
8 McFarland V *et al*. Renewed interest in a difficult disease: *Clostridium difficile* infections-epidemiology and current treatment strategies. *Curr Opin Gastroenterology.* 2009;25(1):24-35.
9 Collini PJ, Bauer M, Kuijper E, Dockrell DH. *Clostridium difficile* in HIV-seropositive individuals and transplant recipients. *J Infect* 2012; 64: 131–147.
10 Klingler, PJ, *et al. Clostridium difficile* Infection: Risk Factors, Medical and Surgical Management. *Dig Dis* 2000;18:147–160.
11 Keddis MT, et al. *Clostridium difficile* infection in patients with chronic kidney disease. *Mayo Clin Proc*. 2012. 87(11):1046-53.
12 Pant C, *et al*. Association of *Clostridium difficile* infection with outcomes of hospitalized solid organ transplant recipients: results from the 2009 Nationwide Inpatient Sample database. *Transpl Infect Dis*. 2012;14(5):540-7.
13 Campbell R, *et al*. Length of stay and hospital costs among high-risk patients with hospital-origin *Clostridium difficile*-associated diarrhea. *J Med Econ*. 2013;16(3):440-8.
14 Riddle DJ, Dubberke ER. *Clostridium difficile* infection in solid organ transplant recipients. *Curr Opin Organ Transplant*. 2008;13(6):592-600.
15 Bouza E, *et al*. Results of a phase III trial comparing tolevamer, vancomycin and metronidazole in patients with *Clostridium difficile*-associated diarrhoea. *Clin Micro Infect*. 2008;14(Suppl 7):S103-4.
16 Lowy I, *et al*. Treatment with monoclonal antibodies against *Clostridium difficile* toxins. *N Engl J Med.* 2010;362;3:197-205.
17 Louie TJ, *et al.* Fidaxomicin versus vancomycin for *Clostridium difficile* infection. *N Engl J Med.* 2011;364:422–31.
18 Bauer MP, *et al.* European Society of Clinical Microbiology and Infectious Disease (ESCMID): treatment guidance document for *Clostridium difficile*-infection (CDI). *Clin Microbiol Infect.* 2009;14(Suppl 7):S103-4.
19 Kuijper EJ, *et al.* Emergence of *Clostridium difficile*-associated disease in North America and Europe. *Clin Microbiol Infect.* 2006;12:2-18.
20 Ghantoji SS, *et al.* Economic healthcare costs of *Clostridium difficile* infection: a systematic review. *J Hosp Infect*. 2010;74:309-18.