The prevention of Clostridium difficile associated diarrhoea in hospital

The number of health care-associated infections has increased over the years and generated a lot of interest and concern. The attention tends to be focused on methicillin-resistant Staphylococcus aureus (MRSA), but the less publicised Clostridium difficile is a growing problem. It increases length of hospital stay, causes significant morbidity in patients, affects nurses’ workloads, adds to the cost of cleaning, laundry and disposables, and can lead to ward closures. All NHS trusts in England are now required to report C. difficile-associated diarrhoea (CDAD) in all patients over 65 years of age (National Clostridium Difficile Standards Group, 2003).

What is Clostridium difficile? C. difficile is a Gram positive, spore-forming, anaerobic bacillus (Fig 1). In its vegetative state, it dies rapidly when exposed to air but the spores can survive for up to five months in the environment (Yassin et al, 2001). It can withstand drying, heat, and is resistant to many disinfectants (Wilcox, 2003). C. difficile colonises the gut of approximately three per cent of healthy adults and up to 50 per cent of infants (Yassin et al, 2001) and is also found in soil and in farm and domestic animals, but is not considered a zoonotic infection – a disease transmitted from animals to humans (Wilcox, 2003). The organism produces at least two toxins – toxin A and toxin B – both of which can cause disease in humans and can be isolated in the faeces of asymptomatic individuals.

What disease does it cause? C. difficile is recognised as a major cause of hospital-acquired diarrhoea. However, diarrhoea can be a consequence of other disease processes or medications, so laboratory diagnosis is necessary to confirm a diagnosis of CDAD (Wilcox, 2003). Testing for toxins in a faeces sample is the gold standard for laboratory diagnosis. Faecal culture is used when antibiotic sensitivities and typing are required for epidemiological purposes.

Only diarrhoeal stools should be submitted for testing. Diarrhoea is defined as stools that take the form of the specimen pot (NCDSG, 2003). A faecal specimen should be fresh, or refrigerated if there is going to be a delay in processing it (Brazier, 1998). Clinical information, especially relating to underlying disease and any antibiotic therapy, should be provided on the microbiology form.

For C. difficile to cause disease, it requires a change in the normal gastrointestinal flora, acquisition or overgrowth of the organism, and toxin production. CDAD may be caused by an overgrowth of the patient’s own C. difficile organism or it may be acquired from other patients, the environment or from the hands of health care workers (Department of Health and Public Health Laboratory Service Joint Working Group, 1994). However, not all patients colonised with C. difficile develop disease.

The toxins produced cause increased capillary permeability and gut peristalsis (Yassin et al, 2001). The clinical manifestation of disease includes asymptomatic carriage, diarrhoea of varying degrees, and life-threatening pseudomembranous colitis (acute inflammatory bowel disease). The diarrhoea may be watery or contain mucus and has a distinctive odour (Brazier, 1998). Diarrhoea may be absent in patients with pseudomembranous colitis.

The patient may complain of abdominal pain and be pyrexial, and as a result of diarrhoea may develop electrolyte imbalance, hypoalbuminaemia (low serum albumin levels), and paralytic ileus (Wilcox, 2003).

Risk factors CDAD is associated with the use of antibiotics (Yassin et al, 2001), mainly because they alter the gastrointestinal flora that normally inhibits its growth. Cephalosporins tend to be associated with a high risk of developing CDAD (DoH and PHLS, 1994), but this may be a reflection of the frequency of their use. Occasionally disease occurs in the absence of a history of antibiotic therapy (Wilcox, 2003). Other medications that may predispose a patient to CDAD are cytotoxic drugs, antacids, stool softeners, and laxatives (Brazier, 1998).

The prevalence of CDAD is greatest in older people and debilitated patients. For risk factors see Box 1. Other risk factors for the disease include chemotherapy and malnutrition (Yassin et al, 2001; Samore, 1999; DoH and PHLS, 1994).

Epidemiology CDAD is associated with patients in hospital over the age of 65, but it is not exclusively a hospital-acquired infection. Studies by Jenkins (2002) and Karlstrom et al (1998) showed evidence of...
Asymptomatic carriage of the organism can occur for up to three months (Wilcox, 2003). Evidence to support their successful use is inconclusive. Therapies for the control of CDAD are available but vancomycin-resistant metronidazole due to concerns regarding promotion of and PHLS, 1994). First-line treatment should be oral metronidazole or vancomycin is recommended (DoH units (DoH and PHLS, 1994). This may be due to the high use of antibiotics in these groups, or it may be a consequence of their underlying disease (Box 2).

**Box 2. Groups at Risk of CDAD**

- Hospital patients over 65 years of age
- Oncology patients
- Renal patients
- Patients in intensive care

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**Infection prevention and control**

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**Handwashing**

This is not only important for the prevention and control of *Clostridium difficile* but is also an important prevention and control measure for other infections (DoH and PHLS, 1994). Spores have been shown to be present on the hands of health care workers (Samore, 1999) and they may become contaminated from contact with the environment. Hands can also contribute to the contamination of the environment or equipment (Wilcox, 2003).

Handwashing needs to be carried out vigorously with soap and water, and hands must be dried thoroughly in the patient’s bowel habits and it has been stated that experienced nurses can identify *Clostridium difficile* by the characteristic smell of the faeces (Wilcox, 2003; Brazier, 1998). They are therefore key in instigating infection prevention and control measures, and identifying the need for faecal samples (diarrhoeal) for microbiology testing. Documentation of the patient’s bowel movements is important to show that the infection is being controlled, with or without antibiotic therapy. Patients and relatives require information on the infection as well as on prevention-control measures. They should be aware of the need for handwashing before and after visits but do not need to wear gloves and aprons unless involved directly with incontinence care or toileting.

**Treatment**

Diarrhoea may be self-limiting after two or three days, or may need to be treated with antibiotics. Concurrent antibiotic therapy should be reviewed and discontinued if the patient’s underlying condition allows. If symptoms persist, oral antibiotic therapy with metronidazole or vancomycin is recommended (DoH and PHLS, 1994). First-line treatment should be oral metronidazole due to concerns regarding promotion of vancomycin-resistant enterococcus. Alternative therapies for the control of CDAD are available but evidence to support their successful use is inconclusive.

Once the patient is asymptomatic, it is not necessary to send specimens to test for clearance of the organism. Asymptomatic carriage of the organism can occur for up to three months (Wilcox, 2003).

**Nursing management**

Nurses may notice a change in the patient’s bowel habits and it has been stated that experienced nurses can identify *Clostridium difficile* by the characteristic smell of the faeces (Wilcox, 2003; Brazier, 1998). They are therefore key in instigating infection prevention and control measures, and identifying the need for faecal samples (diarrhoeal) for microbiology testing. Documentation of the patient’s bowel movements is important to show that the infection is being controlled, with or without antibiotic therapy. Patients and relatives require information on the infection as well as on prevention-control measures. They should be aware of the need for handwashing before and after visits but do not need to wear gloves and aprons unless involved directly with incontinence care or toileting.

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Handwashing needs to be carried out vigorously with soap and water, and hands must be dried thoroughly
with paper towels. Alcohol-based gel or rubs should be used in addition to washing or as an alternative when a washbasin is not available. Compliance with handwashing is often poor, and its importance must be stressed to all staff as well as patients and relatives. In order to protect clothing and hands from contamination with body fluids, gloves and aprons should be worn when caring for a patient with diarrhoea.

Isolation Diarrhoea facilitates the spread of *C. difficile* in the environment, increasing the risk of contamination and transmission to other patients. The DoH and PHLS (1994) guidelines state that patients with *C. difficile*-associated diarrhoea, or with diarrhoea not yet confirmed as *C. difficile* positive, should be isolated until formed stools are obtained.

The availability of single rooms in hospitals is limited, and symptomatic patients are often nursed in communal ward areas (Jenkins, 2002). Strict infection prevention and control precautions must therefore be implemented at the point of care. A risk assessment to determine the level of care necessary should be carried out by nurses (especially the infection control nurse) (Worsley, 1998) to identify the appropriate infection prevention and control intervention required, as well as the patient’s physical and psychological needs.

Patients without symptoms (ideally for 48 hours) do not require isolation as they do not constitute a risk (DoH and PHLS, 1994).

Cleaning Thorough cleaning of the hospital environment will help prevent acquisition, re-infection, and transmission of *C. difficile*. Commodes, bed frames, and floors are the most frequently contaminated (Worsley, 1998). Thorough cleaning of surfaces and equipment with detergent and hot water is essential, and the use of disinfectant should be undertaken according to local infection control policy.

Prudent use of antibiotics CDAD is associated with antibiotic use and therefore prudent antibiotic use is required in order to help prevent disease occurrence.

Conclusion *C. difficile* infection causes significant morbidity and mortality in patients and costs the health service an estimated £4,000 per case (Wilcox, 2003). Effective prevention and control relies on prudent use of antibiotics and strict adherence to infection prevention and control measures. Staff should have knowledge regarding the organism and the disease caused so that they understand the measures required to control and prevent CDAD.