

**PREVENTION AND MANAGEMENT OF CLOSTRIDIUM DIFFICILE
INFECTION IN ACUTE TRUSTS**

Introduction

The Greater Manchester Pathology Network requested that a group were convened to give advice on the prevention and management of prevention and treatment of *Clostridium difficile* infection in Acute NHS Trusts. A multi-disciplinary group consisting of Consultant Microbiologists, Infection Control Practitioners, Antibiotic Pharmacists and Biomedical Scientists from representative acute Trusts across Greater Manchester met on a number of occasions. The group have produced this consensus document which should be seen as a standard to which Trusts should aspire. The guidelines may be used as a standard for future audit.

Recommendations:

1. Prevention

- 1.1 Risk assessment
- 1.2 Infection control/cleaning
- 1.3 Antibiotic stewardship
- 1.4 Education
- 1.5 Audit

2. Diagnosis

- 2.1. Criteria for laboratory testing for CDI
- 2.2. Laboratory testing methods/QC
- 2.3. Surveillance/typing

3. Management

- 3.1. Clinical management of CDI
- 3.2. Management of severe, recurrent, relapsing disease
- 3.3. Outbreak management
- 3.4. Reporting of deaths from CDI

1. Prevention

1.1 Risk assessment

Ideally, all patients presenting with diarrhoea should be isolated, however there are situations in which this is not possible. In such situations, a risk assessment system for CDI should be used alongside or combined with other admission risk assessment scores e.g. falls, nutrition, Waterlow.

A number of factors are well reported to increase the risk of CDI (age, underlying disease, antibiotics, GI surgery/procedure, NG tube, anti-ulcer drugs, enemas, ICU admission, prolonged hospital stay, recent healthcare contact). However, in general, patients with the following risk factors can be considered to be at high risk:

- 1. age over 65 years;**

2. presence of significant underlying disease;
3. exposure to antibiotics;
4. recent contact with healthcare facilities;
5. a previous history of CDI;
6. diarrhoea with a smell characteristic of CDI;
7. high Waterlow score.

Such patients should be assessed regularly for symptoms or signs of CDI and care should be taken when prescribing any further antibiotics. The Clean, Safe Care website provides a decision scorecard which can be used for more detailed risk assessment if required. Any patient being prescribed an antibiotic should be risk assessed for CDI at the time of prescription.

1.2 Infection control/cleaning

Routine cleaning

The use of a chlorine containing agent for routine cleaning of all clinical areas should be considered. In the absence of this, routine chlorine based cleaning is strongly recommended for areas at high risk of CDI based on local risk assessment/*C. difficile* epidemiology.

Cleaning of bed area/ward of CDI patient(s)

A chlorine-based agent e.g. Chlorclean, Actichlor Plus at a concentration of 1,000ppm is recommended for the cleaning of bed areas and cohort wards occupied by patients with CDI. Single-use cloths must be used, with cleaning taking place at least daily. The local disinfectant policy must be updated in line with any changes in the local CDI policy.

Cleaning of toilets/commodos of CDI patients

Commodos should be cleaned after each use using a chlorine-based cleaning agent, this cleaning **must** include the supporting structure and underside of the commode. Toilets should also ideally be cleaned after each use with a chlorine-based agent. Patients' hands should be washed after each toilet visit. If unable to do so unassisted, hand hygiene with soap and water should be offered to the patient or, alternatively, hand wipes if washing is not possible.

Terminal clean

On discharge of the CDI patient from the single room/bed area, curtains must be changed and a deep clean using a chlorine-based disinfectant at a concentration of 1,000ppm carried out.

Isolation

On suspicion of symptomatic CDI (a patient with one or more episodes of diarrhoea and clinical features/risk factors suggestive of CDI), the patient should be moved to a side room with a self-contained or designated toilet/commode immediately or as soon as is practicable.

If a side-room is unavailable, cohort-nursing or an isolation ward is the next option. If neither is possible, an incident form should be generated and the absence of isolation facilities reported.

Close liaison between the infection control team and bed management is essential. An electronic bed management system can facilitate appropriate use of single rooms within the hospital.

The CDI patient can be moved out of isolation when they have been symptom-free for 48 hours (formed stool- type 4 or below). Consideration should be given to continuing isolation of patients who have experienced severe disease or who are known to be infected with Ribotype 027 even in the absence of symptoms. Vigilance should be maintained for evidence of relapse in which case the patient should be isolated again.

Personal Protective Equipment (PPE)

Apron and gloves must be worn by any staff in direct contact with the patient or their immediate environment.

Visitors/relatives involved in direct care of the patient should wear apron and gloves.

Hand hygiene

Hand washing with soap and water is essential before and after contact with the patient or their environment.

Alcohol hand gel is not effective and should **NOT** be used.

1.3 Antibiotic stewardship

Each Acute Trust should have an antimicrobial strategy (refer to SACAR recommendations). Training in antimicrobial prescribing should form part of the induction/mandatory training for medical staff (see below). Inappropriate antibiotic use should be highlighted and alternative recommendations given.

The risks and benefits of antibiotics for the individual patient should be considered before prescribing. If safe to do so, either avoid the use of antibiotics or give a short course of a narrow spectrum/low CDI risk agent. Cephalosporins, clindamycin and quinolones present a high risk for CDI and should be avoided where possible. Clear documentation of the route, indication and duration of antibiotic is vital both for management of the patient and for audit. Reporting and review of DDDs (defined daily doses) for individual antibiotics should take place on a regular basis. Any change in antibiotic policy should be audited for evidence of benefit or to detect any detrimental effect in clinical outcome.

Guidance should be provided to GPs regarding patients discharged from acute trusts with CDI. This may be incorporated in a discharge letter or electronic communication of the patient's record of admission. Involvement of community pharmacists in acute trust antimicrobial meetings will aid the communication of antibiotic concerns and issues to and from general practice. Antibiotic usage data should be available and shared between hospital and community.

1.4 Education/training

Annual mandatory infection control training should be accessed by all staff.

Education of medical staff should include mandatory antibiotic prescribing training and updates.

1.5 Audit

A number of audits are appropriate in the context of the management of CDI, these include audits of: antibiotic policy compliance; root cause analysis findings; environment and equipment; cleaning; isolation of infectious patients and integrated care pathway/management of CDI policy. The frequency and priority of individual audits will depend on the local prevalence of CDI and recognised risk factors.

Regular audit of compliance with local antimicrobial policies is essential.

1.6 Visitors

Visitors to patients with CDI should be kept at a minimum. Children should not visit patients with CDI and visitors should not eat when visiting. Visitors/relatives involved in direct care of the patient should wear apron and gloves.

2. Diagnosis

2.1 Criteria for laboratory testing for CDI

All in-patients with diarrhoea (sample that takes the shape of the container) should be routinely tested for CD toxin if 2 years of age or over. All community patients with diarrhoea who are 65 years or over should be tested for CD toxin. As a minimum, community patients under the age of 65 years with symptoms should be tested if they have any risk factors for CDI:

1. Recent antibiotic therapy
2. Recent hospitalisation
3. On proton-pump inhibitor/gastric acid suppressant
4. Known or suspected exposure to other cases
5. Faeces with a characteristic odour of *C. difficile*.

2.2 Laboratory testing methods/QC

Although there is no definitive gold standard, kits should detect both toxins A and B as a minimum. If there is a strong clinical suspicion of CDI, further samples should be processed if the initial result is negative. The performance of the toxin testing kit used should be taken into account when reporting results. A comment such as “A negative result does not exclude CDI” could be appended to negative reports as appropriate.

Laboratories should carry out CD toxin testing 7 days/week and report results within 24 hours of collection of the sample. A review of priorities for weekend working may be required. Out of hours, samples should be refrigerated if there is a delay before processing. Toxin positive samples should be stored for at least two months by refrigerating or freezing.

There are a number of emerging diagnostic techniques for *C. difficile*, such as GDH, lactoferrin and PCR based tests. The exact role of these tests is not yet known nor is the most appropriate algorithm for their use.

2.3 Surveillance/typing

Surveillance should incorporate both national mandatory reporting and local systematic reporting to wards, departments and directorates. Stored samples may be

required for typing and sensitivity testing. Criteria for referral of samples for typing are available from the HPA's Ribotyping Network (CDRNE).

Definitions of outbreaks and 'periods of increased incidence' should be established locally. Root cause analysis should be used as a tool for investigating CDI within the hospital setting and improving future outcomes.

3 Management

3.1 Clinical management of CDI

Initial actions for all cases identified or suspected as CDI should include:

1. Assess severity (see below);
2. Stop inciting antibiotics if possible (if ongoing infection, consult microbiology);
3. Initiate treatment for *C. difficile*;
4. Stop / avoid anti-diarrhoeal agents;
5. Review opiates;
6. Review gastric acid suppressive agents if possible;
7. Assess fluid balance and ensure adequate hydration;
8. Assess nutritional status – refer to dietician if necessary.

Identification of severe disease

Although there is currently no definitive scoring system for categorising patients with severe disease a range of clinical markers may be used. These include:

- White cell count $\geq 15 \times 10^9/L$;
- Creatinine (50% increase from baseline) / new oliguria;
- Albumin $< 25g/L$;
- CRP $> 50mg/L$;
- Fever $\geq 38^\circ C$;
- Deterioration in mental status not explicable by other illness;
- Serum lactate $> 2.2mmol/L$.

Particular attention should be paid to the white cell count and deteriorating renal function as markers of severe disease.

Any patient exhibiting signs of abdominal complications (e.g. ileus) should be treated as having severe / complicated disease.

Trusts should have a mechanism in place for assessing disease severity and defining severe disease.

Severity should be assessed at diagnosis and the patient should be clinically assessed on a daily basis. The severity assessment should be repeated if there is a change in clinical status to aid escalation of treatment.

3.2 Treatment of CDI

Once the diagnosis of CDI has been made, the disease should be treated as a disease entity in its own right.

The following is a suggested treatment protocol for the treatment of CDI.

Asymptomatic patients – No CDI treatment required. However careful monitoring of the patients clinical status should continue.

Non-severe disease –Patients who are clinically stable and meet no criteria for severe disease may be managed conservatively by removal of the inciting antibiotic and fluid resuscitation, such patients should be closely monitored for signs of deterioration. If specific CDI therapy is required then metronidazole 400mg orally tds for 10-14 days is suitable.

Review response after 4 days, if no improvement in symptoms change to vancomycin 125mg orally for 10-14 days.

Severe disease - vancomycin 125-250mg orally for 10-14 days.

Higher doses or oral vancomycin or rectal administration may be considered for severe / complicated patients on an individual case basis.

Patients who are nil by mouth - Metronidazole 500mg IV tds for 10-14 days. Review as soon as possible to convert to oral administration.

Immediate surgical review is essential for any patient exhibiting signs of abdominal complications (e.g. ileus).

Recurrent / relapsing CDI

The infection should be regarded as a relapse/recurrence if it occurs within 4 weeks of a previous CDI episode. Onset of diarrhoea beyond this period should usually be considered as new infection.

Episode	Treatment
2 nd episode (1 st recurrence)	Assess severity Review response to previous treatment Non-severe and previous response to metronidazole - metronidazole 400mg orally tds for 10-14 days Otherwise Vancomycin 125-250mg qds orally for 10-14 days
3 rd and further episodes	Vancomycin 125-250mg qds orally for 10-14 days Consider tapered – pulsed vancomycin Wk 1 - 125mg qds Wk 2 - 125mg bd Wk 3 – 125mg od Wk 4 - 125mg alt days Wk 5 & 6 - 125mg every 3 days

Other treatments are available for severe/recurrent CDI, although the evidence base is lacking. These include:

- Probiotics
- *Saccharomyces boulardii*
- Intravenous immunoglobulin
- Anion exchange resin (cholestyramine)
- Non-toxicogenic *C. difficile*
- Faecal transplant
- Fusidic acid
- Rifampicin
- Nitroimidazole

3.3 Outbreak management

Outbreak Definition:

Each Trust should have a standard definition of an outbreak which will vary depending on the incidence of disease within that organisation. This should reflect periods of increased incidence of disease as identified by robust surveillance. A change in disease severity may be as important as the incidence of the disease and should be taken into consideration

when defining an outbreak. Close liaison with clinical staff is essential in the recognition of an outbreak.

Management:

Each Trust must have a robust policy in place for the management of outbreaks of CDI, the overall aim of this policy should be to minimise the onward transmission of the organism.

Outbreak policies should include guidance on:

Definition/recognition of an outbreak

Staff and patient movement

Cleaning

Patient isolation

Ward closure and re-opening

Communication within and outside the Trust (including notification of HPA, PCT & SHA)

The roles and responsibilities of those managing the outbreak.

3.4 Reporting of deaths from CDI

Trusts must ensure that there is a robust system in place for the identification of patients who have died due to CDI. Trusts should ensure that those likely to complete death certificates (primarily junior doctors) are aware of the CMO Letter dated October 2007 (PL/CMO/2007/8), which gives guidance on the completion of death certificates in patients who die with *C. difficile*. Junior medical staff who are unsure as to whether *C. difficile* contributed to the death of a patient should be encouraged to seek the advice of senior colleagues. Review of death certification should be part of the root cause analysis process into deaths from *C. difficile*.

References:

Saving Lives delivery tools, including self-assessment and action planning tools, balanced scorecards, learning resources and high impact interventions (HIIs)

National Cleaning Specification Standards, NPSA

CDI: How to deal with the problem – a Board to Ward approach

Cleanyourhands campaign

CMO Letter, October 2007 (PL/CMO/2007/8)

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