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Clostridium difficile in hip fracture patients: Prevention, treatment and associated mortality

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ABSTRACT

Background: A series of infection control measures were introduced at the University Hospitals of Leicester NHS Trust in 2006–2007 to reduce the incidence of *Clostridium difficile* infection.
Aim: The aim of this study was to assess the impact of these measures on the incidence of *C. difficile* and to record the associated mortality in hip fracture patients.
Patients and methods: A case matched comparison of mortality was conducted between *C. difficile* positive patients and *C. difficile* negative patients admitted with a hip fracture between 1st January 2003 and 30th September 2007. An interrupted time series analysis was performed to assess the effect of various infection control policies on the incidence of *C. difficile* infection.
Results: The interrupted time series analysis showed that the only effective measure was changing antimicrobial prophylaxis to Co-amoxiclav in May 2007. This reduced the incidence of *C. difficile* from 7.1 to 1.5% ($p < 0.001$). Six-month mortality in *C. difficile* positive patients was 71% 1 year before introduction of a diarrhoea treatment policy and 65% 1 year after ($p = 0.5$) indicating treatment was ineffective. A matched cohort comparison over a 57-month period from January 2003 to September 2007 showed that the 6-month mortality was 67% in 170 *C. difficile* positive patients, 27% in 3247 *C. difficile* negative patients and 29% in the 170 *C. difficile* negative matched patients.
Conclusion: This 38% excess mortality indicated that *C. difficile* increased mortality and did not simply colonise the sickest patients. Changing prophylaxis to Co-amoxiclav was the most effective measure. This reduced the incidence of *C. difficile* by 80% and thus reduced mortality by prevention rather than cure.

Introduction

Clostridium difficile associated diarrhoea (CDAD) is a growing problem worldwide[9,10,14,15] and is increasingly associated with mortality in hospital patients.[12,14] In the UK alone, there were more than 55,000 reported cases of *C. difficile* in 2006[6] and *C. difficile* was mentioned on 6480 death certificates.[12] A study in Quebec found that 23% of patients died within 30 days of contracting *C. difficile* infection.[14] This infection is associated with the use of a variety of antibiotics[13,21] routinely used in elective and trauma orthopaedic surgery.[11]

The University Hospitals of Leicester NHS Trust has approximately 4000 trauma admissions in a year. This includes about 700 hip fracture patients, almost all of whom receive antibiotics. Indications for antibiotic use include surgical prophylaxis and treatment of wound and other infections.

In July 2006, a healthcare commission enquiry into a *C. difficile* outbreak in Stoke Mandeville Hospital stated that patient deaths due to *C. difficile* infection could have been avoided.[7] At this time an increasing number of patients at our hospital were noticed to be suffering from *C. difficile*. As a result of this a *C. difficile* task force overseen by the trust infection control committee was set up in July 2006 and a series of infection control measures were introduced to reduce the rate of *C. difficile* infection and to reduce mortality in patients suffering from *C. difficile* diarrhoea.

The aim of this study was to assess the individual and overall impact of these policies on the incidence of *C. difficile* infection. We also aimed to record the mortality associated with *C. difficile* in order to assess whether patients died "of *C. difficile*" and not just "with *C. difficile*".

Patients and methods

We performed two separate studies. In the first, we performed a case-matched comparison of mortality between *C. difficile* positive patients and *C. difficile* negative patients and in the second, we assessed the impact of the infection control measures.

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Definitions

"*C. difficile* infection" was defined as positive stool sample for *C. difficile* toxin in a patient with diarrhoea. "*C. difficile* negative" was defined as no diarrhoea or diarrhoea with negative stool sample for *C. difficile* toxin. Fracture neck of femur patients were those admitted with intra-capsular, inter-trochantric and sub-trochantric fractures of the proximal femur.

Infection control measures

The first policy introduced was the five-day antibiotic stop policy in August 2006 wherein antibiotics were to be prescribed for a maximum of 5 days and any further prescription required microbiology department approval. Intravenous administration of certain high-risk antibiotics such as fluoroquinolones[13] also required microbiology department approval. The next policy was

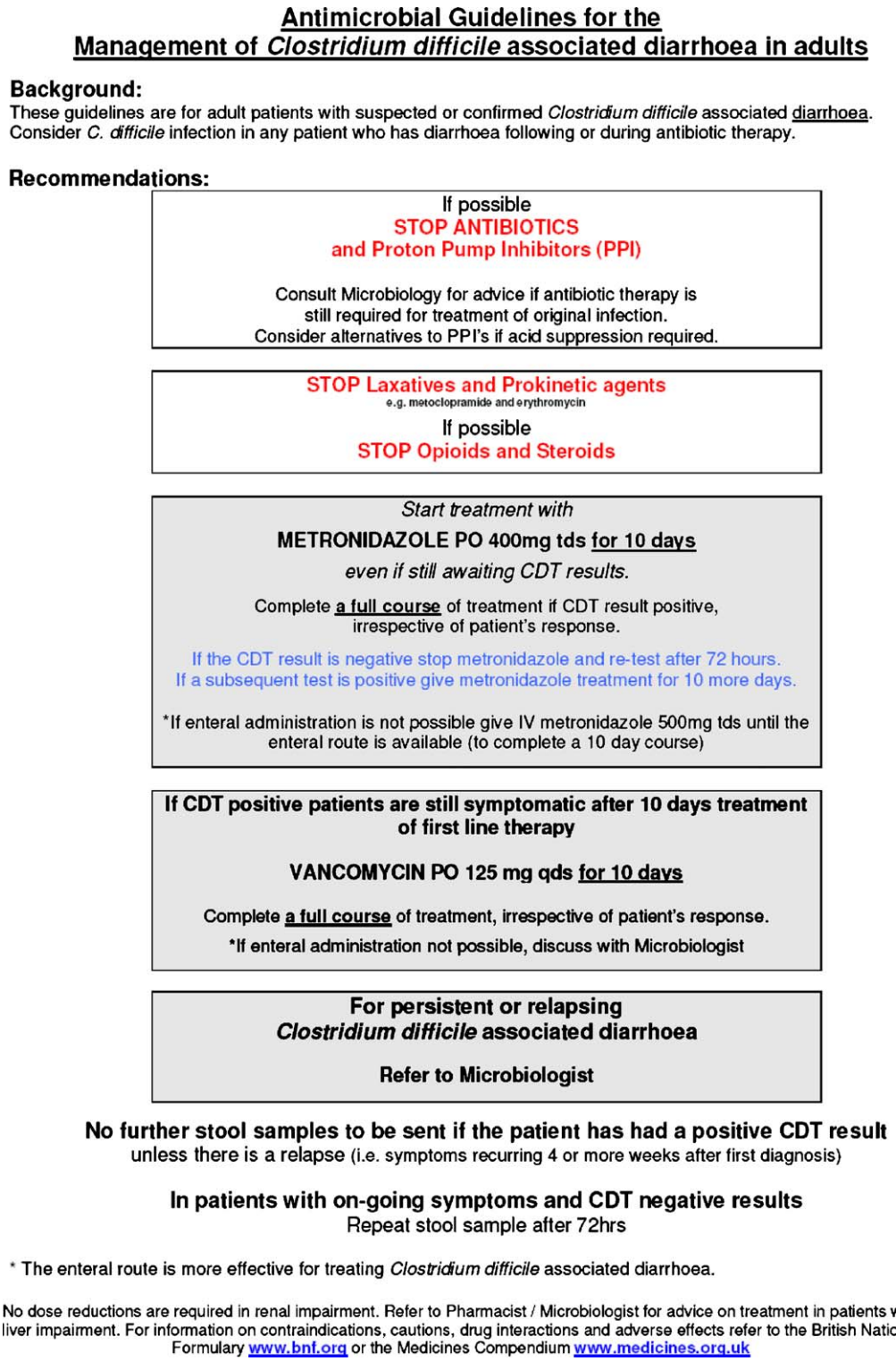

Fig. 1. Antimicrobial policy for the management of *Clostridium difficile* associated diarrhoea in adults.