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Protecting Patients from Clostridium Difficile Infection

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Protecting patients from acquiring Clostridium difficile infection has become a major challenge for healthcare institutions worldwide. Antimicrobial stewardship, early isolation, accurate diagnosis, and environmental disinfection are the key steps to prevention.

Clostridium difficile infection (CDI) is an increasing menace across the entire healthcare spectrum. It is now the leading healthcare acquired pathogen and accounts for over 165,000 cases which have their onset in US hospitals. The downstream impact of this is enormous, affecting another 50,000 persons after discharge and over 263 million nursing home residents. The costs in dollars, deaths and loss of independence are staggering. This all comes at a time of an aging population with a higher risk of acquiring and developing complications of this disease. There are two principal modifiable factors, which may mitigate risk, reducing antimicrobial exposure and reducing the acquisition of C. difficile. Nationally recommended strategies have focused on enhanced isolation practices (contact isolation), hand hygiene compliance, an early alert system of notification of lab results and more recently, antimicrobial stewardship and environmental cleaning (Cohen et al. 2010).

Clostridium difficile is an anaerobic toxin producing organism, which colonises the lower gastrointestinal tract. The frequency of colonisation is dependent upon healthcare and antimicrobial exposures, the host's immune state and the competitive fecal biome. Disruption of any one of these factors may enhance the risk of acquisition and disease due to this organism.

There are several potential approaches to prevention:

1.Preventing acquisition from the environment;

2.Preventing colonisation of the gut;

3.Enhancing host immune defenses; and

4.Providing early, effective treatment.

A simple three step approach may help reduce acquisition and transmission. The initial step for clinicians is to think C. Difficile – when planning a course of therapy for a patient. Physicians should consider the risk of CDI associated with a particular antimicrobial and its duration of use. Specific factors to consider are older age >60, recent healthcare exposure, long duration of hospitalisation, severe underlying illness, and the use of acid lowering medicines.

The second step is early isolation and rapid testing of suspected CDI cases. Hospitalised patients with diarrhea should be placed in contact isolation preemptively until the diagnosis is excluded by a sensitive C. difficile toxin test. Many of the currently used EIA assays for toxins A and B may miss significant portions of cases (Sloan et al 2008). The use of a sensitive assay allows more rapid initiation of therapy and limits unnecessary isolation. Immediate phone notification of clinicians of a positive C. difficile toxin assay markedly reduces the time to initiation of treatment (Verdoorn et al 2009). Early treatment also may reduce the duration of their symptom and risk for nosocomial transfer. Oral vancomycin reduces diarrhea and improves symptoms faster than oral metronidazole and may be another strategy employed to reduce healthcare transmission (Al Nassir et al 2008).

The third step is the prevention of transmission from colonised and infected patients and their environment to healthcare personnel and other patients. Barriers such as gowns and gloves, and dedicated patient equipment (rectal thermometers, blood pressure cuffs, stethoscopes) have been shown to reduce transmission. Patients infected with C. difficile continue to shed organisms into the environment even after their diarrhea

has ceased. We recommend that patients remain in contact isolation throughout their hospital stay. Isolation may reduce transmission if compliance is high but fails when healthcare workers contact contaminated surfaces and fail to remove C. difficile from their hands. Thus, reducing environmental contamination is important.

This is accomplished by ensuring adequate cleaning of high touch surfaces and monitoring its effectiveness. Audit and feedback to housekeepers engages them in the process of protecting patients from harm. A wellcleaned hospital room reduces bioburden but cannot eradicate C. difficile spores which requires cleaning with sporicidal agents such as bleach. The targeted rooms and frequency with which they should be cleaned with sporicidal agents, remains unanswered.

In our hospital, despite high compliance with isolation practices and all the other measures previously noted, nosocomial rate remained elevated. We identified units with the highest endemic rates of nosocomial C. difficile and introduced a targeted intervention to wipe out C. difficile using germicidal bleach wipes. Three published studies (and several unpublished have shown hypochlorite disinfection to reduce rates of CDI, particularly in the setting of high colonisation pressure (Mayfield 2000, Wilcox 2003). These studies have shown a 1:10 dilution of household bleach to be an effective sporicide against C. difficile. Recently, several manufactures have produced germicidal bleach wipes for use in cleaning hospital rooms. These are easier to use and need to be left to dry to achieve the 10 minute wet contact time to kill C. difficile spores. The cleaned surfaces often have a salt residue well tolerated by patients, even those with respiratory ailments and by nursing staff. No and if visible this should be wiped with wet cloth to improve appearance.

At our institution we identified 2 medical units with the highest nosocomial rates of CDI. These units cared for patients with chronic gastrointestinal and pulmonary diseases and had an incident rate of CDI 10- fold above the institutional rate, reflecting a high colonisation pressure.

Prior to the intervention we monitored the effectiveness of room cleaning with audits and use of Clean Trace. All rooms on these units were determined to have been effectively cleaned. We then met with the unit nursing, clinical and environmental services staff an outlined our vision of how to wipe out C. difficile by eliminating spores from the patient and work environment. The intervention consisted of housekeeping staff cleaning each room well tolerated by patients, even those with respiratory ailments and by nursing staff. No on these two units every day using Clorox brand germicidal bleach wipes 6.15%-5200 ppm active chlorine. The bleach wipes were used on all high touch surfaces and allowed to dry to achieve the recommended 10 minute contact time. Surfaces that showed salt residue were re-wiped with a water dampened cloth to eliminate any concerns that the surfaces were dirty. We explained the rationale to housekeeping and advised them of the potential irritant side effects from the bleach product. Like any bleach product, the odor was noticeable at low concentrations. The wipes have a masking agent but we found that cleaning in a closed nonventilated space was irritating to the environmental services staff. Mitigation was provided for those bothered by the irritant effects in the form of a plain surgical mask and ensuring adequate ventilation of the area. The product was well tolerated by patients, even those with respiratory aliments and by nursing staff. No well tolerated by patients, even those with respiratory ailments and by nursing staff. No equipment damage was reported during the trial. We continued to monitor cleaning effectiveness and surveyed patients and staff regarding their acceptance of the new product. As CDI rates became available each month we met with housekeepers to review the survey data and rates to show them how effective their work was at reducing CDI and to address any of their concerns. Daily and terminal cleaning of all rooms on the affected units with the germicidal bleach wipes resulted in a 92% decline in hospitalacquired CDI on these two high risk units over a 6 month period. The intervention and its results have been sustained now for over 8 months (see figure for one of the two units).

This reduction in clinical cases of C. Difficile well tolerated by patients, even those with respiratory ailments and by nursing staff. No infection was achieved in the absence of any other interventions, in rooms known to be effectively cleaned and with no change in hand hygiene practices. Rates elsewhere in the institution on non-targeted units did not decline. The change was easily implemented with education of environmental service staff and is exportable to other high-risk units.

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