Methicillin resistant Staphylococcus aureus (MRSA) remains a significant contributor to healthcare associated infections (HAIs). Transmission and infection prevention strategies have been in place for several decades and include patient screening, the use of contact isolation/contact precautions (CP), skin antisepsis and targeted anterior nares decolonization with a topical antibiotic agent. While efforts to control transmission of the pathogen have resulted in a decrease in the incidence of MRSA HAIs in U.S. hospitals, federal agency goals for reduction have not been met. As reflected in the recent literature, newer technologies have emerged, including the use of topical, nonantibiotic nasal antiseptics. Studies are revealing that nasal decolonization together with daily bathing with an antiseptic agent in all patients (universal decolonization) within areas such as the ICU and OR, result in a reduction of MRSA-related HAIs.

Despite the continued growth of evidence that universal decolonization is more effective than targeted screen and isolate protocols in reducing HAIs, concerns for antibiotic over-use has fostered the reluctance of some to adopt the universal approach. With the availability of a nonantibiotic nasal decolonization alternative, infection preventionists, infectious disease personnel, nursing managers accountable for HAIs on their units, surgeons and other professionals responsible for patient care and safety have reason to reconsider the advantages of universal decolonization. These advantages extend to several areas in which the reduction of MRSA infection and transmission is paramount, most certainly including efforts to reduce the use of CP.

The move to reduce CP stems from the demonstrated broad range of benefits, including improving patient care, allowing more efficient utilization of hospital personnel time, improving patient and staff satisfaction ratings, reducing burden on visitors and eliminating unnecessary facility costs. Hospital decision makers should strongly consider the advantages of implementing these newer CP strategies in preventing MRSA infection and transmission in their facilities, while adhering to the basic principles of Standard Precautions which form the basis for infection prevention and control.
Nasal Decolonization’s Broadening Application: Replacing Contact Precautions

Introduction

Healthcare-associated infection (HAI) remains a leading cause of illness and death, particularly in the intensive care unit (ICU) setting, as various organisms develop antimicrobial resistance and colonize or infect “at risk” patients. Methicillin-resistant Staphylococcus aureus (MRSA) has been targeted for many years as the priority organism for reduction and prevention of ICU infections. An increase in prevalence in healthcare settings across the continuum of care over several decades has resulted in MRSA and other multidrug-resistant organisms (MDROs) being given priority as targets of reduction efforts by several regulatory and advisory bodies. These include the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA) and the Centers for Disease Control and Prevention (CDC).

In 2006, the CDC introduced specific MDRO transmission prevention guidelines. These guidelines employ a seven step approach to control the spread of or eradicate MDROs, including surveillance (routine and enhanced), Standard and Contact Precautions and decolonization. Hospitals commonly screen patients in the ICU for nasal carriage of MRSA and implement contact precautions for positive patients. As of January 2013, The Centers for Medicare and Medicaid Services (CMS) mandated nationwide reporting of healthcare-associated MRSA bacteremia from all hospitals excluding inpatient psychiatric hospitals. The Joint Commission developed National Patient Safety Goals (NPSGs) several years ago and included implementation of evidence based practices to prevent HAIs due to MDROs in acute care hospitals. Hospitals are to include policies to address NPSG 07.03.01 – Use of “proven guidelines to prevent infections that are difficult to treat” in their annual infection prevention and control plan. As part of the Health and Human Services National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination, the government included MRSA in its 2020 targets and metrics for acute care hospitals.

The History of Contact Precautions for Patients with MRSA

Patients at most risk for transmitting healthcare associated MRSA are currently considered to be those with active infection, positive surveillance screening tests, history of colonization and/or infection and those transferred from a long-term care facility. In conjunction with Standard Precautions which are used for every patient across the continuum of care, CDC’s 2006 guidelines recommended that Contact Precautions be implemented “to prevent transmission of infectious agents, including epidemiologically important microorganisms, which are transmitted by direct or indirect contact with the patient or the patient’s environment”.

CP includes, if possible, placement of an “at risk” patient in a private room and the judicious use of gloves and gowns that should be donned by healthcare professionals (HCP) when the patient room is entered and discarded before exiting. CP is also addressed in CDC’s 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.

Healthcare facilities over the years have modified and customized CP while following the guidelines. In 2014, SHEA and IDSA updated joint recommendations supporting the use of CP in conjunction with Standard Precautions, environmental disinfection and MRSA monitoring through the use of Active Surveillance Cultures (ASCs) or Tests. ASCs are universal or targeted screening tests, collected by swabbing the anterior nares to detect the presence of MRSA. This screening method has played a large role in patient placement for at least the last decade. However, controversy and confusion has been widely documented amid poor control of MRSA transmission despite use of ASC.
Assessing the Benefits of Contact Precautions

The question that continues to challenge the infection prevention community is whether CP practices are necessary to control endemic rates of MRSA, since overall infection prevention practices have improved over the years. These practices include hand hygiene, MRSA nasal decolonization, chlorhexidine gluconate (CHG) bathing and environmental cleaning. Individual reports in the literature offer conflicting evidence as to the effectiveness of CP in reducing transmission and infection when added to Standard Precautions. In one review that considered factors that likely contribute to the controversy, it was suggested that variations in clinical settings and procedures could account for variation in reported outcomes. These elements include the selection of components in the infection prevention bundle with which CP is typically partnered. The authors concluded that the most effective CP bundles utilized screening of patients, decolonization of positive carriers (usually with intranasal mupirocin with or without CHG bathing), placement of patients in single rooms, strict hand-hygiene and use of personal protective equipment (PPE) in the form of gloves and gowns. Of particular importance was the presence of leadership in following IC guidelines and the adherence of healthcare workers to these recommendations.

In October 2015, the Journal of Infection Control and Hospital Epidemiology published an article that was based on an extensive literature review. The article highlighted a survey and examination of facilities that forewent the use of CP, in order to determine whether CP actually controls the endemic rate of MRSA and vancomycin resistant Enterococcus transmission. The authors reported an outcome similar to other such analyses - that currently available data are inconclusive as to whether CP truly assists in preventing transmission of endemic MDROs. Inconclusive CP benefits were most often reported in studies that also involved the use of improved horizontal practices, including hand-hygiene, glove and gown use, decolonization and environmental cleaning.

The use of horizontal practices to address MRSA control was also evident in their random sampling of US hospitals that do not use CP for MRSA. Their survey also indicated that, although more than 90% of responding hospitals used CP to prevent the spread of drug resistant organisms including MRSA, roughly 60% would consider using CP in a manner different from its current application.

Negative Impacts Associated with the Use of Contact Precautions

Adverse effects linked to the use of CP have significantly contributed to discussion regarding questionable benefits. Concerns about the application of contact precautions for the control of MRSA have been expressed by physicians, nurses and other health care professionals (HCP), patients and patient families. Unfortunately, the literature does not provide a fully consistent picture of the extent to which some of these concerns are valid. Nevertheless, there are several primary areas in which harm to the patient or impediments to the provision of health care have been repeatedly reported, as described in reviews of the literature.

Patients in isolation have reported being dissatisfied with their hospital experience due to the decreased interaction with caregivers and other staff. Some studies have reported that many patients showed deficits in mental well-being, attitude and behavior, perhaps resulting from their sense of separation from others. Outcomes of psychological testing indicate that isolated patients have higher rates of depression, anxiety and anger than non-isolated patients. A basis for these patient perceptions has been provided in some studies showing that the frequency and duration of CP room visits by HCP (including attending physicians) tended to be fewer and shorter with
patients under CP compared to those who were not. From the perspective of the HCP, CP compliance is time-consuming, resulting in fewer opportunities for random patient checks and a reduction in their time available for overall health care delivery. Perhaps as a consequence of reduced interaction with caregivers, some studies have identified increased harm to patients under CP from preventable, supportive care failures that include falls, ulcers and abnormalities in fluid and electrolyte balance. Reports of adverse medical outcomes have also been reported, but are not consistently supported by the general literature and may reflect facility- or outcome-specific events.

On the operational side, heavy utilization of CP can also lead to interference in effective patient flow. A variety of studies examining wait times show significant delays in new admission intake and transfers from other units that are linked to the availability of private rooms. Conversely, delays in transferring patients under CP out of the ICU to long-term and other facilities have been reported.

Use of CP may contribute to adverse satisfaction reporting on the part of the patient which can also have an impact on the facility as a whole. In 2005, the National Quality Forum (NQF) endorsed the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey which is a nationally standardized, publicly reported survey that measures patient satisfaction related to their hospital stay. Public reporting began in 2008 and is a very effective way for consumers to choose their providers based on information released from the surveys. HCAHPS scores, based on four consecutive quarters of patient surveys, are publicly reported on the Hospital Compare Web site.

In addition to concerns for optimizing patient care and safety, the utilization of CP generates an economic burden through direct costs that can be significant. Therefore, unnecessary uses of CP in providing for the safety and well-being of patients represents an unwarranted cost to the facility. When taken together, these considerations argue in favor of investigating effective mechanisms through which CP use can be modified and reduced for the benefit of the patient as well as the health care facility.

The previously cited paper by Huang and colleagues offered important insight into strategies for the control of MRSA that were derived from their multi-center controlled study of more than 74,000 ICU patients. One of the most informative observations of the work was that universal nasal decolonization with mupirocin along with CHG decolonization of the skin was significantly more effective than either screening and isolating or targeting nasal decolonization to identified MRSA carriers. The universal approach avoids the loss of time required for test results and allows patients to undergo immediate initiation of nasal decolonization on admission. In a later evaluation of the study results, the authors reported on substantial cost savings realized with universal decolonization compared to screen and isolate or treat approaches. However, despite the superiority of the universal decolonization strategy, concerns regarding antibiotic stewardship and the universal use of mupirocin have impeded its adoption.

The availability of a non-antibiotic, nasal antiseptic for use as an alternative to mupirocin for nasal decolonization provides a new lens through which to view strategies for MRSA control. A hospital study on replacing CP with skin and nasal decolonization compared the reduced CP year with the prior year and results showed their relatively low MRSA rates remained unchanged while CP costs were reduced by 40%.

In an evaluation of the study results, the authors reported on substantial cost savings realized with universal decolonization compared to screen and isolate or treat approaches.
through the 2-day average length of stay and extended by instruction for self-administration for 5-7 days into the post-discharge period. Mean infection rates were significantly decreased by 81% from 1.76 to 0.33 per 100 surgeries during the 15-month trial, when compared with the prior 9-month baseline. In 3 of the 5 treatment quarters, these SSI rates decreased to zero.17

In 2016, at the annual APIC meeting, a 113-bed acute care hospital presented the results of their year-long facility-wide selective reduction of CP use.18 The prior protocol, in which CP was applied to all patients with active MRSA infection, nasal colonization or MRSA history, was modified to apply CP only to those with active MRSA infection. Patients in all three categories were treated daily with the alcohol-based nasal antiseptic and all ICU patients were bathed daily with CHG. To reduce further risk, patients with current colonization or MRSA history were not cohorted with patients with wounds or any line more invasive than a peripheral IV or indwelling urinary catheter. In comparing the reduced CP year with the prior year, their relatively low MRSA rates remained unchanged and CP costs were reduced by 40%.

As described above, recommendations for the application of CP are driven by the need to reduce the likelihood of MRSA transmission from patients to their healthcare providers and, subsequently, to other patients and the environment.8 When considering the placement of asymptomatic patients under CP, it is important to note that although transmission risk to others is reduced by doing so, unless these patients undergo nasal and skin decolonization they are not being provided protection from self-inoculation.

In a recent longitudinal study in a VA facility, assessment of infection and nasal strain concordance indicated that self-inoculation was the apparent cause of MRSA infections in 85% of their patients.19 Therefore, the application of preventive nasal and skin decolonization in isolated asymptomatic patients to address this risk might certainly warrant consideration.

Replacing CP as a means for improving patient care and satisfaction, containing costs, and assisting hospital personnel with easing unnecessary burdens, appears to be finding a place in the ever-changing field of infection prevention. While adhering to the basic principles of Standard Precautions, which form the basis for prevention of transmission of infections, healthcare facilities should strongly consider the benefits of replacing CP with a universal decolonization bundle that includes a nasal antiseptic in preventing MRSA transmission.
References


2. CDC/HICPAC. Prevention of transmission of multidrug resistant organisms 2006. Available at: www.cdc.gov/hicpac/mdro/mdro_5.html


4. Healthcare Facility HAI Reporting Requirements to CMS via NHSN. Available at: https://www.cdc.gov/nhsn/cms/index.html


13. Medicare Gov; Hospital Compare. Available at: https://www.medicare.gov/hospitalcompare/search.html


