has the potential to expand the use of chlorhexidine bathing. Institutions will be able to use the currently available supply of chlorhexidine to produce the bathing solutions. The use of every other day bathing kept skin irritation low and not significantly different than bathing with soap and water.

There still remain major areas to address before there is a call for all ICU patients to undergo chlorhexidine bathing. The stage is set for future studies to confirm that chlorhexidine bathing can reduce individual HAIs. Moving forward with future studies, we must be vigilant to appraise the effects of chlorhexidine bathing on pathogen susceptibility patterns. Widespread use of disinfectants has the potential to create an environment for resistant pathogens, as there are already signals of reduced susceptibilities of some organisms to chlorhexidine (15, 16).

Until we are able to maintain the normal (less pathogenic) microbiome in critically ill patients, reducing any bacterial burden via decolonization provides the currently available best option to reduce CLABSI, with evidence building to reduce HAIs.

REFERENCES


Stress Ulcer Prophylaxis Deadoption: What is the Barrier?*

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In 1969, Skillman et al (1) reported a clinical syndrome of lethal stress ulceration in seven of 150 consecutive ICU patients (5%). These patients had in common respiratory failure, hypotension, and sepsis. Pathologic examination demonstrated multiple superficial ulcers, which were confined to the gastric fundus. Following this report, these authors performed a randomized controlled study in which 100 critically ill ICU patients at risk of “stress ulceration” were randomized to either antacid prophylaxis or no prophylaxis (2). Two of 51 treated patients (4%) had gastrointestinal bleeding as compared to 12 of 49 control patients (25%) (p < 0.005). Subsequent studies confirmed this finding and meta-analyses published by Cook et al (3, 4) in 1991 and 1996 demonstrated that histamine-2 receptor blockers (H2RB) decreased the risk of bleeding from stress ulceration when compared with placebo. None of these studies however demonstrated a reduction in mortality or length of hospital stay with the use of stress ulcer prophylaxis (SUP). In 1994, Cook et al (5) published the results of a prospective multicenter cohort study in which they evaluated the risk factors for bleeding from stress ulceration in

*See also p. 1842.

Key Words: de-adoption; stress ulceration; stress ulcer prophylaxis

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ICU patients. Of the 2,252 patients enrolled, 1.5% had “clinically important bleeding.” The authors of this study identified two independent risk factors for bleeding, namely, respiratory failure (odds ratio, 15.6) and coagulopathy (odds ratio, 4.3). Despite the fact that these authors suggested that SUP could be safely withheld from ICU patients unless they had a coagulopathy or required mechanical ventilation, SUP soon became regarded as the standard of care in all ICU patients around the world (6–8). Furthermore, SUP was frequently continued in patients discharged from the ICU and at hospital discharge (6, 7, 9). In addition, proton pump inhibitors (PPIs) largely replaced H2RB’s as the choice of SUP (6, 10).

SUP is not a benign intervention. It would appear to be no accident of natural selection that the gastric mucosa of mammalian species secretes acid. Acid plays an important role in protein digestion, but more importantly sterilizes the upper gastrointestinal tract. Acid suppressive therapy is associated with increased colonization of the upper gastrointestinal tract with potentially pathogenic organisms. This likely increases the risk of hospital-acquired pneumonia. In a large prospective pharmacoepidemiologic cohort study involving non-ICU hospitalized patients, Herzig et al (11) demonstrated that acid-suppressive medication was associated with a 30% increased odds ratio of hospital-acquired pneumonia. Furthermore, the use of gastric acid suppressive therapy together with the use of broad spectrum antibiotics has been associated with an increased risk of Clostridia difficile infection (12–14). Gastric acidity may be important in destroying ingested C. difficile spores while broad spectrum antibiotics reduce colonization resistance (15). The rapid increase in the prevalence of C. difficile colitis in hospitalized patients during the last decade may be causally related to the exploding use of PPI’s.

During the past 2 decades, the rate of stress-related gastrointestinal bleeding has declined substantially; this observation is probably related to improved resuscitation and early enteral feeding of critically ill patients (6, 16). In 2014, Krag et al (17) performed a systematic review with trial sequential analysis comparing SUP versus placebo or no prophylaxis in critically ill patients. Trial sequential analysis demonstrated no difference in the risk of bleeding between SUP and the no-SUP groups. The authors concluded that “both the quality and the quantity of evidence supporting the use of SUP in adult ICU patients are low.” In a large propensity-matched cohort study of patient with severe sepsis, Sasabuchi et al (18) demonstrated that SUP was integral to a physician’s practice which they judged to be beneficial in these patients. Although limited by the relatively small sample size, this study supports the findings of the more recent studies which suggest that the potential risks associated with the use of routine SUP may outweigh any potential benefit. The Hippocratic dictum “Primum Non Nocere” would dictate that it is now time to abandon routine SUP. Acid suppressive therapy should be reserved for patients with clinically evident upper gastrointestinal bleeding or those with known peptic ulcer disease. In 1842, Curling (20) reported 10 cases of severe hemorrhage from duodenal “stress ulceration” in patients who had suffered burns. Curling ulcers appear to have become “extinct” in contemporary medicine (21); however, this may be the result of the ubiquitous use of SUP in these patients. The role of routine SUP in patients with burns is unclear as these patients have been excluded from the recent studies cited above. While SUP is frequently prescribed in patients receiving corticosteroids, there is no evidence that these drugs cause peptic ulceration, and hence SUP is unlikely to be beneficial in these patients (22).

It is now time to deadopt the routine use of SUP in ICU patients. However, real-life experience suggests that physicians are slow to deadopt practices once considered routine when these practices are shown to be ineffective or even harmful (23, 24). The failures to deadopt tight glycemic control and the persistent use of the central venous pressure to guide fluid resuscitation are recent examples of this pervasive problem (25, 26). Multiple factors likely contribute to the inertia of deadopting the “lack of comfort” in abandoning a practice that was integral to a physician’s practice which they judged to be beneficial (beliefs vs science), the fear of change itself, the perceived shame at having used a discredited or obsolete practice and the failure of the practitioner to fully appreciate the scope of the science (23). Furthermore, specialist societies frequently continue to support established clinical practices in the face of published evidence that favors deadopt (8, 27). It is essential that established standards of care be abandoned when what was thought to be beneficial is proven be ineffective or harmful (28). It is now time to abandon routine SUP.

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An H1N1 Update: Deja Flu?*

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In 2009, a novel influenza strain, H1N1, was found to cause illness in humans. The virus spread globally within months, resulting in the first influenza pandemic since 1968. Unlike typical seasonal flu strains, H1N1 predominantly impacted children and younger adults, with rapid onset critical illness and high rates of mortality from acute respiratory distress syndrome (ARDS) and multiple organ failure (1). Prior analyses demonstrated wide-ranging mortality rates in H1N1-mediated critical illness between different countries (1). This difference was particularly striking between the North American countries of Canada and Mexico (1–3). Possible reasons for the disparate levels included variable access to critical care given high demand and easier identification and selective inclusion of sicker patients (2, 3). Although these studies provided invaluable information early in the pandemic, direct comparison of the data to determine the causal mechanisms underlying the mortality difference is fraught with difficulty due to confounding variables and baseline differences.

In the years since the initial pandemic, H1N1 has emerged as the predominant seasonal influenza strain (4). Despite an early peak in cases of H3N2 early in this influenza season, H1N1 has become the predominant strain in all age groups with the greatest number of cases in the nonelderly adult population of 25–64. Furthermore, H1N1 has been responsible for 90% of all hospitalizations attributable to influenza this season in which subtyping was available (4, 5). Preliminary reports have also revealed that the overall vaccine effectiveness for H1N1 at 51%, well below the efficacy for the other included influenza strains (6). As of early March 2016, cases of H1N1 were on the rise in the United States with widespread activity noted in as many as 40 states (5). Despite the rise, death rates from H1N1 remain below epidemic level nationally as of early March. Unfortunately, the activity of H1N1 has previously extended outside of the typical influenza season (1), and it is very likely there will be more cases before the current season is over. Given

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*See also p. 1861.

Key Words: Canada; critical care; influenza A virus, H1N1 subtype; Mexico

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