Chlorhexidine bathing every other day still does the trick, but it may come at a cost

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Comment on: Swan JT, Ashton CM, Bui LN, *et al*. Effect of Chlorhexidine Bathing Every Other Day on Prevention of Hospital-Acquired Infections in the Surgical ICU: A Single-Center, Randomized Controlled Trial. Crit Care Med 2016;44:1822-32.

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In current times, hospital-acquired infections (HAI) are one of the leading causes of mortality worldwide (1), therefore it is overwhelmingly necessary to discover innovative ways to reduce them. Aside from the increased risk of death for any patient with a HAI, there are other detrimental aspects regarding them such as; increased length of hospital stay, increased economic cost and extended disability only to name a few (2).

Over the last decade strategies such as patients' whole-body bathing with chlorhexidine (CHX) has been a resource for such purpose. This has being perceived as a simple strategy that reduces the number of HAIs especially in critically ill patients (3,4). Nevertheless it is important to mention that more recent reports suggest that this is not a strategy that can be used in a widespread manner (5).

Swan *et al*. in a well-planned study (6) explored a variation of the standard daily bathing as an alternate approach. This variation consisted in using CHX bathing every other day interlaced with a traditional soap and water bath proving this to be another approach capable of reducing HAIs. In the study, there is a statistically significant reduction in all four types of HAIs: catheter-related urinary tract infections (CR-UTI), primary bloodstream infections (BSI), ventilator-associated pneumonia (VAP) and surgical-site infections (SSI). Only few studies have significantly reduced HAIs in surgical ICUs by using CHX-bathing-related interventions since most of the HAIs' reductions have been shown to have a higher impact in the medical ICU rather than the surgical ICU.

Although commendable results by Swan and colleagues, it would have been very interesting to see how the intermittent intervention would perform against daily bathing with CHX. The study did not express clearly the rationale for the intermittent use of CHX bathing *vs*. soap and water; while reducing HAI; did the trial intend to also reduce costs by using less CHX? Or a change in microbiological burden? Or both?

Given the fact that the clinical implications of CHX resistance are not fully understood, one can only speculate that through time antimicrobial resistance might be induced; just like it would happen with any antimicrobial agent intermittently exposed to any given initially susceptible microorganism.

Gram positive cocci (GPC) have been the mostly reduced microorganism when CHX is used and subsequently HAI caused predominantly by GPC have followed that reduction. Historically CHX's whole body cleansing in critically ill patients have shown a higher overall impact for reducing BSI; central line associated-BSI (CLABSI), contaminated blood cultures, primary BSI and hospital acquired-BSI (7,8). No comment was made for CLABSI in the trial by Swan *et al*. only for primary BSI. As for any well-planned intervention intending to reduce infection rates, the highest impact will be noted when the rates are higher, and as the rates are lower it will be more difficult for any intervention to have a strong impact; If the authors had a low rate of CLABSI before intermittent bathing with CHX then it would be more difficult to demonstrate a

benefit specifically for the reduction of CLABSI rates.

Experience with daily CHX bathing and *Acinetobacter baumannii* (*A. baumannii*) has shown to promote clone selection with high antimicrobial resistance. In that study (9) during a continuous 6-month exposure the reduction was greatly observed not only in the number of HAI caused by *A. baumannii*, but also in the progressive emergence in a clone of *A. baumannii* with higher biofilm production than others. Contrary to what was expected it seemed that bathing patients with CHX facilitated the establishment of a "more virulent" *A. baumannii* clone. Another study (10) looked at expression of *VanA* genes of *Enterococci* demonstrating that sun inhibitory concentrations of CHX induced expression of VanA-type vancomycin resistance genes and genes associated with daptomycin non-susceptibility. These studies emphasize the important ecological impact of these types of interventions. From a microbiological standpoint there is uncertainty as to what changes will follow these types of intermittent or prolonged interventions in the hospitals' microbiology; could these intermittent exposures develop the sufficient resistance that will make CHX useless in the following years?

Never the less this study provides a new insight into a simple and effective method for reducing HAI in a surgical ICU; but will economic cost reduction come at a higher microbiologic cost in the long run?

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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