LETTERS TO THE EDITOR

Does the Composition of Urinary Catheters Influence Clinical Outcomes and the Results of Research Studies?

TO THE EDITOR—We enjoyed reading the recent article by Srinivasan et al. on the use of silver alloy-coated catheters.[1] The authors state that previous studies demonstrated that silver alloy–coated catheters were more effective in reducing the incidence of urinary tract infection (UTI) than were uncoated latex-based catheters. However, in their study, silver alloy–coated catheters were not more effective in preventing UTI than uncoated silicone catheters. Perhaps silicone catheters simply have better properties than latex catheters and they are not incrementally improved by silver alloy coating. This hypothesis is supported by a recent systematic review of antimicrobial urinary catheters.

We performed a reanalysis of the data reviewed by Johnson et al.[2] to test the hypothesis that the efficacy of silver hydrogel–coated catheters differs on the basis of whether the control catheter is latex or silicone. As can be seen from the Figure, studies in which the control catheter was composed of latex show a much larger reduction in the risk of UTI, compared with studies in which the control catheter was composed of silicone (risk reduction −65% vs. −18%).[3-9]

On the basis of the aggregate data, the number of patients needed to treat (NNT) to prevent 1 UTI was 6 in studies in which the control catheter was latex, but was 104 in studies in which the control catheter was silicone. Incorporating the results of the study by Srinivasan et al. into the analysis does not appreciably alter our findings; use of a silver hydrogel–coated catheter results in a modest UTI risk reduction of −17%, and the NNT to prevent 1 UTI is 65.

The explanation for these large differences in clinical efficacy remains hypothetical. Individual brands of catheters may contain other chemicals, including vulcanizers, dyes, accelerators, and stabilizers. These chemicals can dissolve and exert local toxic effects, causing inflammation and stricture formation.[6] In the 1980s, epidemics of stricture formation were reported among males with latex catheters, which ended following substitution with silicone catheters.[10] A comparative trial demonstrated that fewer strictures formed with use of silicone catheters than with latex catheters.[11] Silicone catheters have been reported to have smoother surfaces than latex catheters.[12] Ruutu et al.[13] evaluated the cellular toxicity of eluates derived from various brands of catheters. Eluates from some of the latex products showed cytotoxicity and inhibited cell growth, whereas eluates from silicone catheters had less influence on cell growth. Edwards et al.[14] demonstrated that silicone catheters provoked fewer inflammatory reactions in rat bladders than did latex catheters. A randomized trial demonstrated that silicone catheters were associated with less penile discomfort and less purulent urethral discharge (clinical urethritis) than were latex catheters.[15]

The lumens of silicone catheters are wider than those of latex-based catheters with similar external diameters.[16] Silicone catheters have been shown to be less prone to obstruction by encrustations.[16] Encrustations harbor large numbers of organisms, and encrustations on the external surface of the catheter may be a source of irritation and trauma.

Taken as a whole, current data suggest that commercially available silver-coated silicone urinary catheters only offer

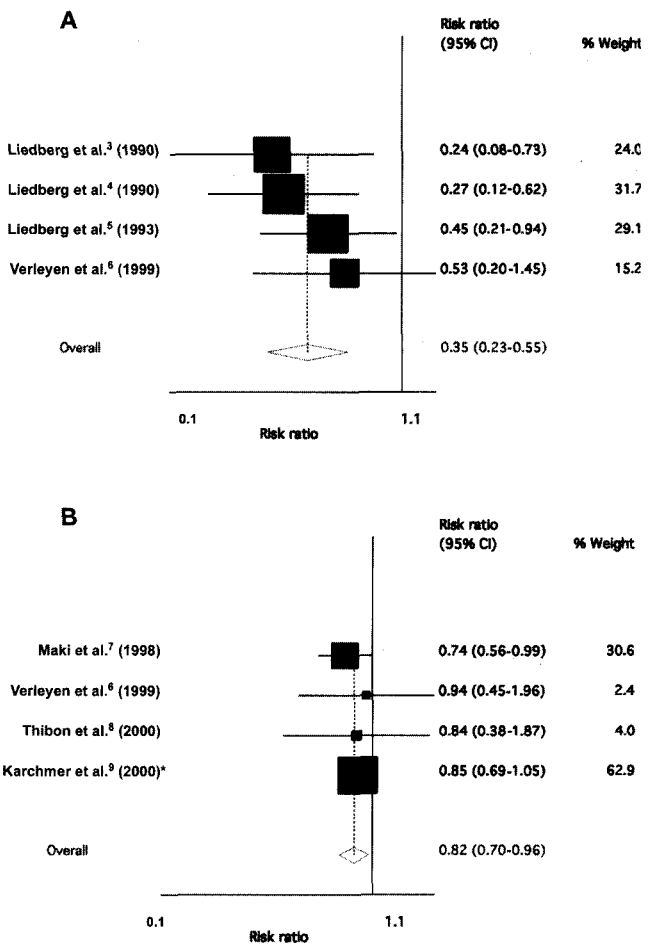

FIGURE. Forest plots results of clinical trials in which the control catheter was composed of latex *(A)* or silicone *(B)*. *Control catheter composed of latex with a silicone coating. *CI*, confidence interval. The risk ratio is indicated by the horizontal position of the solid black squares. The relative sample size of each trial is indicated by the size of the solid black squares, which corresponds to the percentage weight (rightmost column) each trial contributed to the summary risk ratio estimate.

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modestly greater benefits than uncoated catheters made of silicone. Perhaps silicone catheters simply have better properties than latex catheters and they are only minimally improved by silver coating.

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Barriers to and Facilitators of Implementing an Intervention to Reduce the Incidence of Catheter-Associated Bloodstream Infections

There are several published reports showing that educational interventions to standardize catheter insertion and care are effective in reducing the incidence of catheter-associated bloodstream infection (BSI), with reported decreases ranging from 28%-67%.[1-4] However, none of these reports have completely delineated the steps for implementing each intervention. Given the complexity of today's healthcare system, understanding the perceived barriers to and facilitators of implementing an intervention may streamline future implementation of similar interventions at other institutions, allow future implementers to replicate and/or enhance successful interventions or to modify and improve unsuccessful interventions.

In 2002, a multicenter BSI educational intervention was implemented in intensive care units (ICUs) at 6 centers of the Prevention Epicenters Program. The Prevention Epicenters consisted of 7 academic medical centers that work with the US Centers for Disease Control and Prevention (CDC) under a cooperative agreement to assess the effectiveness of interventions to prevent healthcare-associated infections. The Epicenter BSI educational intervention was designed at one center, the originating institution, and then implemented at the other 6 centers. In total, the study included a 3-month baseline period, 6-month implementation period (ie, the period during which intervention was introduced), and 6-month follow-up period. The intervention consisted of 3 components: a 9-page self-study educational module summarizing prevention strategies for BSI (some Prevention Epicenters also presented slide shows); a pretest and a posttest to measure knowledge of BSI prevention; and informational posters and fact sheets developed by the institutions. The institutions could implement each of the components as designed or modify them on the basis of specific organizational needs of the facility.

This report describes the perceived barriers to and facilitators of implementing this multicenter intervention at these