Reemergence of Staphylococcal Toxic Shock Syndrome in the United States since 2000

Schlievert et al. recently reported that the increased number of cases of toxic shock syndrome (TSS) observed by their surveillance group over the last 4 years in the Minneapolis-St. Paul metropolitan area is consistent with Centers for Disease Control and Prevention findings of an 18% increase in the incidence of TSS from 2002 to 2003 (3). He wisely cautioned medical practitioners and women using tampons (especially teenagers and young women) to be aware that the TSS incidence is rising.

Further, Schlievert et al. suggested that while the reason for this increased incidence is unclear, the possible role of changed tampon usage patterns might offer an explanation (3). I would like to support that contention with two additional observations. First, in 1999 the Food and Drug Administration proposed an amendment to tampon labeling regulation 21 CFR 801.430(e)(1) which provided an absorbency term for tampons that absorb 15 to 18 g of fluid, namely, ultra. Soon thereafter, tampons with this increased in absorbency became widely available on the marketplace, thereby making five categories of extant tampons, namely, light (<6 g), regular (6 to 9 g), super (9 to 12 g), super-plus (12 to 15 g), and ultra (15 to 18 g). Clearly, this permitted increase in absorbency is of concern because the statistical association of highly absorbent tampons with development of TSS has been unequivocally established (1, 2, 4). Thusly, this absorbency increase might also be a reason for the observed increased incidence of TSS. In the past, increases in absorbency were achieved by using more absorbent synthetic fibers. Although tampon composition has not recently changed, the increases in tampon absorbency can be accounted for by increased weight of the current component fibers.

Second, the Food and Drug Administration’s position on “8-h/overnight” usage of menstrual tampons may have also inadvertently contributed to the observed increased incidence of TSS by allowing manufacturers to use the word “overnight” on their packaging (even though they explain that by that word they mean 8 h or less). Simply put, women may not be able to precisely control their sleeping cycles and therefore may sleep considerably longer than 8 h with a more absorbent tampon in place, thus increasing their risk for TSS development.

Implicit with the pattern of tampon usage is its absorbency, which in turn is related to length of use. In conclusion, it seems prudent, in light of accumulating data, to suggest that if tampons are to be used at bedtime the timeframe of their use must be controlled or they should not be used. Additionally, tampon absorbency should be reduced to the pre-2000 absorbency levels with capacity limits of no more than 15 g of fluid as an extra measure of safety.

REFERENCES


Authors’ Reply

Dr. Philip Tierno’s response suggests the reason for increased toxic shock syndrome (TSS) cases reported from 2000 through 2003 resulted from (i) marketing of ultra absorbency tampons, (ii) tampon compositions, and (iii) overnight tampon use.

We do not believe the reasons raised by Dr. Tierno provide adequate explanations for our data. First, recommendations for tampon use advise women to use tampons of lowest absorbency to control menstrual flow. These recommendations suggest the majority of women will not use tampons of ultra absorbency. Although such tampons are available, they are not highly used today. We are not aware of TSS cases associated with their use.

Dr. Tierno has long suggested that tampons made exclusively of cotton reduce risk of TSS development by both reducing TSS toxin 1 production and sequestering toxin that is made, thereby rendering toxin unavailable to induce TSS (7). The majority of tampons available today are rayon or cotton-rayon blends. Tierno’s premise seemed attractive when first proposed, but subsequent studies failed to show that cotton bound to TSS toxin 1 or prevented TSS toxin 1 production (3, 5). Finally, there has been no epidemiological study showing overnight use of tampons is a risk factor for TSS.

The exact reasons for increased numbers as we reported are not known, but four possibilities are discussed. Our definition of TSS was potentially broader than definitions used by the Centers for Disease Control and Prevention (4, 6). We obtained strains from treating physicians and made the decision on TSS based only on criteria provided. Thus, a number of the patients may not have met all required criteria despite culturing toxin-producing organisms.

We stated in our report that the appearance of methicillin-resistant Staphylococcus aureus TSS isolates is an emerging problem, for both menstrual and nonmenstrual illnesses. Many such isolates in vitro make more superantigen toxins than methicillin-resistant S. aureus, and this could lead to TSS more rapidly.

It is possible that menarche is occurring earlier in life; that menstrual periods of this group are erratic; that these individuals are less likely to have neutralizing antibodies, thus increasing their susceptibility; and that their tampon usage patterns are changing (8).

S. aureus strains cycle in approximately 10-year intervals, as seen previously in hospital-associated 80/81 and 52/52A phage-type infections (1). We are possibly witnessing the emergence of new TSS S. aureus strains as is clearly the case for community-associated methicillin-resistant S. aureus which contributes to numbers in our report (2).
In sum, there must be explanations for increased TSS cases as reported in our studies. We believe the explanations provided by the Tierno commentary are incorrect. We suggest that one or more of the explanations we provide above are more plausible. However, establishment of definitive explanations awaits further epidemiological analysis.

REFERENCES


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