



EPIDEMIOLOGY BULLETIN

TOXIC-SHOCK SYNDROME

Toxic-Shock Syndrome (TSS) is a severe illness characterized by sudden onset of high fever with vomiting, diarrhea, and myalgia, followed by the development of hypotension and, in severe cases, shock. An erythematous, "sunburn-like" rash is present during the acute phase of the illness; about 10 days after onset, there is desquamation of the skin, particularly of the palms and soles (Table 1).

TABLE 1. Toxic-shock syndrome case definition

1. Fever (temperature ≥ 38.9 C [102 F]).
2. Rash (diffuse macular erythroderma).
3. Desquamation, 1-2 weeks after onset of illness, particularly of palms and soles.
4. Hypotension (systolic blood pressure < 90 mm Hg. for adults or < 5 th percentile by age for children < 16 years of age, or orthostatic syncope).
5. Involvement of 3 or more of the following organ systems:
 - A. Gastrointestinal (vomiting or diarrhea at onset of illness).
 - B. Muscular (severe myalgia or creatine phosphokinase level ≥ 2 x normal).
 - C. Mucous membrane (vaginal, oropharyngeal, or conjunctival hyperemia).
 - D. Renal (BUN or Cr ≥ 2 x normal or ≥ 5 white blood cells per high-power field - in the absence of a urinary tract infection).
 - E. Hepatic (total bilirubin, SGOT, or $_3$ SGPT ≥ 2 x normal).
 - F. Hematologic (platelets $< 100,000/\text{mm}^3$).
 - G. Central nervous system (disorientation or alterations in consciousness without focal neurologic signs when fever and hypotension are absent).
6. Negative results on the following tests, if obtained:
 - A. Blood, throat, or cerebrospinal fluid cultures.
 - B. Serologic tests for Rocky Mountain spotted fever, leptospirosis, or measles.

Cases of TSS continue to be reported to CDC. Since January 1980, 299 cases of TSS have been reported; 285 (95%) of these cases have been in women; there have been 25 (8.4%) deaths. Although cases have been recognized since 1975, reporting has increased over time. From earlier studies, the incidence of TSS was estimated to be 3/100,000 women of menstrual age per year, based on surveillance data from Wisconsin. It now appears that that rate underestimates the true incidence of the disease in menstruating women for 3 reasons: 1) there is incomplete reporting of cases, 2) the rate was based on severe cases meeting the strict case definition above that requires evidence of hypotension and involvement of 3 or more organ systems, and 3) not all women of menstrual age are actually menstruating. While the rate is still low, the severity of the illness and the case-fatality ratio make TSS a cause for concern, particularly since TSS occurs almost exclusively in previously healthy young women.

Approximately 95% of all reported cases of TSS in women have occurred during a menstrual period. A significant association between tampon use, particularly continuous use during the menstrual period, and the development of TSS has been found. The association with tampon use was corroborated by a separate study conducted by the Wisconsin State Health Department.

Preliminary results of the most recent CDC study, detailed below, suggest that there are differences in the brand of tampons used by TSS patients and controls. The proportions of cases and controls using a single brand of tampon exclusively during the menstrual period are shown in Table 2.

TABLE 2. Distribution of tampon brands among toxic-shock syndrome cases and controls using only one tampon brand

Tampon brand	Cases (N=42)	Controls (N=114)
Rely	71%	26%
Playtex	19%	25%
Tampax	5%	25%
Kotex	2%	12%
OB	2%	11%

The risk associated with use of Rely tampons was statistically significant ($P < .0001$, relative risk = 7.9; 95% confidence limits = 2.8 to 22.2). While cases of TSS have occurred with tampons produced by all 5 of the major U.S. tampon manufacturers, a substantially greater proportion of cases than controls in the present study used Rely tampons. Consistent with this finding is the fact that consumer use of Rely tampons has increased as the apparent incidence of TSS has increased. The Minnesota State Department of Health, has reported preliminary results of a study of cases of TSS occurring since early 1979. In this study, 10 (35%) of 29 cases and 9 (18%) of 50 matched controls used Rely tampons. These trends are similar to the results of the CDC study. However, other tampon manufacturers have changed the formulation of their products during the same period of time, and consumer buying practices have been changing rapidly. Moreover, it is possible that tampons are associated with TSS only because they serve as a proxy for some as yet uncharacterized risk factor. If so, the risk of various brands cannot be fully evaluated until such factors are identified and controlled.

Although the use of tampons is undoubtedly an important factor in the development of TSS in menstruating women, the pathogenesis of TSS is not yet fully understood. The isolation rates of S. aureus in cases and controls document an association between S. aureus and TSS. In a recent CDC study, S. aureus was isolated from the vaginas of 4 (7%) of 55 unmatched control women who visited family planning clinics during their menstrual periods. In contrast, S. aureus was isolated from 43 (98%) of 44 appropriately cultured TSS patients included in this tampon brand study ($P < 0.001$). This association is consistent with an etiologic role for S. aureus in this disease. Studies to date suggest that tampons play a contributing role, perhaps by carrying the organism from the fingers or the introitus into the vagina in the process of insertion, by providing a favorable environment for growth of the organism or elaboration of toxin regardless of the manner in which the organism is introduced, or by traumatizing the vaginal mucosa and thus facilitating local infection with S. aureus or absorption of toxin from the vagina.

Whatever roles S. aureus and tampons play in the development of TSS, certain preventive measures can be identified. Women can almost entirely eliminate their risk of TSS by not using tampons. Women who choose to use tampons can reduce their risk by using them intermittently during each menstrual period (that is, not use them all day and all night throughout the period). Rely tampons have recently been withdrawn from the market and the FDA has warned women to stop using them. If a woman chooses to use tampons and develops a high fever and vomiting or diarrhea during her menstrual period, she should discontinue tampon use and consult a physician immediately. Proper management of women suspected of having TSS includes a careful vaginal examination with removal of any retained tampons, inclusion of cervical and vaginal cultures for S. aureus among other cultures performed, and aggressive fluid replacement. Physicians should probably use beta-lactamase resistant antistaphylococcal antibiotics after appropriate cultures have been obtained. Such antibiotics are indicated in view of the evidence supporting their efficacy in preventing recurrences. In addition, because of the recurrence rate of 30%, CDC continues to recommend that women who have had an episode of TSS not use tampons at least until S. aureus has been eradicated from the vagina.

SOURCE: MMWR, September 19, 1980/Vol. 29/No. 37

SMALLPOX VACCINATION

The Immunization Practices Advisory Committee (ACIP) has recently (MMWR 29:417-420 September 5, 1980) said that, "Smallpox vaccination of civilians is now indicated only for laboratory workers directly involved with smallpox or closely related orthopox viruses (e.g., monkeypox, vaccinia, and others)". "There is no evidence that smallpox vaccination has therapeutic value in the treatment of recurrent herpes simplex infection, warts, or any other disease. Smallpox vaccine should never be used therapeutically."

At this point only four countries require proof of smallpox vaccinations for visitors. These are Democratic Kampuchea (Cambodia) in Asia and Madagascar, Djibouti, and Chad in Africa.

In Virginia the number of smallpox vaccinations administered by local health departments has decreased from 1,965 in fiscal 1976 to 248 in fiscal 1980. Routine vaccination of U.S. children was discontinued in 1971, and of hospital employees in 1976.

OPHTHALMIA NEONATORUM

New Rules and Regulations promulgated by the Board of Health now allow three additional modalities of therapy in addition to silver nitrate in each eye (2 drops of 1.0% solution) for the prevention of ophthalmia neonatorum:

1. two drops 1.0% tetracycline ophthalmic solution
2. one quarter inch or an excessive amount of 1.0% tetracycline ophthalmic ointment
3. one quarter inch or an excessive amount of 0.5% erythromycin ophthalmic ointment

A copy of the Rules and Regulations for Disease Reporting and Control will be sent to each Virginia physician as soon as printing is completed.

MONTH: SEPTEMBER

DISEASE	STATE					REGIONS				
	THIS MONTH	LAST MONTH	TOTAL TO DATE		MEAN 5 YEAR TO DATE	THIS MONTH				
			1980	1979		N.W.	N.	S.W.	C.	E.
CHICKENPOX	2	27	374	936	917.4				1	1
MEASLES	6	1	305	273	1325.6	6				
MUMPS	8	7	64	85	261.6		1	4		3
PERTUSSIS	1	2	7	12	13.2					1
RUBELLA	1		51	202	314.6		1			
MENINGITIS - ASEPTIC	41	41	137	179	108.4	3	10	12	10	6
BACTERIAL	10	15	138	126	92.0	1		3	4	2
ENCEPHALITIS - INFECTIOUS	10	6	27	26	20.4	1	4	1	2	2
POST-INFECTIOUS	2	1	5	13	6.4		1	1		
HEPATITIS A (INFECTIOUS)	31	28	236	205	242.4	2	12	10	3	4
B (SERUM)	43	57	405	335	223.4	1	20	4	12	6
SALMONELLOSIS	172	163	931	874	601.2	22	25	18	51	56
SHIGELLOSIS	20	20	99	215	124.8		6	14		
TUBERCULOSIS - PULMONARY	62	41	412	441	497.2					
EXTRA-PULMONARY	5	6	77	90	78.2					
SYPHILIS (PRIMARY & SECONDARY)	49	54	425	364	422.6	3	11	1	18	16
GONORRHEA	2,097	2,830	16,955	17,304	18400.6					
ROCKY MOUNTAIN SPOTTED FEVER	18	32	90	85	105.0	6	3	4	4	1
RABIES IN ANIMALS	1	4	13	16	37.4	1				
MENINGOCOCCAL INFECTIONS	5	8	49	54	41.6			3	1	1
INFLUENZA	8	1	770	355	5588.6	1		3	4	
MALARIA	8	7	56	21	14.0		6		1	1
OTHER: HISTOPLASMOSIS	1		7	5	NA			1		
KAWASAKI'S DISEASE	2	1	12	16	NA		1			1
LEPTOSPIROSIS	1		1	2	NA		1			
TETANUS	1		3	2	1.0					1
TYPHOID FEVER	3		7	4	5.2		2		1	

COUNTIES REPORTING ANIMAL RABIES: Rockingham - 1 raccoon

OCCUPATIONAL ILLNESSES: _____

Published Monthly by the
VIRGINIA HEALTH DEPARTMENT
 Division of Epidemiology
 109 Governor Street
 Richmond, Virginia
 23219

Bulk Rate U. S. POSTAGE PAID Richmond, Va. Permit No. 1225
