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The Invasive Investigator

Newsletter for the DoD Invasive Streptococcus Surveillance

Surveillance for Invasive *Streptococcus pyogenes* Continues at Military Training Centers

Introduction

Department of Defense (DoD) medical personnel are conducting surveillance for invasive *Streptococcus pyogenes* infections at military training installations throughout the United States as part of a protocol titled "An Epidemiological Study of Invasive *Streptococcus Pyogenes* Infections Among U.S. Military Personnel." When a case of invasive disease occurs, DoD medical personnel conduct a comprehensive bacteriologic and immunologic investigation of the patient and close contacts. This strategy may also be used to investigate invasive *S. pyogenes* cases that occur among active-duty personnel at other military sites. For more information, or if you have a suspected case of invasive disease at your facility, please contact one of the study investigators (see pg. 4).

News and Notes

There haven't been any additional cases of invasive *S. pyogenes* infection reported since the last newsletter in June. We would like to remind everyone that a positive blood culture is **not** necessary to meet the case definition for this study. A positive culture from a nonsterile site (throat, skin, etc.), in combination with toxic shock syndrome, also meets the case definition. The complete case definition is shown on page 3. Invasive *S. pyogenes* infection is a rare event, so we need to make sure that every case is identified. Most of the sites are doing a great job of reporting surveillance data. These data are very important, even if no positive cultures are found, because they allow for a better estimation of the incidence of invasive disease.

Since there are no new *S. pyogenes* case data to report, we thought it would be interesting to report the blood culture rates at the participating sites (page 2). This table shows the number of trainees and the number of blood cultures performed during each 2 week reporting period between June and December 1996. The average training population and number of blood cultures were calculated for each site, and rates were determined. Ft. Knox had the lowest blood culture rate (0.24 blood cultures/5,000 trainees/2 weeks) and Ft. Jackson had the highest rate (4.70), with most sites having a rate of about 2.

Characteristics of Invasive *Streptococcus pyogenes* Infections Described

A recent study in the New England Journal of Medicine (1996; 335:8, p 547-54) has estimated the incidence, identified risk factors, and recorded clinical characteristics of invasive *Streptococcus pyogenes* infection. Davies, et al. conducted a prospective, population-based study among residents of Ontario, Canada (pop. 10.7 million) to investigate invasive *S. pyogenes* infection, which was defined as isolation from a normally sterile site. 323 cases of invasive *S. pyogenes* infection were identified during 1992 and 1993, resulting in an annual incidence of 1.5/100,000 population. The rates of infection were highest among the younger (< 10 yrs) and older (> 60 yrs) segments of the population and more cases occurred in the winter. Other significant risk factors for invasive disease were recent chickenpox, alcohol abuse, and HIV infection. Household contacts of patients with invasive *S. pyogenes* infection were estimated to have 200 times greater risk of acquiring invasive disease than the general population!

Clinically, 13% of patients with *S. pyogenes* infections had streptococcal toxic shock syndrome (STSS). Bacteremia was found in 69% of the cases (93% of STSS cases). Mortality among all invasive disease patients was 15% (81% of STSS cases). The most common *S. pyogenes* serotypes were M1 (24%), M12 (7.4%), M4 (6.5%), M28 (6.2%), and M3 (5.8%). The toxin genes, SpeA and SpeC, were found in 26% and 44% of the isolates, respectively. There was a strong association between the M1 serotype and the SpeA gene, which was associated with STSS and death.

The researchers compared their results to the results of studies performed in other parts of the world and found that they were similar with respect to incidence and *S. pyogenes* serotypes. They also concluded that close contacts of invasive disease patients should undergo chemoprophylaxis because of their greatly increased risk for acquiring invasive disease. This study demonstrates that invasive *S. pyogenes* disease, although relatively rare, is a condition with significant morbidity having profound implications when it occurs among our crowded military training populations.

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Blood Culture Rates at Military Training Facilities

	NTC Great Lakes		Lackland AFB		Ft Jackson		Ft Knox		Ft Leonard Wood		Ft Sill		MCRD Parris Island		MCRD San Diego	
Period Ending	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures	# of Trainees	# Blood Cultures
9 Jun	4912	2	3537	0	5696	6	1793	0	4353	0	2839	0	2891	0	2259	0
23 Jun	5140	0	4221	0	5620	5	1371	0	5775	1	3599	3	3796	2	2886	1
7 Jul	6441	2	4361	0	7207	10	1853	0	6954	2	4220	4	4255	3	3386	2
21 Jul	7859	5	4253	3	9002	8	1170	0	7718	3	4200	2	4487	2	4202	2
4 Aug	9286	4	4780	1	-	-	2300	0	7621	0	4257	1	5142	0	4447	2
18 Aug	9774	4	4903	0	8794	12	1557	1	6956	3	4220	1	5284	1	4478	3
1 Sep	9790	1	4315	0	7902	8	4202	0	7031	-	4156	2	5538	2	4436	0
15 Sep	9667	2	4941	3	7529	5	4929	0	7191	0	4418	1	5004	5	4599	2
29 Sep	9242	2	4756	1	5545	5	5157	1	7560	1	4485	2	5495	2	4262	2
13 Oct	9735	2	4734	3	6873	6	4604	0	7548	1	4443	1	5470	2	3904	2
27 Oct	9155	3	4607	1	7848	9	3865	0	7050	4	4464	2	5000	0	3566	0
10 Nov	9794	4	3795	2	7041	9	-	-	6614	0	4192	3	5257	4	3899	2
24 Nov	7780	7	2952	9	8107	2	3909	0	6350	2	3921	0	5089	2	3162	1
8 Dec	-	-	2655	1	8470	5	3297	0	6076	1	3370	1	-	-	2791	1
Avg.	**8352**	**2.92**	**4201**	**1.71**	**7356**	**6.92**	**3077**	**0.15**	**6751**	**1.38**	**4056**	**1.64**	**4824**	**1.92**	**3734**	**1.43**
Rate per 5000 Trainees	**1.75**		**2.04**		**4.70**		**0.24**		**1.02**		**2.02**		**1.99**		**1.91**	

Case Definitions: Invasive *Streptococcus pyogenes* Infection and Streptococcal Toxic Shock Syndrome (STSS)

Invasive *S. pyogenes* infection: The isolation of *S. pyogenes* from a normally sterile site, such as blood, surgical wound, tissue biopsy, and cerebrospinal, pleural, or peritoneal fluid.

Streptococcal Toxic Shock Syndrome:[1]

A. Definite case:
1. Isolation of *S. pyogenes* from a normally sterile site as listed above
2. Hypotension - SBP $\leq$ 90 mmHg
3. Two or more of the following:
   a. Renal impairment - creatinine $\geq$ 177 mol/L ($\geq$ 2 mg/dL)
   b. Coagulopathy - platelets $\leq$ 100 x 10^9/L ($\leq$ 100,000/mm^3)
   c. Liver abnormalities - SGOT, SGPT, or total bilirubin $\geq$ 2 times the upper limit of normal
   d. Adult Respiratory Distress Syndrome (ARDS)
   e. A generalized erythematous macular rash that may desquamate
   f. Soft tissue necrosis, including necrotizing fasciitis or myositis, or gangrene

B. Probable case:
1. Isolation of *S. pyogenes* from a nonsterile site (throat, sputum, vagina, superficial skin lesion)
2. Hypotension - SBP $\leq$ 90 mmHg
3. Two or more of the following:
   a. Renal impairment - creatinine $\geq$ 177 mol/L ($\geq$ 2 mg/dL)
   b. Coagulopathy - platelets $\leq$ 100 x 10^9/L ($\leq$ 100,000/mm^3)
   c. Liver abnormalities - SGOT, SGPT, or total bilirubin $\geq$ 2 times the upper limit of normal
   d. Adult Respiratory Distress Syndrome (ARDS)
   e. A generalized erythematous macular rash that may desquamate
   f. Soft tissue necrosis, including necrotizing fasciitis or myositis, or gangrene

[1]Adapted from Stevens DL. Streptococcal toxic-shock syndrome: spectrum of disease, pathogenesis, and new concepts in treatment. *Emerging Infectious Diseases.* 1995;1(3): 69-77.