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Pseudomonas Folliculitis at a Hot Spring Resort

During June 1998, the Section of Epidemiology investigated an outbreak of illness at a hot spring resort in central Alaska. Our investigation identified 24 persons who developed rash after using the pool and hot tubs at the resort.

Six ill persons who had spent a day at the resort were initially reported to our office. We interviewed them about pool/hot tub exposure and performed physical examinations. Cultures were obtained from the lesions. A case of folliculitis was defined as the presence of two or more erythematous raised skin lesions 5-15 mm in diameter, not caused by mosquito bites, which occurred 1-7 days after visiting the resort over a particular weekend. We obtained a list of registered guests present during the same time period and telephoned these persons to obtain information about illness and pool/hot tub exposure using a standard questionnaire. Many of the guests were tourists traveling through Alaska, and most day visitors were not registered; it was not possible to follow-up on these persons.

Information gathered from day receipts and the hotel register indicated that over 200 people probably used the facilities on the same day as the six initially reported cases. Of 58 persons we interviewed who had used the pool/hot tubs at the resort, 18 new cases of rash were identified for an attack rate of 31% (18/58).

All 24 cases reported developing skin lesions within 12-48 hours of being at the resort. Each lesion progressed from a discrete follicular, pruritic papule to an erythematous maculo-papule, often with a central pustule. Lesions were distributed mostly over the arms, chest, back, and abdomen but also occurred on other areas of the body, including breasts, groin, legs, and feet. Other signs and symptoms included itchiness, fatigue, muscle aches, and axillary adenopathy.

Five identified case-patients had sought medical attention. The rash was correctly diagnosed in one case, in the others it was attributed either to mosquito bites, *Staphylococcus aureus* infection, or rash of unknown origin. Two cases had been started on an oral cephalosporin. Three cultures we obtained from the initial cases grew *Pseudomonas aeruginosa* at the State Public Health Laboratory. All rashes resolved spontaneously.

After the initial cases were reported, the State Department of Environmental Conservation (DEC) investigated the facility. Record keeping was found to be inadequate, and chlorine levels were frequently below the minimal required level with no indication of remedial measures being taken. DEC temporarily closed the pool and hot tubs. Water samples were collected from the two hot tubs, the pool, and an outdoor pond. In addition, environmental swabs were taken from the filters and edges of each vessel. *Pseudomonas aeruginosa* was cultured from the pool filter. The filters were changed, and the pool and tubs drained and super-chlorinated according to the DEC's instructions. Repeat cultures were negative for *Pseudomonas*, and the facility was allowed to reopen.

An analysis of pool/hot tub use did not implicate any particular vessel. Because most guests used multiple vessels, finding a risk associated with use of any one vessel was not expected. Use of the pool or a hot tub during the afternoon was significantly associated with illness (relative risk = 5.4, 95% confidence interval 1.4-57.3). This was presumably due to progressively increasing amounts of organic matter introduced by bathers and subsequent bacterial overgrowth. There were no records of chlorine levels at that time. Longer duration of pool use was also significantly associated with rash (chi-square for linear trend = 7.5, $p < 0.05$).

Comments: This investigation documented 24 persons with rash after using the pool/hot tubs at an Alaska resort. Three-case patients had skin cultures positive for *Pseudomonas aeruginosa*. Presumably, the other cases had *Pseudomonas* folliculitis as well. With an attack rate of 31%, there would have been over 60 cases if all 200 plus day users and registered guests had used the pool and hot tubs.

This outbreak underscores the importance of maintaining adequate chlorine and pH levels in hot tubs and pools, and the importance of regular monitoring of these levels. Owners and operators of public spas need to understand that improper operation and maintenance can lead to bacterial overgrowth and result in rash among users.

Health care providers should keep *Pseudomonas* folliculitis in the differential for rash and question patients about pool or hot tub use. The Section of Epidemiology should be contacted if patients are seen with rash possibly associated with use of public hot tubs or pools.

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