

# *Pseudomonas aeruginosa* folliculitis from a contaminated bathing sponge: 2 cases from Singapore

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## Introduction

*Pseudomonas aeruginosa*, a gram negative bacillus, is a transient member of skin flora. It occurs in soil and water and may readily colonize moist skin lesions, ulcers and burns. In immunocompetent patients, it can cause intertrigo, folliculitis, external otitis, nail infection or superinfection of leg ulcers and burns. In immunosuppressed patients, cellulites and ecthyma gangrenosum are severe complications of *Pseudomonas aeruginosa* sepsis<sup>1</sup>.

*Pseudomonas aeruginosa* folliculitis occurs in persons who bathe in contaminated water or use objects that can harbor the organism. Most often *Pseudomonas aeruginosa* folliculitis has been associated with use of overpopulated, underhalogenated hot tubs, whirlpools and saunas, and occasionally from swimming pools. It has also occurred through the use of contaminated synthetic and loofah sponges, diving suits, skin depilation and sporadically with no obvious recreational exposure<sup>2</sup>.

We report 2 cases of *Pseudomonas aeruginosa* folliculitis acquired from a bathing sponge. To our knowledge, this is the first report of *Pseudomonas* folliculitis in Singapore.

## Report of cases

A 5 year old girl and her 7 year old brother had recurrent attacks of slightly itchy erythematous follicular papules and pustules over the trunk, buttocks and lower limbs for 2 months (Fig.1). The rash used to clear in 1 to 2 weeks with or without treatment. They had no fever or any other systemic manifestations. There was no history of recent usage of any spas, except for public swimming pool which they didn't visit for the last 2 months. They reported resolution of skin lesions after use of topical mupirocin and clindamycin, and oral amoxicillin-clavulanic acid

(Augmentin), but lesions kept recurring thereafter. It was not clear whether the lesions cleared due to treatment or due to their natural history.



**Figure 1.** This photograph shows the distribution of erythematous follicular papules and pustules on lower trunk, buttocks and lower limbs in the 5 year old girl.

A few weeks earlier, their paternal grandmother, who was on a visit from overseas who had used the same bathtub, has had a similar skin eruption on her trunk and extremities during her stay. That eruption had resolved when she went back home. Interestingly, the parents of the affected children have not acquired similar skin manifestations at any time.

The white blood cell count and ESR were unremarkable. A bacterial culture from the follicular pustules in the girl on two occasions and in the boy on one occasion revealed the growth of *Pseudomonas aeruginosa*.

Histology showed folliculitis with neutrophil infiltration beneath and within the hair follicle (Fig. 2).

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Bacterial cultures were taken from different sites and common items used in the childrens bathroom. *Pseudomonas aeruginosa* was cultured from a synthetic bathing sponge and from the wash cloth. The antibiotic sensitivity pattern of all the cultures were similar, with sensitivity for piperacillin/tazobactam, cefepime, aztreonam, gentamicin and ciprofloxacin. The specimens taken from bath tub drain and shower head were negative for *Pseudomonas*.



**Figure 2.** This vertical section through a follicular papule shows a neutrophil infiltrate within and beneath hair follicle. (Haematoxylin-eosin stain;  $\times 100$ .)

The family was advised to stop using any bathing sponges, wash cloth or any other form of scrubbing devices and discard the previously used infected items. They were also advised to avoid using the bath tub for sometime. The affected children were prescribed potassium permanganate soaks and silversulphadiazine cream to be applied topically to the affected areas. All the skin lesions cleared after 2 weeks and they did not recur.

### Discussion

*Pseudomonas aeruginosa* folliculitis clinical manifestations appear after an incubation period of 8 hours to 5 days. It usually occurs in epidemics among users of spa pools, hot tubs, whirlpools and swimming pools less frequently. *Pseudomonas* folliculitis can develop sporadically subsequent to the use of sponges for bathing and showering<sup>3</sup>.

Although *Pseudomonas aeruginosa* can not survive long on normal dry human skin, it has been shown in experimental conditions of superhydration of stratum corneum, that *P. aeruginosa* may proliferate in great numbers<sup>4</sup>.

Serotype and pyocin type were not determined in our cases. However, isolation of *Pseudomonas* from the sponge, wash-cloth and the skin lesions, resolution of lesions after elimination of the contaminated sponge, similar antibiotic sensitivity pattern of all the cultures, clearing of the grandmother's lesions after leaving, and, all strongly suggest that the scrubbing devices (sponge and washcloth) were the source of this infection.

Serotype 0:11 has been the single most common aetiological agent in *P. folliculitis*. Other serotypes known to cause this disease are 0:1 , 0:4 , 0:6 , 0:9 and 0:10<sup>5</sup>.

The new dry "loofah" sponges contain a sparse bacterial flora, while the dry 'in use' sponges contain a flora of predominantly gram positive cocci (staphylococci, micrococci) and bacillus species<sup>6</sup>. If the sponge is allowed to remain wet, especially after use, the microbial flora become enormous and shifts to predominantly gram negative species, including *Pseudomonas aeruginosa*<sup>7</sup>.

Clinically, *Pseudomonas* folliculitis manifests as macules, papules, papulopustules, nodules and/or urticarial rashes occurring on any body part that is subject to infected water (or objects)<sup>4</sup>. Occasional associated symptoms include sore throat, conjunctival irritation, rhinitis, fever, nausea, vomiting, abdominal cramps, general malaise, headache, breast tenderness and painful axillary lymphadenopathy.

Important differential diagnoses to consider in case of *Pseudomonas* folliculitis include insect bites, scabies, staphylococcal folliculitis, pseudofolliculitis, pityriasis folliculitis, contact dermatitis, miliaria profunda, viral eruptions and urticaria.

Often, no treatment is needed for *P. aeruginosa* folliculitis, lesions usually clear spontaneously in 2 to 10 days, provided that the causal source has been eliminated. There is no indication that topical or oral antibiotics alter the course of the skin condition<sup>8</sup>. However, 1% acetic acid compresses, potassium permanganate soaks and silver sulphadiazine cream may help.

Persistent colonization of the skin surface by *P. aeruginosa* may rarely cause malignant otitis media or recalcitrant osteomyelitis, if a breach of inner tissues occurs, even in the non-immunocompromised. In the immunocompromised it can cause life threatening infections more easily.

To prevent *Pseudomonas* folliculitis, it is recommended to dry the sponge between uses. A prolonged drying (>2 weeks) is necessary to bring about a substantial diminution in bacterial counts which, upon subsequent rehydration, are elevated again. It is also strongly recommended that sponges undergo regular hypochlorite (bleach) decontamination<sup>6</sup>. Proper maintenance and chlorination of pools, hot tubs, and spas are essential in decreasing the population of *Pseudomonas*. If possible use of bath sponges and similar items should be abandoned. Bathtubs should be cleaned well and allowed to be dry at least periodically.

This case highlights that *Pseudomonas* folliculitis should be considered in the differential diagnosis of recurrent follicular papular or pustular lesions in the immunocompetent hosts. Appropriate hygienic and preventive measures are very important in successful management of such cases.

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