



A Rare Pathogen in a Burn Patient: *Pantoea agglomerans*

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Abstract

Children with burn injuries are prone to increased risk for infection. *Pantoea agglomerans* is a particularly uncommon microorganism related to burn wound infections. A previously healthy, 28-month-old-boy was admitted with scald due to hot water. His general condition was moderate with normal vital signs. He had full thickness (right anterior forearm, 1.5%) and partial thickness (upper part of left arm, 0.5%; left anterior forearm, 2%; right thigh, 1%; right leg, 0.5%; left thigh, 0.5%; and left leg, 1%) burn wounds with totally estimated surface area percentage of 7%. Laboratory findings (hemogram, C-reactive protein, erythrocyte sedimentation rate, and blood biochemistry) were unremarkable. As well as hemodynamic stabilization and nutritional support, daily dressing with silver sulfadiazine was performed. Ten days later, grafting was carried out as the wound on right anterior forearm did not heal. Prophylactic intravenous cefazolin treatment (50mg/kg/day) was started. Four days after operation, he had 38.8°C fever and wound infection was realized. Gram stain of the swab revealed gram negative rods. Antibiotic treatment changed to ceftriaxone (75 mg/kg/day). While blood culture was negative, swab culture grew *Pantoea agglomerans*, resistant to cefazolin, sensitive to ceftriaxone. His fever subsided after 24 hours of ceftriaxone treatment and he was discharged on the 10th day. His immunological investigation was normal. One week later on control examination, his lesion was epithelized. Burn wound infections in pediatric age group can be caused by rare organisms. Other than presence of immunodeficiency, a graft tissue may ease this situation.

Keywords: Burn infection, child, graft, *Pantoea agglomerans*

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Introduction

Burn injuries are tender wounds, bearing enhanced risks for infections. Both generalized immune suppression and impaired skin's barrier make predisposition. About one-third of admissions to burn centers are for scald injuries, which occur when contact with hot liquid or steam damages one or more layers of skin [1]. Number microorganisms, including *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Escherichia coli* are frequently isolated pathogens in burn wounds [2]. *Pantoea agglomerans* is a particularly uncommon microorganism related to burn wounds.

In general, Genus *Pantoea* is a rarely encountered pathogen in clinical settings. Among species of this organism, *Pantoea agglomerans* is the most prominent seen in humans. This case report describes a previously healthy boy who developed a wound infection due to *Pantoea agglomerans* after scald injury.

Case

A previously healthy, 28-month-old-boy was admitted to our clinic with scald due to hot water. His general condition was moderate, he was conscious and cooperated. His vital signs were within normal limits. He had full thickness (right anterior forearm; 1.5%) and partial thickness (upper part of left arm, 0.5%; left anterior forearm, 2%; right thigh, 1%; right leg, 0.5%; left thigh, 0.5%; and left leg, 1%) burn wounds with totally estimated surface area percentage of 7%. On the laboratory, white blood cell count, 11,800/mm³ (peripheral blood smear, 75% lymphocytes, 20% polymorphs, and 5% monocytes); hemoglobin, 11.9 gr/dL, platelet, 287,000/mm³; C-reactive protein, 0.6 (normal, 0-0.5) mg/L; and erythrocyte sedimentation rate, 11 mm/h. Coagulation parameters and blood biochemistry were normal. Hemodynamic stabilization, nutritional support was maintained, and daily dressing of the wound lesions with silver sulfadiazine was started. On the 10th day of hospitalization, because of no healing of the wound on right anterior forearm, a grafting procedure with a patch from posterior left thigh was carried out. Postoperatively, daily dressing with 5% chlorhexidine acetate cloths was continued and prophylactic intravenous cefazolin treatment (50 mg/kg/day) was started. Four days after the operation, he had 38.8 °C fever and necrotic appearance, and minimal semi-purulent discharge on the wound lesion on right anterior forearm (Figure 1a). Gram stain of the swab revealed gram negative rods, cefazolin treatment

was stopped and ceftriaxone (75 mg/kg/day) was started. Swab culture grew *Pantoea agglomerans*, during which the specimen was cultured on blood and chocolate agar plates, and after yellow pigmentation was seen. Confirmation of the microorganism and testing for antimicrobial susceptibility were performed by Vitek-2 automatized system (bioMerieux, Marcy l'Etoile, France). It was resistant to cefazolin, but sensitive to ceftriaxone. Blood culture was negative. His fever subsided after 24 hours of ceftriaxone treatment. His immunological investigation was normal. He was discharged on the 10th day of the treatment. One week later on control examination, his lesion was epithelized (Figure 1b) and he had no obvious complaint.



Figure 1a. The image of the infected graft tissue before the antibiotic treatment

Figure 1b. The image of the healed and epithelized graft tissue after the antibiotic treatment

Discussion

This is a case report of a 28-month-old child with burn infection caused by a rare organism. *Pantoea agglomerans* is a gram-negative aerobic bacillus of the family Enterobacteriaceae which was formerly known as *Enterobacter agglomerans*. The species of the genus *Pantoea* can be isolated from plants, water, and soil. Also they have been isolated routinely from

human wounds, fractures, blood and other fluids, skin and surface swabs, stool, cysts and abscesses, as well as from swabs of the urethra, trachea, and oropharynx [3]. They can be either pathogens or commensals.

Until now, case reports of infections due to *P. agglomerans* have been reported such as bacteremia in febrile neutropenic patients [4, 5], peritonitis in a peritoneal dialysis patient [6], dacryocystitis [7], septic arthritis [8], and wound infections in patients with traumatic injuries [9]. Also an outbreak of *P. agglomerans* which presented as sepsis in a pediatric urgent care center was formerly reported [10]. Contamination of the transference tube used for transport of intravenous solutions was found as the trouble. In the study by Rosanova et al., bacteremia in burn patients has been reported [11]. In cases of delay in healing of post-traumatic wounds, the presence of foreign bodies of plant origin which have been infected with *Pantoea agglomerans* should be taken into account [12]. It can also colonize the burns or wounds, similar to those receiving antibiotic treatment, diabetics, cancer patients, and neutropenic patients. Nevertheless, after considering the agent was not colonization, our case has shown rapid recovery of the infected graft tissue with initiation of suitable antibiotic therapy. The swab technique was not the ideal way to recognize the causative agent. But, the unfeasibility of biopsy or any other technique from the graft tissue enforced us to believe the result. Given the absence of any previous known immunodeficiency, it was reasonable to hypothesize that contaminated or colonized graft material or the wound surface was the etiological factor. Beside hampered migration of immune cells, a protein rich, avascular environment instead of intact skin barrier provides a favorable niche for microbial colonization and proliferation [2]. Additionally, the likely high bacterial load and the particular virulence of the organism may have been the contributory factors for this uncommon agent to be causative.

In United States it has been reported over 136,000 children to have emergency room visits for burn injuries, with a 1100 mortality per a year [13]. The most important thing is prevention of scalds with strict precautions. And in burn units, cleaning and disinfection of the equipment and environment, hand hygiene, and active hospital-based surveillance are indispensable to prevent burn infections.

As a conclusion, our case highlights that burn wound infections in the pediatric age group can be caused by rare organisms. As well as presence of an immunodeficiency, a graft tissue may ease this situation.

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Conflict of interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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