Streptococcus equi subsp. zooepidemicus Infections Associated with Guinea Pigs

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Streptococcus equi subsp. zooepidemicus is a known zoonotic pathogen. In this public health investigation conducted in Virginia, USA, in 2013, we identified a probable family cluster of S. zooepidemicus cases linked epidemiologically and genetically to infected guinea pigs. S. zooepidemicus infections should be considered in patients who have severe clinical illness and report guinea pig exposure.

Streptococcus equi subsp. zooepidemicus is a facultative pathogen affecting animals and humans. Infections have occurred in horses, pigs, ruminants, guinea pigs, monkeys, cats, and dogs (1-2). Zoonotic transmission of S. zooepidemicus is rare and is usually associated with drinking unpasteurized milk or through contact with horses by persons who usually have underlying health conditions (1-3). Few if any human case-patients with S. zooepidemicus infection have documented guinea pig exposure even though S. zooepidemicus infections have been described in guinea pigs since 1907 (4). This case report describes 1 probable and 1 confirmed human case of severe S. zooepidemicus infection and the laboratory methods used to link human and guinea pig isolates.

Case Reports
An adult man (patient 1) from northern Virginia, USA, arrived at a hospital in late February 2013 with influenza-like symptoms, worsening bilateral thigh pain and stiffness, nausea, shivering, fatigue, diarrhea, sweating, and headache. Past medical history included exercise-induced asthma, nephrolithiasis, and slightly elevated liver function test results for “a couple of years,” as stated in the medical record. Initial physical examination of the patient revealed mild scleral icterus, rhabdomyolysis, and rash on his thighs. The patient’s elevated liver function test results were attributed to the rhabdomyolysis. Shortly after being admitted, the patient experienced acute renal failure, sepsis, pneumonia, and bilateral lower extremity edema, the latter of which was thought to be compartment syndrome. Blood cultures performed at the hospital showed group C streptococcal infection. Because of the patient’s worsening condition, he was transferred to a tertiary care center. At the tertiary care center, the patient was treated for septic shock secondary to rhabdomyolysis, placed on a ventilator several times to treat respiratory failure, and underwent bilateral thigh fasciotomy and debridement several times to treat necrotizing fasciitis. Wound cultures identified S. equi as the causative agent; a subspecies was not specified, although zooepidemicus was likely because it is the only zoonotic subspecies of S. equi. After treatment at the tertiary facility for several months, the patient was discharged to a rehabilitation hospital for another month.

An elderly man from central Virginia (patient 2) who was related to patient 1 was admitted to a hospital, 1 week after patient 1 was hospitalized, with nausea, vomiting, chills, difficulty breathing, weakness, abdominal and chest pain, and icterus. The medical history of patient 2 included smoking, oral cancer, myocardial infarction, hypertension, hyperlipidemia, and coronary artery disease. By the second day in the hospital, patient 2 experienced acute hypoxia and respiratory failure; pneumonia in the right lower lobe was diagnosed. He also had hypotension secondary to septic shock and multiple organ failure. Group C Streptococcus spp. were identified in blood cultures 2 days after hospitalization. Patient 2 was discharged 18 days after hospitalization and was receiving continuous oxygen.

The local health department for the area in which patient 1 resided was contacted by the tertiary care center where he was treated because of the probability that the S. equi infection was caused by guinea pig exposure. Questioning of a female relative of patient 1 (relative 1) indicated that patient 1 recently purchased 4 guinea pigs and that 1 had died shortly after purchase. During the interview with relative 1, it was learned that patient 2 was hospitalized. After another female relative (relative 2) was interviewed, it was learned that patient 2 had cleaned the guinea pigs’ enclosure 2 days before his illness. The Virginia Department of Health (VDH) requested isolates from both patients to be forwarded to the Division of Consolidated Laboratory Services (DCLS), the state
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Figure. Pulsed-field gel electrophoresis (PFGE) patterns for 4 *Streptococcus equi* subsp. *zooepidemicus* isolates from 1 person and 3 guinea pigs submitted to the Division of Consolidated Laboratory Services, Virginia, USA. Patterns indicate that all 4 isolates were indistinguishable by comparison with the *Sma*I and *Apa*I enzymes. Specimen origin and type are indicated.

**PFGE_PF802_GAS_SmaI**

**PFGE_PF802_GAS_ApaI**

**Origin**

**Type**

- Human
  - Blood

- Guinea pig
  - Nostril
  - Lymph node
  - Conjunctiva

**Conclusions**

*S. zooepidemicus* infection should be considered in patients who have purulent wounds or systemic symptoms of infection who have had known contact with guinea pigs or their environment. Likewise, patients whose specimen cultures reveal *S. equi* or further test results show *S. zooepidemicus* should be questioned about guinea pig exposure as well as exposure to other animals associated with this pathogen: horses, pigs, ruminants, monkeys, cats, and dogs.
Dr. Gruszynski is the veterinary epidemiologist at the Virginia Department of Health, Richmond. She works on issues related to zoonotic diseases.

References