Case Report

Isolation of *Corynebacterium pseudotuberculosis* Biovar *equi* from a Horse in Central Iowa

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Corynebacterium pseudotuberculosis biovar *equi* is the causative agent of “pigeon fever,” or “dryland distemper” in horses. The agent is typically identified in the Western United States but has recently been identified in Canada; it has not previously been documented as cause of infection in horses in Iowa. This report describes the clinical findings of two horses in Iowa that presented with pectoral abscessation, confirmed in one to be *C. pseudotuberculosis* biovar *equi*.

1. Introduction

Corynebacterium pseudotuberculosis biovar *equi* is the causative agent of “pigeon fever,” or “dryland distemper” in horses. The classic presentation involves focal pectoral abscessation, although internal abscessation and ulcerative lymphangitis also occur. Rare reports of other presentations of *C. pseudotuberculosis* biovar *equi* infection have been documented, including axillary and tricep muscle infection, osteomyelitis, septic arthritis, diffuse lymphangitis, otitis media interna and secondary meningitis, pericarditis and pleuritis, facial cellulitis, and panniculitis [1–5]. *Corynebacterium pseudotuberculosis* biovar *equi* is a gram positive, pleomorphic, facultative intracellular bacterium that is vectored by flying insects. It is typically identified in the western part of the United States with the majority of reports coming from California and has recently been identified in Canada; it has not previously been documented in horses in Iowa [6]. This report describes two horses from the same facility that were native to Iowa and developed pectoral abscessation in November, 2013. A sample of purulent material from a pectoral abscess of one of the horses was cultured and pure growth of *C. pseudotuberculosis* biovar *equi* was isolated.

2. Case Descriptions

The horses in this report were pasture mates housed with two additional horses. None of the horses in the herd had any history of travel outside of Iowa or contact with animals that had been outside of the state. There was no other livestock on the property, although the neighboring property housed cattle that had originated in Colorado.

Case 1 was a 16-year-old Paint gelding that presented to the Iowa State University Field Services with a 4-day history of focal swelling in the right pectoral region. Aside from the swelling, no other clinical signs, such as fever, lethargy, or anorexia, had been observed by the owner. Physical examination was unremarkable with the exception of a firm, painful swelling, 12–15 cm in diameter in the right pectoral region. Ultrasonographic examination revealed a pocket of hypochoic fluid 5 cm deep to the skin, which was 2 cm in diameter. The area was aseptically prepared and locally anesthetized and aspiration revealed a cream colored, tenacious, purulent fluid. Cytology and Gram staining of this sample identified a large number of neutrophils, with a few gram positive bacteria noted. Culture isolated and identified a pure isolate of *Corynebacterium*

pseudotuberculosis biovar *equi*. The following day, the patient presented to the Lloyd Veterinary Medical Center where the abscess was incised and drained. The patient was prescribed 10 days sulfamethoxazole and trimethoprim (30 mg/kg PO q 12 hours) in accordance with antimicrobial susceptibility of the isolate and discharged. The owner was given instructions to keep the wounds clean and to avoid contact with outside horses until the wounds had healed.

Case 2 was a 16-year-old Quarter Horse mare that developed a focal pectoral swelling two days after Case 1. At initial examination in the field, a firm, hot, painful swelling was noted in the right pectoral muscle that was approximately 5 cm in diameter. A plaque of pitting edema was also noted to the right of midline on the ventral abdomen. The patient was referred to the Lloyd Veterinary Medical Center the following day for further evaluation. Ultrasonographic examination identified a small pocket of hypoechoic fluid within the right pectoral region. The ventral plaque of edema was markedly reduced in size at this time, and ultrasound did not identify any pockets of fluid within the swelling. This right pectoral region was prepared aseptically, and following local anesthesia, the abscess was incised and drained. Initial aspiration did not yield a diagnostic sample; thus, culture was not performed. Sulfamethoxazole and trimethoprim (30 mg/kg PO q 12 hours) were prescribed for 10 days on the basis of a presumptive diagnosis of infection with the same isolate as Case 1. Communication with the owner 3 months later revealed that both horses' incisions had healed well, and the animals had not developed any additional abscess. While *C. pseudotuberculosis* biovar *equi* was not confirmed in Case 2, the clinical presentation and timing in conjunction with Case 1 led to a presumptive diagnosis in this case. Neither of the other two horses housed in the property developed evidence of abscessation in this time frame.

3. Discussion

This report documents the first clinical case of pigeon fever identified in a horse in Iowa. *Corynebacterium pseudotuberculosis* biovar *equi* has been isolated from horses in states surrounding Iowa, including Missouri, South Dakota, and Nebraska, but infection has not previously been documented in Iowa (Sharon Spier, personal communication). A search of records of the Bacteriology Section of the Veterinary Diagnostic Laboratory at Iowa State University found two additional equine samples from which *C. pseudotuberculosis* biovar *equi* had been isolated. Interestingly, one of these samples was submitted during the same year as the cases described here, the other in 2005. Complete details from these cases were not available; thus, it is unknown if clinical signs consistent with pigeon fever were present.

Corynebacterium pseudotuberculosis biovar *equi* is highly suspected to be transmitted via insects, of which *Haematobia irritans*, *Musca domestica*, and *Stomoxys calcitrans* have been specifically identified as carriers of the bacteria; all three of these species of flies are native to Iowa (Ken Holscher, personal communication, Department of Entomology, Iowa State University) [7]. A study in 1998 found that owner-perceived problems with insect control and the use of insect

control were significantly associated with risk of disease from *C. pseudotuberculosis* biovar *equi* [8]. The owner of the two horses described here did comment that these horses had a tendency to have more flies on them than other horses, although the species of flies are unknown. Given the proximity to cattle at an adjacent property, *H. irritans* and *M. domestica* were considered likely vectors. Additionally, the cattle had been transported from Colorado to Iowa, potentially acting as fomites and carrying *C. pseudotuberculosis* into central Iowa.

In California, the highest incidence of infection with *C. pseudotuberculosis* biovar *equi* is found in September, October, and November, with this case occurring within this same time frame [1]. Another group found that the highest frequency of case detection was in November and January, although this pertained specifically to horses with internal infections [9]. Interestingly, infections in endemic areas tend to occur with higher prevalence following months with heavy rainfall, whereas drought conditions were present for much of 2013 in Iowa [10]. In a 2012 study, Spier et al. found that *C. pseudotuberculosis* biovar *equi* survived for at least 8 months in soil, and growth was better supported in sandy and rocky soil types in comparison to silty soil [11].

In conclusion, epidemiological studies have suggested that *C. pseudotuberculosis* biovar *equi* may be more widely spread than initially thought [12, 13]. This report documents equine *C. pseudotuberculosis* biovar *equi* infection in one horse and likely its pasture mate, in central Iowa, a state in which pigeon fever is previously undocumented. Identification of agents not native to specific regions of practice highlights the importance of sampling abscesses and culturing purulent material.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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