



# A Rare but Real fatal zoonotic infectious disease. Disseminated bacteremia in an immune-suppressed middle age patient by *Streptococcus zooepidemicus*

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## Introduction

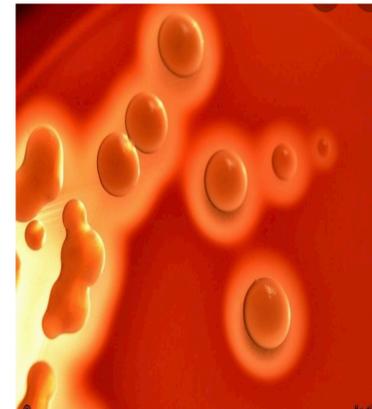
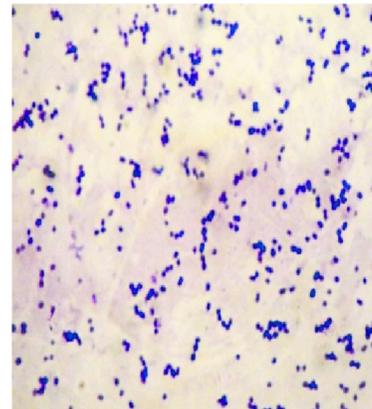
Zoonosis are infectious disease that has jumped from a non-human animal to humans. Zoonotic pathogens may be bacterial, viral or parasitic. Can spread to humans through direct contact or food, water or the environment. They represent a major public health problem around the world due to our close relationship with animals in agriculture, and in the natural environment. Some diseases, such as HIV, begin as a zoonosis but later mutate into human-only strains. Other zoonoses can cause recurring disease outbreaks, such as Ebola virus disease and salmonellosis. Still others, such as the novel coronavirus that causes COVID-19, have the potential to cause global pandemics.

*Streptococcus equi* subspecies *zooepidemicus* is a B- hemolytic, Lancefield group C streptococcal bacterium. Is an opportunistic commensal of equine upper respiratory tract, but it may also cause infection in other domestic animals such as cattle, sheep, goats, pigs, dogs and cats. In animals, behaves as opportunistic pathogen but human infections associated with *S. zooepidemicus* are often severe. This pathogen is able to causes invasive infections in immunocompromised hosts, following close contact to animal especially horses.

## Clinical Case

This is the case of a 62 years old man with known medical history of arterial hypertension, diabetes mellitus type 2, lung cancer and leukemia by history. Lived in a rural area of Puerto Rico and had daily contact with animals including horses, dogs, cats and chickens. Was brought to the Emergency Department after developing sudden onset altered mental status, that evolved to acute respiratory failure and was initiated on mechanical ventilation and empiric IV antibiotic therapy. Initial laboratory workup, remarkable for leukocytosis, neutrophilia and bacteremia, elevated ESR and C-reactive protein. Initial radiographic evidence was negative by chest X ray and head CT scan; but further pneumonia and acute ischemic stroke developed. Blood cultures reveal *Streptococcus equi* subsp. *zooepidemicus* as isolated causative organism. Bacteremia by *Strep. zooepidemicus* was confirmed. IV antibiotic therapy continue as per anti-biogram susceptibility. Despite of IV antibiotic treatment and further IV antibiotic escalation due to associated evolved complications, the outcome was fatal in 27 days period.

## Microbiology



Colonies of *Streptococcus equi* subsp. *zooepidemicus* cultivated on bovine blood agar at 37 °C during 48 h. The agar plate was photographed **with light from above**. Close-up of some colonies from the agar .

## Clinical case-A and Results

Initial performed cerebrospinal fluid culture was negative however cerebrospinal fluid smear revealed leukocytosis, and low glucose levels. Study data sustained a considerable number of patients with CSF inflammation secondary to systemic infections such as septicemia or pneumonia that is not surprising to further evolve and precipitate bacterial meningitis despite initial negative CSF cultures.

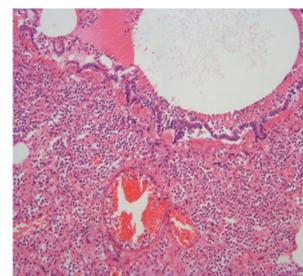
Bacteremia by group C *Streptococcus* is an unusual zoonotic disease. Literature review reveals a high crude mortality rate with broad associated complications like hearing loss, pneumonia, meningitis, endocarditis, blindness. Streptococcal meningitis occurs when the bacteria invade the bloodstream, cross the blood-brain barrier and multiply within the fluid surrounding the spine and brain such as in this case. Neurological complications secondary to bacterial meningitis contribute to the high mortality rate and to disability among the survivors. Antibiotic treatment regimens commonly included benzylpenicillin or third-generation cephalosporin, with a mean treatment duration in survivors of 23 days.

## Conclusion

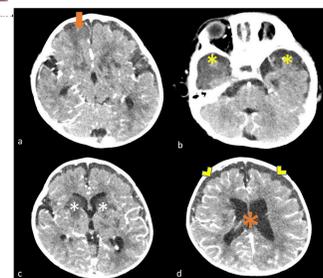
The infrequency of this zoonosis makes it a formidable diagnostic challenge. Also, our case supports the necessity for extended microbiological examination especially in immunocompromised patient and the prompt detection and therapy initiation for better outcomes. It associated high mortality rate and easy transmission on daily basis with commonly animal exposure make its knowledge and awareness important to our community.

## References

1. Research Article, Information *Epidemiology & Infection* , Volume 98 , Issue 2 , April 1987 , pp. 183 – 190 Copyright © Cambridge University Press 1987
2. Pelkonen S, Lindahl SB, Suomala P, et al.: *Transmission of Streptococcus equi subspecies zooepidemicus infection from horses to humans*. Emerg Infect Dis. 2013, 19:1041-8. [10.3201/eid1907.121365](https://doi.org/10.3201/eid1907.121365)
3. Elsayed S, Hammerberg O, Massey V, Hussain Z: *Streptococcus equi subspecies equi (Lancefield group C) meningitis in a child*. Clin Microbiol Infect. 2003, 9:869-72. [10.1046/j.1469-0691.2003.00663.x](https://doi.org/10.1046/j.1469-0691.2003.00663.x)



**Diffuse infiltration of alveolar spaces with numerous neutrophils admixed with fibrin and extravasated erythrocytes. H&E. Magnification 100.**



**Brain CT scan at admission to the intensive care unit.**

a) Hypodense lesions in the right frontal lobe (orange arrow); b) Bilateral temporal lobe hypodense lesions (yellow asterisk); c) Bilateral basal ganglia hypodense lesions (white asterisks); d) Ventriculomegaly (orange asterisk) and early subdural empyema (yellow arrowheads)

