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CORRESPONDENCE

Emergence of *Streptococcus suis* serotype 9 infection in humans

Dear Editor,

Streptococcus suis is a zoonotic pathogen that causes invasive infections in humans and pigs.[1] Of the 33 serotypes, Serotype 2 is the most prevalent in humans, but cases with serotype 5, serotype 14, and serotype 24, have been reported in Thailand.[1] Serotype 9 is the most common serotype affecting pigs in European countries.[1] However, no human cases caused by serotype 9 have been reported. We report here for the first case of *S. suis* serotype 9 infection in a human in Thailand.

A 55-year-old man who suffered from alcohol abuse and liver cirrhosis was admitted to a tertiary hospital in Lampang Province, northern Thailand in May 2013. He presented with fever, headache, and diarrhea. One day prior to the onset of illness, he had consumed a traditional homemade raw pig's blood soup, "*loo*". Physical examination revealed a temperature of 37.9°C, pulse rate of 102 beats/min, respiratory rate of 22 breaths/min, and blood pressure of 70/40 mmHg. No nuchal stiffness or hearing loss was found. A complete blood count showed white blood cell count of 5700 cells/μL (89% neutrophils) and platelet count of 122,000 cells/μL. A comprehensive metabolic panel revealed elevated creatinine (2.19 mg/dL), blood urea nitrogen of 20 mg/dL, serum aspartate aminotransferase of 702 IU/L, serum alanine aminotransferase of 128 IU/L, and creatine phosphokinase of 855 U/L.

Bacteria were isolated from the patient's blood culture, and traditional biochemical tests as well as a VITEK2 system (BioMérieux, Marcy l'Etoile, France) assay suggested that the organism was *S. suis*. A multiplex polymerase chain reaction assay and coagglutination test showed positive results for *S. suis* serotype 9.[2,3] Minimum inhibitory concentrations determined using an Epsilometer-test revealed that this strain was susceptible to penicillin, cefotaxime, and levofloxacin. The patient was diagnosed with septic shock. He was successfully treated with levofloxacin (500 mg/day for 14 days). He survived and was discharged from the hospital in June 2013.

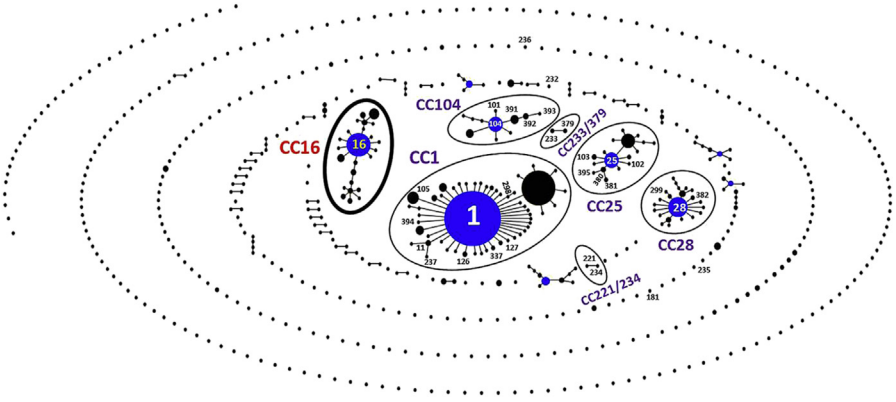

Figure 1. An eBURST analysis of the entire *Streptococcus suis* multilocus sequence typing database (accessed on April 16, 2015). Clonal complexes (CC) relevant to human infection in Thailand are circled and labeled. *S. suis* Serotype 9 sequence type (ST) 16 in this study belonged in CC16 (bold circle). CCs and the predicted founder STs are indicated by blue dots. The size of the dots is relative to the number of isolates with the respective ST present in the database.

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The routes for *S. suis* infection include occupational exposure, recent contact with pigs or raw pork products, and recent consumption of raw pork products.[1] The present case consumed raw pig's blood soup before the onset of illness, which was considered the route of infection. Multilocus sequence typing determined that the present isolate was of sequence type (ST) 16, which belongs to clonal complex 16 (Figure 1). However, two recent studies reported that the prevalence of serotype 9 among isolates from invasive diseases in pigs were 54% in the Netherlands and 27% in Thailand.[4,5] Eighty-nine percent of the serotype 9 isolates from the Netherlands were classified as ST16,[4] but data were not available for STs in serotype 9 isolates from Thailand.

Regarding the virulence markers (*mrp*, *epf*, *sly*), this present strain was identified to be *mrp*+/*epf*−/*sly*+ that revealed a pattern similar to that previously described for clonal complex 16 strains.[1,4] Our data demonstrates that *S. suis* serotype 9 can cause infections in humans as well as pigs. Since the consumption of raw pig products is the traditional custom in northern Thailand, a serious caution against eating raw pork products should be given to patients with liver cirrhosis in such areas.

Conflicts of interest

The authors declare no conflicts of interest.

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Anusak Kerdsin*
National Institute of Health, Department of Medical Sciences, Ministry of Public Health, Nonthaburi, Thailand

Faculty of Public Health, Kasetsart University Chalermphrakiat Sakon Nakhon Province Campus, Sakon Nakhon, Thailand

Rujirat Hatrongjit
Faculty of Science and Engineering, Kasetsart University Chalermphrakiat Sakon Nakhon Province Campus, Sakon Nakhon, Thailand

Marcelo Gottschalk
Faculty of Veterinary Medicine, University of Montreal, Québec, Canada

Dan Takeuchi
Research Institute for Microbial Diseases, Osaka University, Osaka, Japan

Shigeyuki Hamada
Thailand-Japan Research Collaboration Center on Emerging and Re-emerging Infections, Nonthaburi, Thailand

Yukihiro Akeda**
Research Institute for Microbial Diseases, Osaka University, Osaka, Japan

Kazunori Oishi
Infectious Disease Surveillance Center, National Institute of Infectious Diseases, Toyama, Shinjyuku, Tokyo, Japan

*Corresponding author. Faculty of Public Health, Kasetsart University Chalermphrakiat Sakon Nakhon Province Campus, Sakon Nakhon, Thailand.
E-mail address: noksak99@gmail.com (A. Kerdsin)
**Corresponding author. Research Institute for Microbial Diseases, Osaka University, 3-1 Yamadaoka, Suita, Osaka 565-0871, Japan.
E-mail address: akeda@biken.osaka-u.ac.jp (Y. Akeda)

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