Complicated infection caused by *Streptococcus suis* serotype 14 transmitted from a wild boar

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**Introduction:** *Streptococcus suis* is a zoonotic pathogen transmitted to humans from infected pigs. Nearly all human cases of *S. suis* are caused by serotype 2 organisms, and meningitis is the best-documented type of human infection. On rare occasions, *S. suis* can be transmitted to humans from wild boars.

**Case presentation:** Here we report a case where *S. suis* of serotype 14 was transmitted from a wild boar to a previously healthy 63-year-old man, causing meningitis, spondylodiscitis, a psoas abscess and a prolonged post-infectious inflammatory condition. The infection was treated with a long course of β-lactam antibiotics, but signs of inflammation were relieved only after the addition of corticosteroids. The isolate was found to harbour the virulence-associated gene sly.

**Conclusion:** *S. suis* of serotypes other than type 2 can be transmitted to humans from wild boars and the disease may become complicated. Increasing numbers of wild boars in some European countries calls for increased vigilance to this type of infection.

**Keywords:** meningitis; serotype; *Streptococcus suis*; wild boar; zoonosis.
S. suis and slightly elevated levels of lactate and protein. MRP polynuclear cells 2 epf. 2 S. suis˚ 2 was noted. A renewed CT revealed a possible S. suis. and for ampicillin was 0.008 mg l˚ was determined to be serotype 14 by et al. mononuclear cells l˚ (2010). A PCR fragment of the and erythrocyte sedimentation rate (ESR) was above 100 mm. Renewed investigations with MRI revealed signal changes in the lumbar region. Transoesophageal echocardiography (TEE) did not reveal any vegetations. On the eleventh day material was negative. Transoesophageal echocardiography (TEE) did not reveal any vegetations. On the eleventh day the treatment was shifted to piperacillin with tazobactam and CRP gradually decreased from 300 to around 100. The patient was sent home after 23 days of hospitalization and and investigation of the aorta failed to detect this. The patient had low inflammatory markers and was deemed to have fully recovered.

Investigations

The isolate of S. suis was determined to be serotype 14 by the Statens Serum Institute (Hillerœd, Denmark) through agglutination with a latex kit and type-specific serum as well as by microscopic determination of capsule swelling according to Neufeld. The three methods gave concordant results. E-tests (BioMérieux) indicated that the isolate was sensitive to all antibiotics tested. The MIC for cefotaxim was 0.125 mg l˚ and for ampicillin was 0.008 mg l˚. The isolate was tested for the presence of the virulence-associated gene sly, as well as for mrp and epf, believed to be markers of virulence in serotype 2 isolates, by PCR as described by Kim et al. (2010). A PCR fragment of the predicted size was obtained with primers hybridizing to sly, but no fragment was amplified with primers hybridizing to mrp or epf. A serotype 2 isolate (kindly provided by Susanne Sauer, Statens Serum Institute) and a serotype 5 isolate (Gustavsson & Rasmussen, 2014) were used as positive controls for the epf and mrp primers, respectively.

Discussion

In Sweden, more than 70 000 wild boars are shot annually, and the number of animals is steadily increasing. As wild boars in northern Germany are colonized with potentially human pathogenic S. suis isolates (Baums et al., 2007), it is likely that similar isolates are found also among Swedish wild boars. The present case is, to the best of our knowledge, the first describing a non-serotype 2 isolate transmitted from a wild boar to a human and is the third case of S. suis infection reported from Sweden (Christensen & Kronvall 1985; Gustavsson & Rasmussen 2014). The course of the infection described here was complicated, and, despite adequate treatment with antibiotics, an abscess developed. As the infection became so widespread, an intravascular focus was suspected, but repeated TEE and investigation of the aorta failed to detect this. The prolonged course with a high inflammatory activity was suspected to be due to a post-infectious condition rather than a persisting infection. In line with this, the

spectrometry, which gave a score of >2.3 for S. suis. Treatment with ampicillin was continued, and a transthoracic echocardiography was performed without signs of any valvular vegetations. On day 5, the patient was transferred to the Malmœ Department of Infectious Diseases at the University Hospital of Skåne, Sweden. A lumbar puncture was performed and analysis revealed 72 × 106 mononuclear cells l˚, 1.3 × 106 polymonuclear cells l˚ and slightly elevated levels of lactate and protein. Cultures of cerebrospinal fluid were negative, but 16S rRNA gene PCR and sequencing revealed the presence of DNA from S. suis. On day 7, a swelling of the right sternoclavicular joint and elevation of CRP from 52 to 208 mg l˚ was noted. A renewed CT revealed a possible ileopsoas abscess; attempts to drain this abscess were unsuccessful. A small volume of fluid was aspirated from the sternoclavicular joint, but 16S rRNA gene PCR on this material was negative. Transoesophageal echocardiography (TEE) did not reveal any vegetations. On the eleventh day the treatment was shifted to piperacillin with tazobactam and CRP gradually decreased from 300 to around 100. The patient was sent home after 23 days of hospitalization and continued with amoxicillin 750 mg two times daily.

Six days after discharge, the patient experienced increased pain from his neck and he had become subfebrile. He was readmitted and ampicillin treatment was reinstituted. The CRP was 127 mg l˚ and the number of animals is steadily increasing. As wild boars in northern Germany are colonized with potentially human pathogenic S. suis isolates (Baums et al., 2007), it is likely that similar isolates are found also among Swedish wild boars. The present case is, to the best of our knowledge, the first describing a non-serotype 2 isolate transmitted from a wild boar to a human and is the third case of S. suis infection reported from Sweden (Christensen & Kronvall 1985; Gustavsson & Rasmussen 2014). The course of the infection described here was complicated, and, despite adequate treatment with antibiotics, an abscess developed. As the infection became so widespread, an intravascular focus was suspected, but repeated TEE and investigation of the aorta failed to detect this. The prolonged course with a high inflammatory activity was suspected to be due to a post-infectious condition rather than a persisting infection. In line with this, the
inflammation declined rapidly with corticosteroid treatment without recurrence of infection. S. suis serotype 14 has been described in at least three cases of fatal infections (Gottschalk et al., 1989; Takeuchi et al., 2012; Watkins et al., 2001). Thus, it seems that S. suis of this serotype has a high pathogenic potential. Nothing is known about the presence of the putatively virulent S. suis serotype 14 in wild boars, but the increasing numbers of wild boars in Sweden and the present case of severe infection calls for increased vigilance. Protective gloves should be worn when slaughtering wild boars and note should be taken regarding infectious symptoms if traumatic cuts are inflicted. Early antibiotic treatment should be initiated if symptoms occur.

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References


