

Streptococcus suis meningitis: First case reported in Quebec

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S MICHAUD, R DUPERVAL, R HIGGINS. *Streptococcus suis* meningitis: First case reported in Quebec. *Can J Infect Dis* 1996;7(5):329-331. Very few *Streptococcus suis* infections in humans have been reported in Canada, although the condition is frequent in pigs. Meningitis, often accompanied by severe hearing loss, is the most common clinical manifestation. The disease is an occupational illness affecting persons in contact with pigs and may be underdiagnosed because of misidentification of the responsible bacterium. Since Quebec is the leading province for swine production in Canada, physicians and microbiologists should be aware of this infection, especially when a streptococcal meningitis is diagnosed in swine workers. The first case of *S suis* type 2 meningitis reported in Quebec is described.

Key Words: *Streptococcus suis*, Swine workers meningitis, Zoonosis

Méningite à *Streptococcus suis* : premier cas rapporté au Québec

RÉSUMÉ : Très peu de cas d'infections à *Streptococcus suis* ont été rapportés au Canada, même si ce type d'infection est très fréquent chez le porc. Une méningite se compliquant souvent de surdité est la manifestation clinique la plus fréquente chez l'humain qui se contamine par contact direct avec des porcs infectés. La maladie peut être sous diagnostiquée par mauvaise identification de l'agent causal. Le Québec vient en tête des provinces productrices de porc au Canada et pour cette raison, les médecins et microbiologistes doivent être à l'affût de cette infection, particulièrement lorsqu'une méningite à streptocoque est diagnostiquée chez un malade travaillant dans l'industrie du porc. Nous décrivons ici le premier cas de méningite à *S. suis* de type 2 rapporté au Québec.

Streptococcus suis is a frequent pathogen in pigs. However, most clinicians and microbiologists are unfamiliar with this rare zoonosis in humans. About 100 cases of human infection have been reported worldwide since that first described in 1968 in Denmark (1,2). The disease is characterized by meningitis and/or septicemia, often accompanied by a partial or total deafness of perceptive type. It is considered as an occupational disease, affecting persons in contact with pigs or their by-products. Two cases of meningitis in humans were re-

corded in 1982 in Ontario (3), but the present report is the first *S suis* type 2 meningitis case diagnosed in Quebec.

CASE PRESENTATION

A 52-year-old female pig farmer with no past medical history developed a febrile illness on April 15, 1994, with chills, generalized muscle pain and headache. Five days later she presented with rigor, vomiting and severe headache, with photophobia and sonophobia. She went to a regional hospital

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where she received a 2 g dose of ceftriaxone intravenously and was immediately transferred to the authors' hospital. Examination revealed an aroused and oriented patient with a low grade fever of 38.1°C and pronounced neck stiffness. The patient mentioned that since fall 1993 a number of their pigs were treated with penicillin for *S suis* meningitis. During the week preceding her illness and 24 h before the first symptoms she recalled having moved four dead pigs without gloves or any particular hygienic precautions.

Leukocytosis was $20.4 \times 10^9/L$ with 85% polymorphonuclear cells and glycemia of 8.9 mmol/L; lumbar puncture yielded turbid cerebrospinal fluid (CSF) with a white cell count of $3180 \times 10^6/L$ (92% polymorphonuclear cells), CSF glucose concentration of 4.2 mmol/L, protein concentration of 4.9 g/L and no organism on Gram stain. CSF culture grew a nonhemolytic streptococcus initially identified as *S suis* type 1 with API 20 Strep strip (API Bio Mérieux, Marcy L'Étoile, France), later confirmed as *S suis* by the Laboratoire de Santé Publique du Québec and serotyped as *S suis* type 2 at the Faculté de Médecine Vétérinaire of the Université de Montréal with the use of the coagglutination test (4). The strain was sensitive to penicillin (minimal inhibitory concentration less than 0.03 mg/L).

The patient received ceftriaxone 2 g every 12 h for two days and penicillin G 24 MU/day for three weeks. The fever fell rapidly but hearing loss and tinnitus developed on the left side. Cerebral computed tomography was normal. Audiometric tests demonstrated mild left neurosensorial hypoacusia of cochlear type, which improved partially during treatment and resolved completely after six months.

DISCUSSION

In 1959, de Moor (5) isolated beta-hemolytic Lancefield groups R, S and T streptococci from pigs with septicemia. In 1966, Elliott reclassified the organism within Lancefield group D and proposed the name 'Streptococcus suis', which is now in common use (6-9).

S suis is responsible for sporadic as well as epidemic infections in pigs. Healthy carrier pigs harbour the organism in their nose and palatine tonsils (10,11). Although invasive illness occurs in a minority of colonized animals, these carriers play an important role in disseminating *S suis*. In 1985, 8.1% of 347 herds in southwestern Ontario were carriers of *S suis* serotype 2, and the carrier rate by herd was almost 10% (12).

Despite this high prevalence in swine, infections in humans rarely occur. More than 90% of reported cases originated from Europe, especially from Denmark, the Netherlands and the United Kingdom (13,14). *S suis* has also been identified as the most common cause of meningitis in adults in Hong Kong from 1978 to 1982 (15). In nearly all reported cases, most patients had close contact with pigs (farmers, butchers or abattoir workers) or handled pork products (housewives). The most frequent transmission route is through skin abrasions or cuts, although in many cases, no skin laceration can be shown.

S suis meningitis affects mainly previously healthy people and is associated with a 7% mortality rate (14). Most patients

present with classical symptoms of meningitis with headache, nuchal rigidity, confusion and high fever, after an incubation period of approximately 60 h.

Permanent deafness and problems with balance are common complications of *S suis* meningitis. *S suis* has a particular affinity for the meninges and the cochlear branch of the eighth nerve (13). Hearing loss occurs more frequently with this organism than in other types of bacterial meningitis, with an incidence rate of 54% to 64% (2). Deafness is often accompanied by vertigo and ataxia. Early administration of penicillin does not seem to affect subsequent hearing loss. If it is mild initially, it may be completely recovered on a long term basis. However, it can persist for more than four months and often becomes permanent.

Purulent arthritis, involving hips, knees, elbows and spine, has also been described in up to 50% of patients (2). In contrast to deafness, however, the arthritis usually does not persist as a long term sequela. Various other clinical manifestations can supervene, such as bilateral endophthalmitis, disseminated intravascular coagulation and even endocarditis (16-18).

In North America, to our knowledge, only three cases of human infection with *S suis* have been identified (3,18) and the present case is the first of meningitis described in Quebec. Our patient presented all the characteristics of *S suis* meningitis: she was exposed over several months to infected pigs and developed a typical picture of bacterial meningitis accompanied with a transient unilateral hypoacusia.

Interestingly, the diagnosis was suspected on admission and confirmed within 48 h because of the history of *S suis* infections in the patient's swine herd. Still, the bacteriological diagnosis of *S suis* is not always that easily established. *S suis* grows on sheep or bovine blood agar as beta-, alpha- or nonhemolytic colonies (1,19,20). Alpha-hemolytic isolates can grow mucoid colonies similar to those of pneumococci. Because many laboratories are unaware of this organism, it can easily be mistaken for enterococci, *Streptococcus bovis*, pneumococci or even *Listeria* species (13,14). In many cases, the initial diagnosis on Gram stain of the CSF specimen is of pneumococcal meningitis. The disease may have been missed in the past because of such confusion. API 20 Strep can achieve identification but serological typing must be carried out by a reference laboratory with coagglutination test, Neufeld's capsular reaction or with capillary precipitation test (4,21). Most human *S suis* infections are due to serotype 2, but serotypes 4 and 14 have also been implicated. Thirty-five capsular serotypes have been officially recognized, but because there still are untypeable isolates, this number is may increase (22).

S suis type 2 is usually sensitive to penicillin, and the outcome is favourable if treatment is started early. However, eradication of the organism can be difficult, and some cases of relapse after two and four weeks of treatment have been reported (23); therefore, some authors suggest a six-week treatment of 24 MU of penicillin daily for every case of *S suis* meningitis. Some resistant strains have also been described in humans (24).

CONCLUSIONS

Very few *S suis* infections in humans have been reported in Canada. Meningitis accompanied by severe hearing loss are the most common clinical manifestations. The disease may be underdiagnosed because of misidentification of the responsible bacterium. Because Quebec is the leading province for swine production in Canada, physicians and microbiologists should be aware of this infection, especially when streptococcal meningitis is diagnosed in swine workers.

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