# Severe *Streptococcus* suis Meningitis: A case report

## *Meningite grave por Streptococcus suis: Um Caso Clínico*

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**Abstract**

*Streptococcus suis (S. suis) is a commensal and opportunistic pathogen in pigs. Human infection is rare, occurring due to occupational exposure or consumption of pork products. The authors report an uncommon case of severe bacterial S. suis meningitis.*

*A 42-year-old alcoholic male was admitted complaining of headache, fever, chills, vomiting and photophobia. One week prior to hospital admission the patient participated in a traditional pig slaughtering. After acute bacterial meningitis was diagnosed, therapy was started. His condition deteriorated and he was admitted to the Intensive Care Unit. S. suis grew in the blood and cerebrospinal fluid cultures. The patient was treated with intravenous penicillin G; improving his clinical condition, however complaining of hearing loss. A 3-week course of antibiotics was completed before he was discharged.*

*Key words: Streptococcus suis, Swine Exposure, Meningitis, Coma, Penicillin G.*

**Resumo**

O *Streptococcus suis (S. suis)* é uma bactéria comensal e oportunista do porco. A infeção nos humanos é rara e habitualmente ocorre após exposição ou consumo de produtos contaminados. Os autores descrevem um caso raro de meningite grave por *S.suis.*

Trata-se de um homem de 42 anos, alcoólico, admitido por um quadro de cefaleias, febre, arrepios, vómitos e fotofobia. Na semana que antecedeu a hospitalização tinha participado na tradicional "matança do porco". Foi-lhe diagnosticada uma meningite bacteriana e iniciou terapêutica empírica. Verificou-se agravamento do estado de consciência e admissão na Unidade de Cuidados Intensivos. Nas hemoculturas e no líquido cefalorraquidiano foi identificado um *S. suis.* O doente foi tratado com Penicilina G endovenosa durante 3 semanas, com evolução clínica favorável, mas mantendo hipoacusia sequelar.

Palavras Chave: Streptococcus suis, exposição, Meningite, Coma, Penicilina G.

## INTRODUCTION

*Streptococcus* suis is an important commensal and opportunistic pathogen in pigs reported worldwide. Infection in pigs is usually asymptomatic, but can result in severe disease and death.[1-3] Predisposing factors are found in pigs reared in poor housing conditions, with inadequate ventilation.[2] *S. suis* is a α-hemolytic gram-positive cocci with 35 different serotypes; serotype 2 is considered to be the most pathogenic for both humans and pigs.[3]

*S. suis* human infection occurs mainly among risk groups with frequent exposure to pigs, or from consuming uncooked or undercooked pork products.[1,3] Transmission to humans occurs through wounds on the skin (including minor abrasions), through mucous membranes (such as the conjunctiva) and via oral ingestion.[2] The incubation period of *S. suis* infection ranges from a few hours to 14 days.[2,3] Patients are usually healthy prior to infection, although predisposing factors, such as alcoholism, diabetes, malignancy, splenectomy and heart failure, have been described.[4] Meningitis is the most common clinical manifestation and is often accompanied by septicemia. Less common manifestations include acute or subacute endocarditis, arthritis, spondylodiscitis, epidural abscess and endophthalmitis.[3,4] Treatment is similar to other causes of bacterial meningitis, being Ceftriaxone, with or without Vancomycin, a good choice for empirical therapy.[3] Penicillin G has been successfully used for treatment of *S. suis* infection in humans, although resistance to β-lactams has recently been described.[5] Permanent hearing loss or vestibular dysfunction is a common sequelae.[6] The death rate from this disease varies in different studies, but has been low[5], except when associated with septicemia and multiorgan dysfunction syndrome.

Outbreaks of human *S. suis* infection are uncommon, although they have occurred in China in recent

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Small cut in the patient's thumb considered to be the entry point for bacterial infection.

FIG. 1

years.[1] The number of sporadic cases reported in literature is small, but has increased in the last few years, most of them from Asian countries.[1,4] In Portugal, one case was reported in 2008.[7] In this article we describe another case of *S. suis* meningitis.

## CASE REPORT

A 42-year-old male, mason, resident in a rural area of northern Portugal, was admitted complaining of persistent headache, fever, chills and vomiting. He was a smoker and an alcoholic, with no remarkable past medical history.

One week prior to hospital admission, the patient participated in a pig slaughtering, during which he accidently cut his thumb with a soiled knife. Two days later he became ill complaining of headache, nausea, confusion, photophobia, neck pain and fever. These symptoms persisted and he was admitted to the hospital four days later.

On physical examination he was confused, febrile, with nuchal rigidity but no focal signs on neurological examination. The rest of the physical exam was normal.

Blood tests showed 7.000 leukocytes/µL with 75.9% neutrophils, 49.000 platelets/µL, hyponatremia (125 mEq/L) and hepatic dysfunction (elevated total bilirubin - 2,1 mg/dl - and increased aminotransferases - AST 193 UI/L and ALT 159 UI/L). C reactive protein was increased (189 mg/L), as well as lactate dehydrogenase (1058 UI/L) and creatine kinase (1117 UI/L). Renal function was normal.

There was no evidence of brain lesion on cerebral computed tomography (CT) scan. The pulmonary x-ray was normal and analysis of arterial blood gases showed slight hypoxemia (PaO2 68 mmHg).

The lumbar puncture (LP) yielded the following: clear fluid, with neutrophilic pleocytosis, low glucose and elevated protein level.

Empiric therapy (ampicillin, ceftriaxone and vancomycin) for acute bacterial meningitis was begun. In addition, dexamethasone was administered for 4 days.

Two sets of blood cultures and CSF culture yielded a Gram-positive coccus, later identified as *Streptococcus suis*. Antimicrobial susceptibility testing (AST) showed that the isolate was sensitive to penicillin, ceftriaxone, vancomycin, clindamycin and eritromycin, but resistant to tetracycline. Antimicrobial therapy was changed to penicillin G 24 million units intravenously daily (MIC < 0,12 µg/dL).

On the following day, the patient´s condition deteriorated, presenting with altered mental status, reappearance of meningismus and later on severe coma (Glasgow coma scale < 8). Orotracheal intubation was performed and he was admitted to the ICU. The cerebral CT scan at this time showed small nonspecific frontal-subcortical hypodensities. New CSF analysis yielded neutrophilic pleocytosis, high protein level and reduced glucose. New CSF and blood cultures were sterile. Transthoracic echocardiogram excluded endocarditis. Human immunodeficiency virus screening tests were negative.

Whilst in the ICU the patient´s condition improved. He became afebrile and meningismus signs disappeared. On day 4 in the ICU the patient was conscious but confused, disorientated and was unable to respond to verbal commands. On day 5, the patient was discharged from the ICU.

Five days after ICU discharge the patient was still confused and agitated, with apparent hearing loss. The cerebral magnetic resonance imaging revealed signs of vasogenic oedema. Audiometric tests were requested, confirming sensorineural hearing loss. A 21-day course of antimicrobial therapy was completed. The patient's mental status improved slowly until he was discharged.

## DISCUSSION

*S. suis* infection is a zoonotic occupational disease, considered to be endemic in Southeast Asia.[3]

Western world´s prevalence is low, with about 100 cases reported in the literature from European countries[3,7-9] and only 5 in America.[10,11]

Although *S. suis* human infection has been reported with no previous exposure to pigs or pork and the exact route of transmission is not known, most cases have been linked to accidental inoculation through skin injuries. In this case report, the patient didn´t wear gloves or a mask during the pig slaughtering and butchering; he was directly exposed to pig´s blood, skin and internal organs through a small cut on his hand (*Fig. 1*). Moreover, he was an alcoholic, a known predisposing factor for *S. suis* infection. No other pig slaughtering member became ill.

Although empirical therapy with vancomycin plus ampicillin and ceftriaxone was adequate and de-escalation was theoretically correct, clinical deterioration was verified after antimicrobial modification. According to similar cases published in the literature, penicillin G remains the standard choice for *S. suis* meningitis treatment[4] and clinical experience with other drugs is limited.[3] Clinical relapse with penicillin or ceftriaxone has been described and requires prolonged therapy.[3,4] After 3-weeks of treatment the patient recovered, though he maintained impaired hearing function and periods of mental confusion.

## CONCLUSION

*S. suis* meningitis is uncommon and usually related with swine exposure. Clinical evolution is favorable but relevant sequelae, such as sensorineural deafness, can be observed. Simple measures as wearing gloves or mask and avoiding undercook pork products consumption seem to be enough to protect against transmission of infection. Penicillin G appears to be the drug of choice for treatment. ■

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