

# Streptococcus Suis Caused Pneumonia: A Case Report

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**Abstract:** Introduction: *Streptococcus suis* bacterial infection is a zoonotic disease that rarely occurs in Indonesia, the cases usually found in the areas that have a consuming raw pork habit. The common manifestation of *S. suis* infection is meningitis, in some cases there are other manifestations such as endocarditis, pneumonia and arthritis. Pneumonia will increase morbidity and mortality rate in *S. suis* infection, so appropriate diagnosis and treatment is necessary. Case: A 50-year-old man who has consuming pork habit with complaints of decreased consciousness since 6 hours before hospital admission, with history of fever, headache, and cough since 2 days prior. Chest x ray shows bilateral consolidation, cerebrospinal fluid analysis revealed bacterial infection, with blood culture showed *S. suis* type II bacterial colonization which is sensitive to several antibiotics such as ceftriaxone, ampicillin and moxifloxacin. The patient regained his consciousness on 5th day of ceftriaxone treatment, but complained bilateral hearing loss. After 14 days of treatment the patient did not show any symptoms of meningitis and pneumonia but still complaint about hearing loss. Conclusion: *S. suis* can be pathogen that that causes pneumonia, especially in patient that had consuming raw pork habit. Appropriate diagnosis and treatment needed to decrease the morbidity and mortality rate.

**Keywords:** Pneumonia, Zoonoses, *Streptococcus suis*, Meningitis, Blood culture, Antibiotics

## 1. Introduction

*Streptococcus suis* is a bacterial pathogen that often infecting pigs, but it also has been found infecting humans<sup>1,2</sup>. It was first discovered infecting pigs in 1954 and first human infection found in Denmark 1968<sup>1</sup>. Recently *S. suis* infection has been reported in many countries around the world such as United States, Netherlands, France, England, and Australia<sup>2</sup>. *S. suis* infections in Asia were mostly found in China, Vietnam and Thailand<sup>2</sup>. In July 2005 an outbreak of *S. suis* was reported in Sichuan province, China, with 215 infections and 39 (18%) of them died<sup>3</sup>. Meanwhile in Indonesia, *S. suis* infection with clinical manifestations of meningitis have been reported in Bali<sup>4</sup>.

*S. suis* infection can cause various clinical manifestations such as meningitis, sepsis, endocarditis, pneumonia and arthritis. High mortality rates occur in patients with sepsis and toxic shock syndrome<sup>3,4</sup>. Patients that infected by *S. suis* often has hearing loss as residual symptoms<sup>3</sup>. The diagnosis of *S. Suis* infection was confirmed by bacterial culture from the infection site. Antibiotic sensitivity test also needed to determine the best antibiotics choice that can be used for therapy.

*S. suis* caused pneumonia was rarely found and sometimes under diagnosed because it usually came with another systemic manifestations. The presence of pneumonia in *S. suis* infection will increase the morbidity and mortality rate, so understanding of clinical manifestation, laboratory finding and appropriate treatments of *S. suis* caused pneumonia is important.

## 2. Case

A 50-year-old man was brought to the emergency room with complaints of unconsciousness since 6 hours before admitted to the hospital. Since 2 days earlier the patient had fever, headache and cough. Due to poor patient awareness, a

complete history taking is difficult to do, from the heteroanamnesis it was found that patient is a welder. Patient or his family doesn't raise pork, but the neighbor in front of the patient's house does. Patient also has a habit of eating pork, either cooked or raw. Patient came with decreased consciousness with Glasgow Coma Scale score 9 (E3V2M4). Vital signs examinations showed his blood pressure 110/70 mmHg, pulse 98 times per minute, temperature 38.4°C, respiration rate 22 times per minute and saturation 99% in room air. On physical examination there are coarse crackles in both lung fields.

Blood examination showed leukocytosis (26.5 x 103/uL), with neutrophilia (90.1%). CSF examination showed a cloudy yellow liquid with polynuclear cells dominant (82%), high protein content (0.64) and low glucose (1). Xpert MTB-RIF examination didn't find MTB. Blood and CSF culture showed *Streptococcus suis II* bacteria in both preparations which were significant as the causative infection agent. Based on antibiotic sensitivity test, ceftriaxone showed the highest sensitivity compared to other antibiotics (Table 1)

**Table 1:** Results of Antibiotic Sensitivity Test

Antibiotics	Interpretation	Disc Diameter (mm)
Levofloxacin	S	24, 7
Erythromycin	S	22, 3
Tetracycline	S	10, 4
Ciprofloxacin	S	23, 1
Cefadroxil	S	25, 4
Ampicilin	S	25, 1
SMoxifloxacin	S	26, 3
CSeftriaxone	S	30, 0

Thorax X-Ray showed minimal consolidation in both lungs (Fig.1).

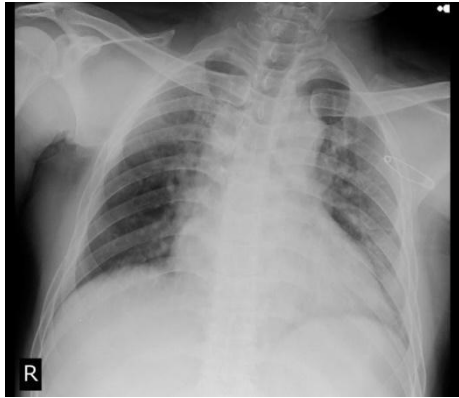


Figure 1: Thorax Photo AP

Head CT scan did not reveal any pathological lesions that could lead to decreased consciousness in patient (Figure 2).



Figure 2: Head CT Scan

Ceftriaxone 2 grams twice a day dexamethasone 5 mg and paracetamol three times a day was given for early treatment. Levofloxacin 750 mg once a day was given as empiric antibiotic for pneumonia. After the culture result and antibiotic sensitivity tests were completed, Ceftriaxone monotherapy was administered 2 gram twice a day for 14 days. After 5th day of treatment the patient began to regain his consciousness, shortness of breathing and cough were no longer experienced. Patient still complaint about hearing loss, communication can be done by writing. After undergoing treatment for 14 days, there were no clinical signs of meningitis and pneumonia, but the hearing loss problem persist.

### 3. Discussion

*S. suis* is a gram-positive facultative an aerobacteria which is a pathogen in pigs and can be transmitted to humans by direct exposure. *S. suis* also found in other animals such as cats, horses, dogs and deer, but transmission from animals to humans is mostly caused by direct contact with pigs<sup>2</sup>. Incidence of *S. suis* infection in humans is more common in adult men compared to women and children, this is because the activities of rising and processing pork are mostly done by men<sup>2,5</sup>.

In pigs *S. suis* usually colonizes on palatine tonsils and nasal cavity, often found at gastrointestinal and urinary tract. Infected pig may show symptoms or become a carrier<sup>6</sup>. Transmission to humans can be through direct exposure with pigs, or contaminated pork products. Bacteria can enter through lesions on skin surface, oral and nasal mucosa<sup>1,2,6</sup>. Furthermore, the bacteria can form lesions on meninges, lymph nodes, and lungs<sup>1</sup>. The mechanism of blood-brain barrier spreading is not certain understand. In humans *S. Suis* infection usually involves various organ systems s it has various clinical manifestations. Meningitis was the most commonly reported case (72.5%) followed by sepsis (24.2%) arthritis (1.1%), endocarditis (1.1%) pneumonia (0.8%), and peritonitis (0.3%).<sup>1</sup> Meningitis patients often had a hearing loss as residual symptoms; this is because the suppurative labyrinthitis process presence before therapy is given<sup>4</sup>.

The diagnosis of *S. suis* infection is confirmed by finding the bacteria in suspected lesion, such as brain tissue, lungs, blood, CSF, and joint fluid. Bacteria were cultured and tested with gram staining, antibiotic sensitivity tests and molecular-biological tests<sup>7</sup>. On gram staining, a colonization of gram-positive cocci bacteria will be found, either in single chain or in pairs<sup>1, 2</sup>. Based on the differences of capsular polysaccharide that found on molecular biology examination, *S. suis* can be classified into 35 stereotypes with type 2 being the most common cause of infection in pigs and humans<sup>2,6</sup>. Antibiotic sensitivity tests usually result in sensitivity to several antibiotics such as ceftriaxone, penicillin, and vancomycin<sup>1,2,7</sup>.

Systemic corticosteroids such as dexamethasone, prednisone, prednisolone, methyl prednisolone also have an important role in its systemic inflammation<sup>7,8</sup>. On bacterial meningitis, antibiotics will cause bacterial lysis and trigger immune system such as macrophages and neutrophils to secrete inflammatory mediators that will trigger increased of capillary permeability, CSF production, cerebral edema and increased intracranial pressure<sup>7</sup>. Corticosteroids play a role by inhibiting activation and proliferation of immune system so that the inflammatory process can be suppressed. In the lung parenchyma, corticosteroids are thought to have a local effect by inhibiting excessive release of cytokines and inflammatory mediators by alveolar macrophages. Several studies have shown that corticosteroids can prevent respiratory failure in pneumonia patients<sup>8</sup>.

In this case, patient had the risk of *S. suis* infection, such us processing and consuming pork. Physical examination shows as systemic infection with the main manifestations was meningitis and pneumonia. Complete blood count, CSF analysis showed bacterial infection, with blood/CSF culture indicated the presence of *S. suis* type II bacterial infection.

Ceftriaxone and levofloxacin where given as empiric antibiotic for meningitis and pneumonia. After obtaining the blood and CSF culture result, antibiotic therapy was focused on ceftriaxon. In addition to antibiotics, dexamethason injection was also given to these patients. Dexamethasone administration aims to reduce inflammation in brain tissue and inflammatory process that occurs in lung parenchyma.

In this patient, hearing loss were still found as residual symptom, this is might happened because labyrinthitis process had occurred before antibiotic therapy was given.

#### 4. Conclusion

*S. suis* bacterial infection is a zoonotic infection that can lead to various clinical manifestations such as meningitis, endocarditis, pneumonia and arthritis. Pneumonia patients who also have meningitis and hearing loss should be suspected of being infected by *S. suis* especially when they also had a history of direct contact with pigs. Blood culture and CSF results are needed for diagnosis and antibiotic sensitivity test. Appropriate diagnosis and treatment are needed to decrease the morbidity and mortality rate.

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