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Case Report

A *Streptococcus suis* infection causing pneumonia in Indonesia: A case report [☆]

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ARTICLE INFO

Article history:

Received 26 July 2022

Revised 6 August 2022

Accepted 10 August 2022

Keywords:

Streptococcus suis

Pneumonia

Infection case

Cancer

Zoonosis

ABSTRACT

Streptococcus suis (*S. suis*) is a zoonotic pathogen that causes pneumonia, sepsis, endocarditis, and meningitis. *S. suis* is primarily found in the upper respiratory tract of pigs. To our knowledge, the first case of *S. suis* infection has resulted in pneumonia in Indonesia. A 40-year-old woman suffered from shortness of breath last month. The complaint worsened one week ago. She also complained of a productive cough with thick white phlegm. She has a history of late-stage cervical cancer. The patient's vital signs were normal, except for tachypnea. Vesicular breath sounds, no wheezing, and coarse lung crackles were discovered during a physical examination. A chest x-ray showed patchy airspace opacities and interstitial thickening throughout both lungs. The following results were obtained from routine laboratory leukocytosis. Gram stain of the sputum showed a few Gram-positive cocci, mostly in pairs. We confirmed this finding by performing the blood agar, and chocolate agar revealed small α -hemolytic and catalase-negative colonies. The strain was positive for penicillin and ceftriaxone in antimicrobial susceptibility testing. A combination of penicillin and ceftriaxone intravenous was utilized for definitive treatment. After completing a 14-day course of oral antibiotic medication, the patient was discharged. Her symptoms had subsided. This case should remind physicians about the possibility of cancer associated with *S. suis* infected patient and no clear history of exposure to pigs or other animals.

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[☆] Competing Interests: None.

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<https://doi.org/10.1016/j.radcr.2022.08.030>

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Introduction

Streptococcus suis (*S. suis*) is a zoonotic pathogen that causes pneumonia, sepsis, endocarditis, and meningitis [1,2]. *S. suis* is primarily found in the upper respiratory tract of pigs [3,4], and infection was initially documented in pigs in 1954, followed by the first human case in Denmark in 1968 [5]. Most people infected with *S. suis* have increased dramatically in recent years due to human outbreaks in China between 1998 and 2005 [3]. The most prevalent infection symptom is meningitis, followed by sepsis, which has a greater fatality rate, especially in immunocompromised conditions [6]. Pneumonia, arthritis, enteritis, peritonitis, uveitis, and endocarditis are some less common clinical manifestations [5,7].

To our knowledge, the first case of *S. suis* infection has resulted in pneumonia in Indonesia.

Case presentation

A 40-year-old woman had suffered from shortness of breath for the last one month. The complaint worsened one week ago. She also complained of a productive cough with thick white phlegm without blood. The patient did not have a fever, had no history of smoking, and had no history of Covid-19. She has a history of late-stage cervical cancer. The patient lived in the city and denied recent or occasional exposure to pigs or other animals. The patient also had no history of eating raw or undercooked pork.

The patient's vital signs were normal at admission, except for a respiratory rate of 24 beats per minute. Vesicular breath sounds, no wheezing, coarse crackles in both lungs, no murmur, and regular S1/S2 heart sounds were discovered during a physical examination. A neurological evaluation revealed that everything was within normal limits. The following results were obtained from routine laboratory and imaging examinations: leukocyte $20.9 \times 10^3/L$, neutrophils 89.9%, platelet $617 \times 10^3/L$, hemoglobin 10.8 g/dL, arterial blood gases study revealed respiratory alkalosis compensated. Tests for the PCR of the novel coronavirus (SARS-CoV-2) were negative. Gram stain of the sputum showed a few Gram-positive cocci, mostly in pairs (Fig. 1). A chest x-ray showed patchy airspace opacities and interstitial thickening throughout both lungs (Fig. 2). Ziehl Nielsen stain showed no acid-fast bacilli (Fig. 3). We confirmed this finding by performing the blood agar, and chocolate agar revealed small α -hemolytic, catalase-negative colonies, and optochin-resistant (Fig. 4). The strain was positive for penicillin, ceftriaxone, vancomycin, and clindamycin in antimicrobial susceptibility testing utilizing the disc diffusion method.

Levofloxacin was given intravenously for empirical treatment before *S. suis* was isolated. A combination of penicillin and ceftriaxone was utilized for definitive therapy after the pathogen, and medication sensitivity was confirmed. Hematological and biochemical blood tests were performed one week after the patient was admitted for treatment. The findings of the culture tests have returned to normal. After completing a 14-day course of oral antibiotic medication, the patient was discharged, and her symptoms had subsided.

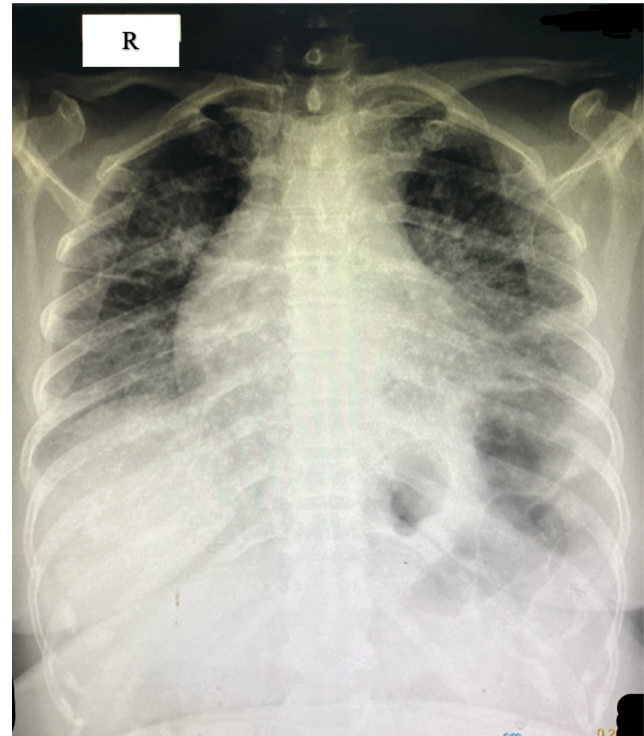


Fig. 1 – A anteroposterior chest x-ray view showed Patchy airspace opacities and interstitial thickening throughout both lungs.

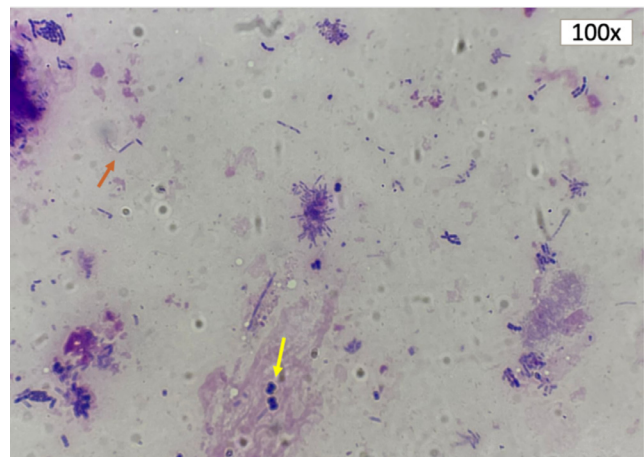


Fig. 2 – Gram stain from the sputum culture reveals a few Gram-positive cocci, mostly in pairs (yellow arrow) (100x magnification).

Discussion

S. suis is a zoonotic pathogen that can cause significant diseases in pigs and people who work with pigs and pork, like farmers, butchers, and slaughterhouse employees [8]. Consumption of tainted pork products, exposure to pigs at work, and direct contact with pigs with skin wounds are identified

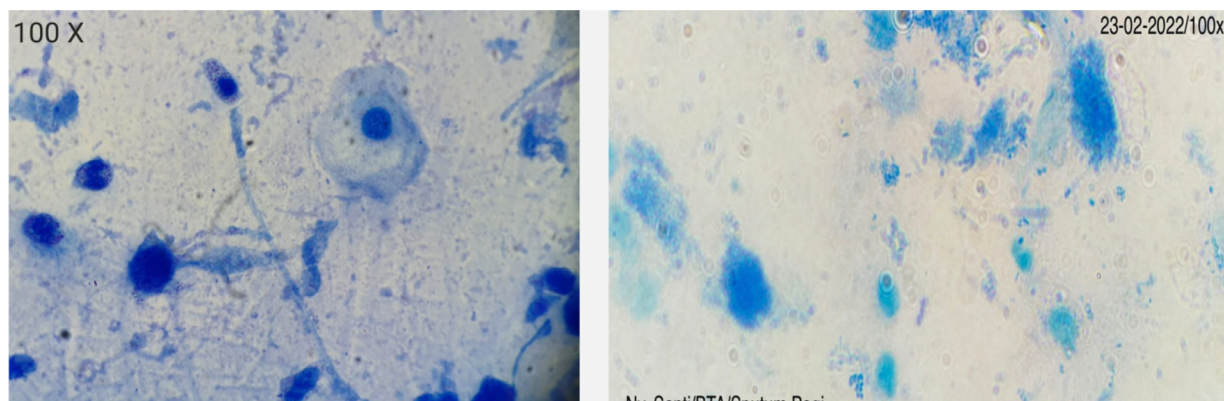


Fig. 3 – Ziehl Nielsen stain showed no acid-fast bacilli (100× magnification).



Fig. 4 – The blood agar (left panel) and chocolate agar (right panel) revealed small α -hemolytic mucoid, catalase-negative colonies, and optochin-resistant.

behavioral risk factors for infection. Males are about 4 times more likely than females to appear with a disseminated illness, and this risk rises with age [2]. Patients with diabetes mellitus, asplenia, alcoholism, and malignancy are at high risk for *S. suis* infection [2,6,9]. However, it is strongly urged to rule out other explanations for a malignancy that resembles an immunocompromised state in patients with no history of such high-risk contact, either directly or through the cross-contamination of raw pork and meat [10].

S. suis infections in humans can result in life-threatening complications and illnesses, including septicemia and meningitis [8]. *S. suis* is considered an emerging pathogen, and it is unclear if this is due to enhanced diagnoses or shifting epidemiological traits. However, the geographic distribution of disease varies considerably in different places. Although Russia has a highly developed pig-rearing business, human infection is almost nonexistent, uncommon in North America, less common in northern Europe, and quite common in Southeast

Asia [2]. *S. suis* can colonize the upper respiratory system, particularly the tonsils and nasal cavities, as well as the digestive and genital tracts in healthy pigs [1]. Between 2016 and 2018, Zhang et al. [11] acquired 223 *S. suis* isolates from 1813 nasal cavity samples from healthy pigs grown on 17 separate farms in 6 different provinces of China.

Serotype 2 of *S. suis* is most frequently linked to human sickness, even though multiple *S. suis* serotypes are dangerous to humans. Serotypes 1, 4, 5, 14, 16, and 24 have been linked to human infections [12]. To the best of our knowledge, ours is the first pulmonary disease case due to *S. suis* in Indonesia.

S. suis infection is diagnosed by separating the organism from clinical samples. *S. suis* is a Gram-positive diplococcus that can be mistaken for *Streptococcus pneumoniae* on Gram stain. It can create mucoid colonies with alpha-hemolysis or no hemolysis on 5 percent sheep blood agar. *S. suis* cannot grow on 6.5% NaCl agar, is VP-negative, resistant to optochin, and generates acid in trehalose and salicin broths. Commercial phenotypic identification techniques or 16S rRNA gene sequencing are used for identification [12].

There are currently 29 known serotypes of *S. suis* [13–15]. Reliable multiplex PCR techniques are replacing traditional biochemical-based approaches for detecting these serotypes. Combined with multilocus sequence typing, this has enhanced the epidemiological characterization and comprehension of this organism's virulence patterns [16]. Unfortunately, these weren't offered by our institution and must be referred to national reference laboratories.

Currently, the best treatments for *S. suis* are penicillin, ampicillin, and 3rd or 4th generation cephalosporins [8]. At the time of admission, the patient, in this case, reported experiencing shortness of breath and a productive cough. We diagnosed our case with pneumonia caused by *S. suis* based on chest x-ray examination, blood agar, and chocolate agar cultures. At the time of admission, the patient was given Levofloxacin, a quinolone antibiotic with broad-spectrum activity against various bacterial infections that cause community-acquired pneumonia. Penicillin and ceftriaxone treatment of the patient's sputum sample 7 days after admission proved *S. suis* pneumonia. The patient's symptoms and the results of his hematological laboratory tests considerably improved a week after his admission.

Conclusion

To our knowledge, the first case of *S. suis* infection has resulted in pneumonia in Indonesia. This case should remind physicians about the possibility of cancer associated with *S. suis* infected patient and no clear history of exposure to pigs or other animals.

Patient consent

Written informed consent for publication of their clinical details and/or clinical images was obtained from the patients.

Acknowledgment

We do acknowledge to Muhammad Faruk, MD for his help in reviewing this case report.

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