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Case Report

Infective Endocarditis Caused by *Streptococcus suis*: A Case Report

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SUMMARY

Streptococcus suis (*S. suis*) can cause various types of infection, leading to high mortality and morbidity rate. However, it is an uncommon pathogen of elderly population infection. Herein, we report a case of 85-year-old female who diagnosed as infective endocarditis caused by *S. suis*, which is the first reported case of infective endocarditis caused by *S. suis* in Taiwan, underscoring the critical role of echocardiography in patients presenting with *S. suis* bacteremia. This patient received antibiotics therapy and was discharged uneventfully after completed treatment courses. Early diagnosis and prompt initiation of appropriate antibiotic therapy are essential in managing such cases.

1. Introduction

Streptococcus suis (*S. suis*) is a Gram-positive bacterium that poses a significant threat to pig populations worldwide. *S. suis* is endemic in countries with extensive pig industries, making it a concern for both animal and human health due to its zoonotic transmission potential.[1] Human infection caused by *S. suis* can have various manifestations, including bacteremia, meningitis, arthritis, bronchopneumonia and infective endocarditis (IE).[2] However, *S. suis* infection was rarely reported in Taiwan, and the case with IE caused by *S. suis* infection is not yet reported in Taiwan.[3] Here we reported an unusual case of IE caused by *S. suis* in an older woman.

2. Case report

An 85-year-old female presented with fever and general weakness for 1 day. Her medical history included hypertension and chronic kidney disease. Additionally, she had undergone prior cardiac surgeries for aortic valve stenosis, with replacement using a 21 mm Hancock II valve (biovalve), and repair of a ventricular septal defect with a pericardial patch 10 years ago. She was working in poultry farming at her residence but denied any recent travel history or exposure to contact clusters. Throughout the course of her illness, she did not experience chills, dizziness, headaches, coughing or sputum production, chest pain, nausea or vomiting, dysuria, or diarrhea.

On admission, her vital signs revealed a temperature of 39.3 °C, a pulse of 103 bpm, a respiratory rate of 20 bpm, and a blood pressure of 157/81 mmHg. A thorough physical examination was unremarkable except cardiovascular assessment, revealing grade 1 to 2 murmur on the right parasternal area of 2nd rib level and grade 1 to 2 murmur on apex area. There were no Roth's spots, Osler's nodes, Janeway lesions, nail hemorrhage, any signs of stroke, or other embolic manifestations observed. Neurological examination demonstrated no signs of hemiparesis nor meningeal irritation, ruling out stroke and meningitis. Laboratory examinations revealed elevated white blood cell count (12500/uL), creatinine (1.54 mg/dL), hs-troponin I (471.40 pg/mL), and C-reactive protein (196.3 mg/L), along with a decreased hemoglobin level (9.9 g/dL). Electrocardiogram revealed regular sinus rhythm without specific ST-T segment change (Figure 1). Chest radiography did not identify any active lung lesions (Figure 2). Brain computed tomography did not find hemorrhage, abscess or other specific lesions except old lacunas and atherosclerotic change. Empirical antibiotic therapy with tazobactam-piperacillin (4.5 mg every 8 hours) was initiated upon collection of blood culture samples. Two days later, the blood culture grew *S. suis*. Following confirmation of *S. suis* bacteremia, echocardiogram revealed fluttering echogenicity over mitral annulus, indicative of vegetation, confirming the diagnosis of IE (Figure 3). Under the diagnosis of left-sided native valve endocarditis (NVE) due to *S. suis*., antibiotic therapy was switched to ceftriaxone 2 g every 12 hours for 4 weeks based on antibiotic susceptibility results. Thereafter, the patient's clinical condition and laboratory parameters improved, and she was discharged uneventfully after successfully transitioning to oral antibiotics consisting of amoxicillin-clavulanic acid for 10 days.

3. Discussion

Streptococci has been recognized as the most common cause of IE in the older population.[4] However, the most common of IE related *Streptococcus* species were *Viridans* group *streptococci*.[5,6] The cases of *S. suis*-induced IE were less reported, and not yet reported in Taiwan.[3] In this study, we present the first case of *S. suis* bacteremia and associated IE in an elderly female without typical exposure and risk factors in Taiwan.

S. suis infections in humans have been linked to occupational

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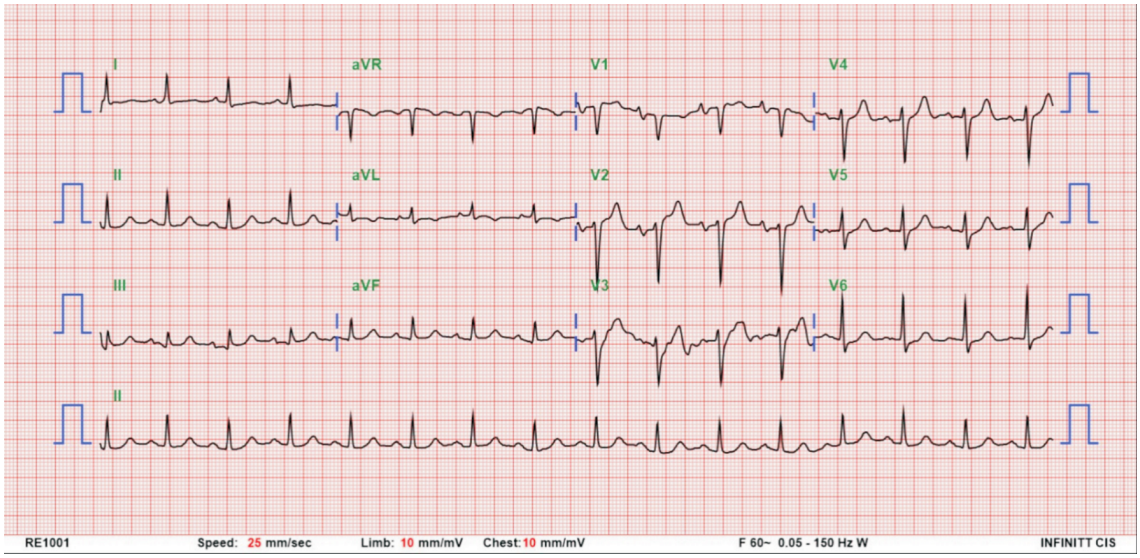

Figure 1. Image of electrocardiogram on admission. There were no abnormal ST-T segment change or arrhythmia noted.

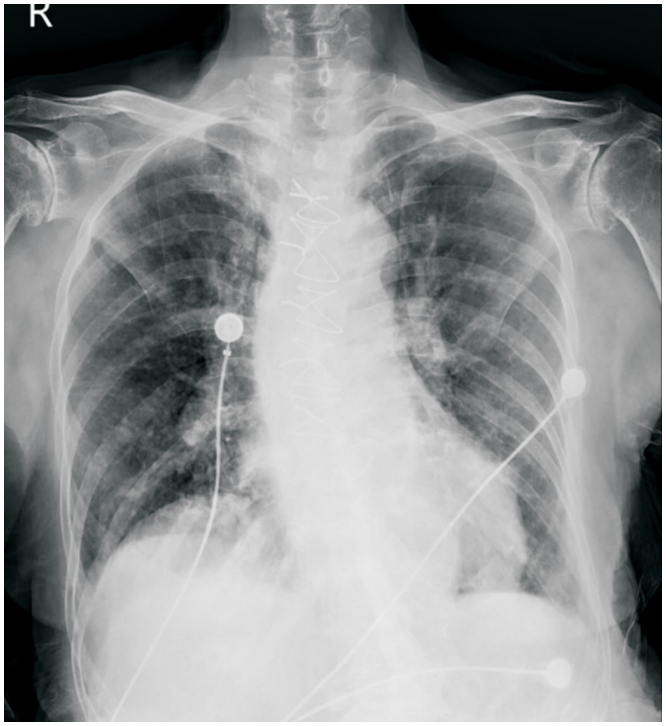

Figure 2. The anterior-posterior view chest X-ray image on admission, which revealed no active lung lesion or cardiomegaly.

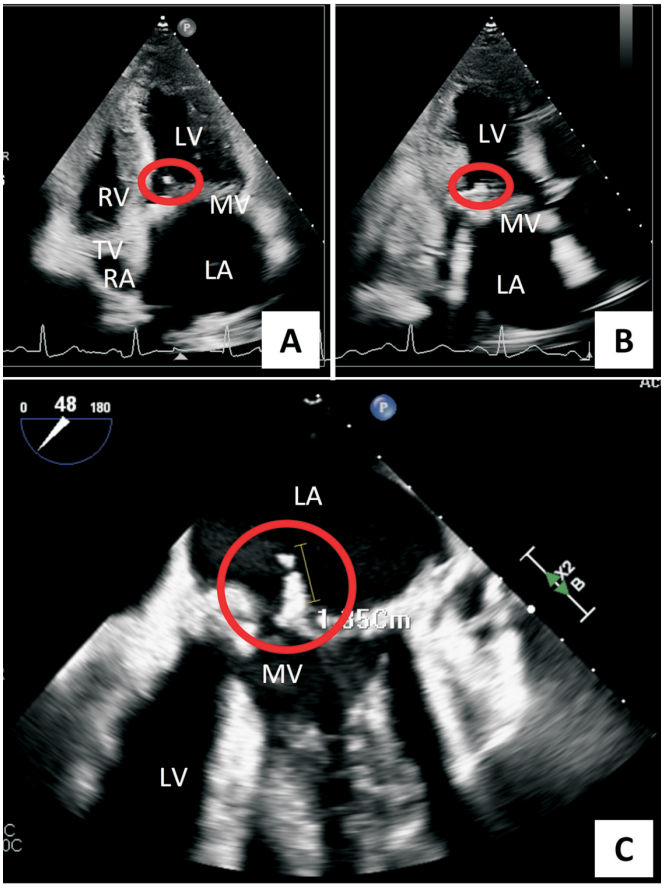

Figure 3. Echocardiogram of the case during hospitalization. Transthoracic echocardiography apical four chambers view (A) and two chambers view (B) showed vegetation on mitral annulus, marked by red circles. (C) Transesophageal echocardiography revealed fluttering vegetations on MV during diastolic phase, marked by red circles. Abbreviations on figure: LA, left Atrium; LV, left ventricle; MV, mitral valve; RA, right atrium; RV, right ventricle; TV, tricuspid valve.

exposure in individuals involved in the swine industry or those consuming undercooked pork products.[7] One meta-analysis reported the risk factors of *S. suis* infections including raw pork consumption, exposure to pigs or pork, and pig related occupation.[8] However, as seen in our elderly female patient who denied above history, suggesting that poultry may also be the potential reservoir or transporter of the *S. suis*.

Prosthetic valve endocarditis (PVE) is a known complication of cardiac valve surgeries.[9–11] The patient's cardiac history, including aortic valve replacement and ventricular septal defect repair, though, may mislead the site of IE. *S. suis* is not a typical causative pathogen in PVE, particularly in those who had no typical contact history because of the low prevalence.[12] In our case, the echocardiogram confirmed the absence of vegetation on aortic valve, but the presence of vegetation on mitral valve.[13] This finding underscores the importance of thorough echocardiographic evaluation in patients with a history of cardiac surgeries, regardless of the expected common sites of infection.

The in-hospital and long-term mortality of IE caused by *Strepto-*

coccus species were as high as 11.1% and 58.5% (median follow-up, 2.3 years), respectively.[14] Moreover, IE in the older population had a higher mortality rate compared to the young population.[15] The early diagnosis and treatment of IE is important for patients' outcome.[16] This case highlights the importance of considering the possibility of IE in patients infected by *S. suis* and underscores the need for a comprehensive evaluation of *S. suis* bacteremia to identify the source of infection.

In general, empiric regimen for suspected NVE consists of vancomycin plus ceftriaxone, which cover staphylococci (both methicillin-susceptible and methicillin-resistant), streptococci, enterococci, and gram-negative bacilli. Cefepime, or piperacillin-tazobactam may substitute for ceftriaxone for patients with risk with *Pseudomonas* infection.[17] The antibiotics use for *S. suis* related left-sided NVE was similar to those for group D streptococcus related left-sided NVE, which including ceftriaxone, as *S. suis* is classified as group D streptococcus.[18] Vancomycin is alternative for patient with hypersensitivity to beta-lactam agents. For those patients with NVE due to penicillin-resistant streptococci, ceftriaxone for four weeks combined with gentamicin use in the initial two weeks was recommended.[17,19]

Surgical intervention may be indicated in those candidates that fit the indications such as severe heart failure, severe valve dysfunction, recurrent systemic embolization, large mobile vegetations, prosthetic valve infection, invasion beyond the valve leaflets, or persistent sepsis despite adequate antibiotic therapy.[17,19,20] In our case, medical treatment without surgical intervention was applied because of small lesion size, stable clinical condition, and the high surgical risk of mortality and morbidity.

In conclusion, we present the first reported patient with *S. suis*-induced IE in Taiwan, who presented with atypical history, exposure, symptoms, and diagnostic findings. This report expands the considerations for IE in clinicians facing complicated cases of *S. suis* infection with atypical presentations.

Declaration of any potential financial and non-financial conflicts of interest

There was no conflicts of interest in this article.

References

1. Lun ZR, Wang QP, Chen XG, Li AX, Zhu XQ. Streptococcus suis: an emerging zoonotic pathogen. *Lancet Infect Dis*. 2007;7:201–209. doi:10.1016/S1473-3099(07)70001-4
2. Feng Y, Zhang H, Wu Z, et al. Streptococcus suis infection: an emerging/reemerging challenge of bacterial infectious diseases? *Virulence*. 2014;5:477–497. doi:10.4161/viru.28595
3. Tsai HY, Liao CH, Liu CY, Huang YT, Teng LJ, Hsueh PR. Streptococcus suis infection in Taiwan, 2000-2011. *Diagn Microbiol Infect Dis*. 2012;74:75–77. doi:10.1016/j.diagmicrobio.2012.05.013
4. DeSimone DC, Lahr BD, Anavekar NS, et al. Temporal trends of infective endocarditis in Olmsted County, Minnesota, between 1970 and 2018: A population-based analysis. *Open Forum Infect Dis*. 2021;8:ofab038. doi:10.1093/ofid/ofab038
5. Murdoch DR, Corey GR, Hoen B, et al. Clinical presentation, etiology, and outcome of infective endocarditis in the 21st century: the International Collaboration on Endocarditis-Prospective Cohort Study. *Arch Intern Med*. 2009;169:463–473. doi:10.1001/archinternmed.2008.603
6. Téllez A, Ambrosioni J, Llopis J, et al. Epidemiology, clinical features, and outcome of infective endocarditis due to abiotrophia species and granulicatella species: Report of 76 cases, 2000-2015. *Clin Infect Dis*. 2018;66:104–111. doi:10.1093/cid/cix752
7. Dutkiewicz J, Zając V, Sroka J, et al. Streptococcus suis: a re-emerging pathogen associated with occupational exposure to pigs or pork products. Part II - Pathogenesis. *Ann Agric Environ Med*. 2018;25:186–203. doi:10.26444/aaem/85651
8. Rayanakorn A, Goh BH, Lee LH, Khan TM, Saokaew S. Risk factors for Streptococcus suis infection: A systematic review and meta-analysis. *Sci Rep*. 2018;8:13358. doi:10.1038/s41598-018-31598-w
9. Lee HA, Wu VC, Chan YS, et al. Infective endocarditis after surgical aortic or mitral valve replacement: A nationwide population-based study. *J Thorac Cardiovasc Surg*. 2023;166:1056–1068.e7. doi:10.1016/j.jtcvs.2021.12.027
10. Cahill TJ, Raby J, Jewell PD, et al. Risk of infective endocarditis after surgical and transcatheter aortic valve replacement. *Heart*. 2022;108:639–647. doi:10.1136/heartjnl-2021-320080
11. Sharony R, Grossi EA, Saunders PC, et al. Minimally invasive aortic valve surgery in the elderly: a case-control study. *Circulation*. 2003;108 Suppl 1:II43–II47. doi:10.1161/01.cir.0000087446.53440.a3
12. Berisha B, Ragnarsson S, Olaison L, Rasmussen M. Microbiological etiology in prosthetic valve endocarditis: A nationwide registry study. *J Intern Med*. 2022;292:428–437. doi:10.1111/joim.13491
13. Ivanovic B, Trifunovic D, Matic S, Petrovic J, Sacic D, Tadic M. Prosthetic valve endocarditis - A trouble or a challenge? *J Cardiol*. 2019;73:126–133. doi:10.1016/j.jjcc.2018.08.007
14. Østergaard L, Voldstedlund M, Bruun NE, et al. Temporal changes, patient characteristics, and mortality, according to microbiological cause of infective endocarditis: A nationwide study. *J Am Heart Assoc*. 2022;11:e025801. doi:10.1161/JAHA.122.025801
15. Ashraf H, Nadeem ZA, Ashfaq H, Ahmed S, Ashraf A, Nashwan AJ. Mortality patterns in older adults with infective endocarditis in the US: A retrospective analysis. *Curr Probl Cardiol*. 2024;49:102455. doi:10.1016/j.cpcardiol.2024.102455
16. Sobreiro DI, Sampaio RO, Siciliano RF, et al. Early diagnosis and treatment in infective endocarditis: Challenges for a better prognosis. *Arq Bras Cardiol*. 2019;112:201–203. doi:10.5935/abc.20180270
17. Baddour LM, Wilson WR, Bayer AS, et al. Infective endocarditis in adults: Diagnosis, antimicrobial therapy, and management of complications: A scientific statement for healthcare professionals from the American Heart Association. *Circulation*. 2015;132:1435–1486. doi:10.1161/CIR.0000000000000296
18. Okura M, Osaki M, Nomoto R, et al. Current taxonomical situation of Streptococcus suis. *Pathogens*. 2016;5(3):45. doi:10.3390/pathogens5030045
19. Delgado V, Ajmone Marsan N, de Waha S, et al. 2023 ESC Guidelines for the management of endocarditis. *Eur Heart J*. 2023;44:3948–4042. doi:10.1093/eurheartj/ehad193
20. Kouijzer JJP, Noordermeer DJ, van Leeuwen WJ, Verkaik NJ, Lattwein KR. Native valve, prosthetic valve, and cardiac device-related infective endocarditis: A review and update on current innovative diagnostic and therapeutic strategies. *Front Cell Dev Biol*. 2022;10:995508. doi:10.3389/fcell.2022.995508