

**Case Report**

When the Heart Catches Us Unawares: A Rare Case of Right-Sided Endocarditis Caused by *Alistipes Onderdonkii*

Sohaïb Mansour¹, Ayoub Jaafari^{2*}, Saïf-Eddine El Bouhali², Andrea Gallerani², Karim Bochouari², Ilyass Zekhnini¹, Rachid Attou²

¹Internal Medicine Department, C.H.U Brugmann, Brussels, Belgium

²Intensive Care Unit Department, C.H.U Brugmann, Brussels, Belgium

*Corresponding author: Ayoub Jaafari, Intensive Care Unit Department, C.H.U Brugmann, Brussels, Belgium.

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Abstract

Right-sided infective endocarditis, which accounts for 5-10% of cases, mainly affects the tricuspid valve and is frequently associated with the use of drugs, intracardiac devices, or venous catheters. The germs most often identified are staphylococci, streptococci, and enterococci. Gut microbiota lives in the gastrointestinal tract and the main coexist harmoniously with humans. Bacteria are the predominant component in the gut microbiome, but viruses, fungi, and archaea are also present and influence gut and systemic metabolism. Scientists have confirmed that gut microbes are closely related to human health by regulating metabolism and immune function. Research has established the crucial role of gut microbes in regulating metabolism and immune function, yet the association between infective endocarditis and microbiota remains underexplored. Here, we report the first documented case of right-sided infective endocarditis caused by *Alistipes onderdonkii*.

Keywords: Endocarditis; *Alistipes Onderdonkii*; Gut Microbes; Metabolism; Immune Function

Introduction

Infective endocarditis (IE) is an infection of the heart valves or any intracardiac artificial devices (prosthetic valves, pacemakers, and defibrillators) associated with significant morbidity and mortality from serious complications such as heart failure, intracardiac abscesses that can lead to septic and cardiogenic shock, and dreaded cerebral abscesses. [1,2]. The annual incidence of infective endocarditis is roughly 30 cases per million inhabitants in population-based studies in Western countries [3]. In contrast with left-sided IE, right-side IE accounts for 5-10% of all cases and is more frequently associated with intravenous drug use, intracardiac devices, and central venous catheters [4]. The most

commonly reported micro-organisms responsible for IE classically encompass aerobic Gram-positive bacteria, such as staphylococci, streptococci, and enterococci [4]. Additionally, a greater prevalence of other gram-negative bacteria has been reported in right-sided infections [5]. The gut microbiota is a well-known entity that has been described for decades. Found in the gastrointestinal tract, they harmoniously coexist with humans, where they are closely linked to their immunity. *Alistipes* is a genus described in 2003 and consists of 13 species including *Alistipes onderdonkii* (AO) [6,7]. To our knowledge, it has been shown that the intestinal microbiota plays an important role in cardiovascular diseases by modulating metabolites or inflammation, but also in auto-immune disease and tumours [8]. Despite growing evidence of the interplay between gut microbiota and cardiovascular health, the connection between intestinal microbiota and endocarditis remains largely unexplored.

Herein, we present the first-rare case of right-side IE caused by *Alistipes onderdonkii* and a review of the literature.

Case Presentation

An 86-year-old patient was referred by his general practitioner for left gonalgia following a fall at home 2 days ago with a bad landing. On systematic questioning, he reported having had a fever for a week, non-traumatic swelling of the left knee 11 days ago, fluctuating, no regular alcohol consumption, no smoking, no use of recreational drugs, and other complaints reported. His medical and surgical history is marked by an adenocarcinoma of the upper and middle rectum metastasized to the liver (segments VI and VIII), treated by radio-chemotherapy and surgery and complicated by the presence of stable abscessed collections at the surgical sites, sensory polyneuropathy post-chemotherapy, bilateral pulmonary embolism in 2020, osteoarthritic disc disease following fracture of the left patellar knee (more than 50 years ago), benign prostatic hypertrophy treated by Transurethral resection of the prostate (TURP) in 2020, and an operated right cataract. His treatment included Apixaban, Acyclovir, B vitamins and magnesium supplements, and acetaminophen. The parameters on arrival were as follows; a blood pressure of 133/75mm Hg, a heartbeat rate of 95, a temperature of 36.8°C, and an oxygen saturation of 94% on room air. On clinical examination, cardiac and pulmonary auscultation were normal. The abdominal and neurologic examinations revealed no abnormalities. His left knee was red, warm, and swollen, with partial functional limitation of the left knee, and without sign of deep vein thrombosis. Bearing in mind the patient's condition at the time of consultation, complementary exams were realized. Laboratory investigations revealed a haemoglobin level of 13.4g/dL, platelet count of 369,000/ μ L, leucocytosis with a white blood cell count of 7,070/ μ L and markedly elevated inflammatory markers, including a C-reactive protein level of 231mg/dL. Renal function tests were normal, with a serum creatinine level of 0.94mg/dL and an estimated glomerular filtration rate (GFR) of 78mL/min/1.73m².

Hepatic tests were also normal. Additionally, pairs of blank blood cultures were taken. Given the patient's laboratory results, a puncture of the left knee was carried out as well as sample which revealed 89 white blood cells, 15 red blood cells, without germs identified. An initial diagnosis of septic arthritis was made, and the patient was hospitalized and treated with anti-biotherapy. During the first 5 days, the patient presented a significant clinical and biological improvement. The CRP continued to fall, and the redness and volume of the knee decreased. However, on the sixth and seventh days, the patient began to become more asthenic/lethargic, and showed a re-increase in his biological inflammation, despite a well-administered course of antibiotics and a knee that remained relatively stable clinically. The parameters were taken at that time and indicated a blood pressure of 134/86mm hg, a heart rate of 101bpm, a saturation of 95% associated with a respiratory rate of 21/min, and a temperature of 38.9°C. On clinical examination, cardiac auscultation revealed a regular rhythm and the presence of a newly holo-diastolic murmur at the tricuspid focus (3/6). The rest of the clinical examination was unremarkable. Bacteriological mapping was carried out (blood cultures repeated twice, microscopic examination of urine, chest X-ray). Given the new patient's laboratory results, and clinical features (cardiac auscultation), a suspicion of endocarditis was raised, and trans-thoracic and trans-oesophageal cardiac ultrasounds were performed. Examinations showed the presence of vegetation on one of the cusps of the tricuspid valve, confirming the diagnosis of right-sided endocarditis (figure 1). Furthermore, the first blood cultures taken in the emergency department showed the presence of a germ called *Alistipes onderdonkii*, which persisted in the second blood culture taken in the hospital ward. Given all this, a diagnosis of endocarditis due to *Alistipes onderdonkii* was made. An antibiotic shift was undertaken, and the patient was started on Piperacillin-Tazobactam followed by Ciprofloxacin and Flagyl for a total of 6 weeks with rapid clinical-biological and ultrasound improvement.

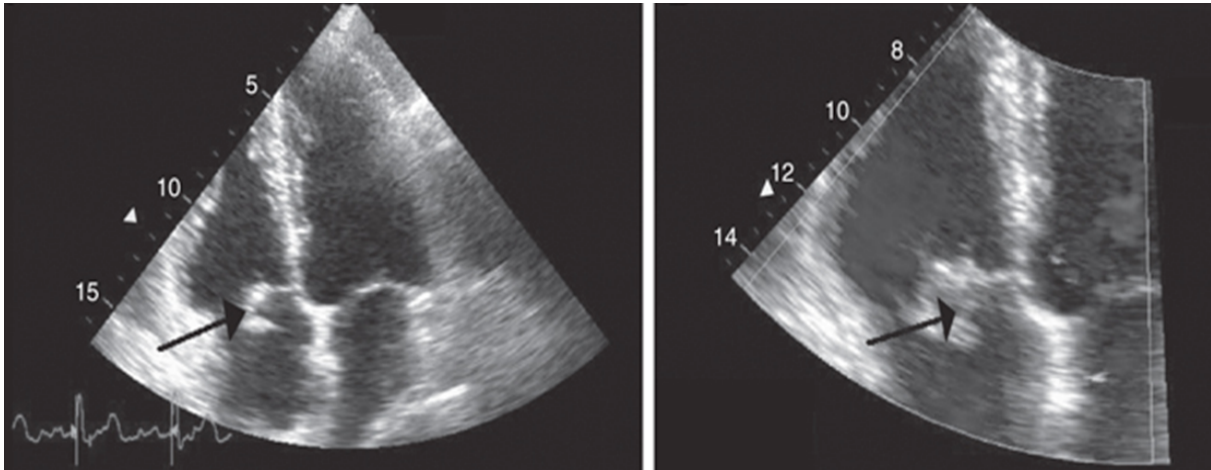


Figure 1: Trans-oesophageal cardiac ultrasound showing vegetation on one of the cusps of the tricuspid valve (black arrow).

Discussion

We reported the first rare right-side infectious endocarditis (IE) caused by an atypical microbiota germ. To our knowledge, risk factors for developing right-side IE are more frequently associated with intravenous drug use, intracardiac devices, and central venous catheters [4,5]. According to our case, the patient had absolutely none of these risk factors for developing right-sided IE. According to his oncological background, this digestive germ was likely translocated by a hematogenous way to the heart from collections at the post-metastectomy surgical liver sites to the supra-hepatic veins and the inferior vena cava and then to the right heart, where it would have implanted itself on the tricuspid valve.

From a taxonomic point of view, *Alistipes* is a genus described in 2003 after being discovered in tissue samples from children suffering from appendicitis [6,8]. At present, we know that there are 13 species: *Alistipes finegoldii*, *putredinis*, *onderdonkii*, *shahii*, *indistinctus*, *senegalensis*, *timonensis*, *obesi*, *ihumii*, *inops*, *megaguti*, *provencensis*, and *massiliensis* [9]. Within the various species of this genus, *Alistipes Onderdonkii* (AO) has been identified from appendix tissues, abdominal abscesses, and peritonitis [7]. In recent years, many studies have been carried out on changes in the bacterial richness of *Alistipes* in human patients and have shown that *Alistipes* can be either beneficial or harmful. Indeed, they have been implicated in liver disease (fibrosis), colorectal cancer such as in our patients, cardiovascular disease, and mood disorders [8]. Recent studies have investigated changes in the bacterial richness of *Alistipes* in human patients, revealing its potential for both beneficial and harmful effects [9]. *Alistipes* has been implicated in liver disease (fibrosis), colorectal cancer, cardiovascular disease, and mood disorders. More cases are needed.

Conclusion

This case represents a significant milestone as it marks the first reported instance of human right-sided infectious endocarditis attributed to *Alistipes onderdonkii*, an unusual microorganism sourced from the microbiota.

References

1. Baddour LM, Wilson WR, Bayer AS, Fowler VG, Tleyjeh IM, et al. (2015) Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications: A Scientific Statement for Healthcare Professionals From the American Heart Association. *Circulation* 132: 1435-1486.
2. Wang A, Gaca JG, Chu VH (2018) Management Considerations in Infective Endocarditis: A Review. *JAMA* 320: 72-83.
3. lung B (2019) Endocardite infectieuse. *Épidémiologie, physiopathologie et anatomopathologie, La Presse Médicale* 48: 513-521.
4. Shmueli H, Thomas F, Flint N, Setia G, Janjic A, et al. (2020) Right-Sided Infective Endocarditis 2020: Challenges and Updates in Diagnosis and Treatment. *J. Am. Heart Assoc* 9: e017293.
5. Cimmino G, Bottino R, Formisano T, Orlandi M, Molinari D, et al. (2023) Current Views on Infective Endocarditis: Changing Epidemiology, Improving Diagnostic Tools and Centering the Patient for Up-to-Date Management. *Life*. 13(2): 377.
6. Yang M, Bi W, Zhang Z (2024) Gut microbiota and risk of endocarditis: a bidirectional Mendelian randomization study. *Front. Microbiol* 15:1320095.
7. Luo S, Li W, Li Q, Zhang M, Wang X, et al. (2023) Causal effects of gut microbiota on the risk of periodontitis: a two-sample Mendelian randomization study. *Front. Cell. Infect. Microbiol.* 13:1160993.
8. Parker BJ, Wearsch PA, Veloo ACM, Rodriguez-Palacios A (2020) The Genus *Alistipes*: Gut Bacteria With Emerging Implications to Inflammation, Cancer, and Mental Health. *Front. Immunol.* 11:906.
9. Chang JH, Chong KKL, Lam LN, Wong JJ, Kline KA (2018). Biofilm-associated infection by enterococci. *Nat. Rev. Microbiol.* 17: 82-94.