

## Case Report

# Arcobacter Butzleri in an AIDS Patient

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**Background.** *Arcobacter butzleri* (*A. butzleri*) is an emerging enteric pathogen increasingly identified in Europe and is likely under-reported in other global regions. We describe to our knowledge the first case report of *A. butzleri* in an AIDS patient, along with the first documented local (Singapore) case of *A. butzleri* infection. **Case Presentation.** A 38-year-old AIDS patient presented with diarrhoea of 2 weeks' duration. Stool cultures yielded *A. butzleri*. The patient was treated with 3 days of ciprofloxacin with clinical resolution of diarrhoea. **Conclusion.** *A. butzleri* is likely to be present, although under-reported in AIDS patients, and it should be noted as a pathogen of increasing significance.

## 1. Introduction

Patients with human immunodeficiency virus (HIV) are more prone to acquiring enteric infections from food-borne and zoonotic pathogens [1]. *Arcobacter butzleri* (*A. butzleri*) is a *Campylobacter*-like organism of the genus *Arcobacter* [2] that has been increasingly identified as an emerging enteric pathogen [2, 3].

We report a case of *A. butzleri* infection in an HIV-positive patient with acquired immunodeficiency syndrome (AIDS). This is likely to be the first case reported of its kind in an AIDS patient and in Singapore based on literature review. Clinicians need to be aware of this pathogen and its treatment and complications in immunocompromised hosts.

## 2. Case Presentation

A 38-year-old man with a history of HIV infection diagnosed in 2016 but only on intermittent antiviral treatment presented with symptoms of acute diarrhoea lasting 2 weeks. The diarrhoeal episodes occurred about ten to twenty times per day and stools were neither bloody nor mucoid. The diarrhoeal episode was associated with clinically significant loss of weight and cramping abdominal pain. The patient

had been on boosted protease inhibitor (darunavir/ritonavir) monotherapy for 6 months prior to admission. There was no recent travel history or intake of raw or uncooked food, and he had worked as a freelance architect prior to losing his job at the start of the pandemic. Clinical examination revealed a hypovolemic fluid state with significant cachexia, while bowel sounds were hyperactive. There was no abdominal tenderness, and digital rectal examination was unremarkable.

Laboratory investigations showed evidence of mild leukocytosis ( $10.03 \times 10^9/L$ ) with neutrophilia ( $9.36 \times 10^9/L$ ); his absolute CD4 count was  $<20$ . His viral load was  $87 \times 10^6$  U/mL. There was no elevated creatinine to suggest acute kidney injury, although his urea level was slightly elevated, indicating dehydration. Blood cultures were negative for bacterial organisms. Stool cultures were positive for *A. butzleri* on 2 separate occasions (Figure 1). Sensitivity testing yielded intermediate sensitivities to ciprofloxacin (34 mm) and high sensitivities to erythromycin (20 mm) (Figure 2).

The patient was subsequently treated presumptively with 3 days of oral ciprofloxacin 500 mg twice daily with complete clinical resolution of diarrhoea and abdominal discomfort. Repeat stool cultures after the completion of antibiotics were also negative (Figure 3). Unfortunately, he developed other

DATE / TIME : 06-MAY-2021 18:38	
PROCEDURE	RESULTS
LOCATION : Ward 44 (Med)	
<u>Stool O2 culture</u>	
Sample Origin	Stool
Request status	Completed
Direct Exam	-
Visual Aspect	-
Appearance (Stool)	loose
Identification	-
Organism 1	Arcobacter butzleri
Sensitivity 1	-
Organism 1	Arcobacter butzleri

DATE / TIME : 12-MAY-2021 16:57	
PROCEDURE	RESULTS
LOCATION : Ward 62 (Iso)	
<u>Stool O2 culture</u>	
Sample Origin	Stool
Request status	Completed
Visual Aspect	-
Appearance (Stool)	loose
Comment	Please refer to accession number 1051080796 for susceptibility test results.
Identification	-
Organism 1	Arcobacter butzleri

FIGURE 1: Stool culture reports indicating presence of *A. butzleri*.

Identifications	
Organism 1	Arcobacter butzleri
Sensitivities	
Organism 1	Arcobacter butzleri
⊗ CIPD Ciproflox. disc	Intermediate ( 34 mm )
⊗ E Erythromycin disc	Sensitive ( 20 mm )

FIGURE 2: Sensitivities of identified *A. butzleri* in our patient.

DATE / TIME : 24-MAY-2021 13:47	
PROCEDURE	RESULTS
LOCATION : Ward 44 (Med)	
<u>Stool O2 culture</u>	
Sample Origin	Stool
Request status	Completed
Visual Aspect	-
Appearance (Stool)	mucoïd
Stool neg comment	Salmonella, Shigella, Campylobacter and Vibrio species not isolated.

FIGURE 3: Stool culture report after 3-day course of ciprofloxacin.

infective complications such as nosocomial pneumonia, cytomegalovirus (CMV) colitis, and disseminated *Mycobacterium avium* complex (MAC) infection. He passed away from respiratory failure from severe pneumonia 4 weeks after admission.

### 3. Discussion and Conclusions

*A. butzleri* is a Gram-negative, motile, aerotolerant microbe of the *Episilonproteo bacteria* class and *Campylobacteraceae* family [2] and is one of 27 recognised species of *Arcobacter* characterised to date [3]. It was first isolated in aborted bovine foetuses [4] and was later linked to causing reproductive disorders and late-term abortions in cattle, pigs, and

sheep [5]. It has been present in a range of commonly consumed meat including poultry and red meat [6, 7] and contains virulence genes such as *ciaB* (*Campylobacter* invasive antigen B) and *hecB* (encoding a haemolysin activation protein) [8], in addition to possessing adhesive and invasive properties toward multiple human cell lines [9]. These virulence genes are nonetheless not routinely tested in our laboratory and thus were not tested in this patient's specimen.

As a result, *A. butzleri* has been identified as an emerging enteropathogen and a zoonotic agent of increasing significance [10]. Taylor et al. identified *A. butzleri* in 2.4% of diarrhoeal samples in Thai children in 1991 [11], while several sporadic outbreaks of *A. butzleri* gastroenteritis have

TABLE 1: Case series of documented *A. butzleri* infections.

Case studies	Treatment	Reference
Diarrhoea in rural children, Thailand (93)	Not stated	[11]
Gastrointestinal symptoms campylobacter-like infections, France (29)	2 treated with oral (PO) fluoroquinolones (ciprofloxacin), 1 treated with PO co-amoxiclav	[17]
Enteritis (46), of which 19 had acute gastroenteritis, 30 had co-existing conditions and 8 had chronic colitis, Belgium	Not stated	[22]
Gastroenteritis (24) out of 3884 outpatients and 752 inpatients	Not stated; recommendations were for fluoroquinolones	[15]
Bacteraemia in an immunocompromised host (1) (85 y/o CLL on idelalisib)	Intravenous (IV) piperacillin-tazobactam and vancomycin	[23]
Bacteraemia in a neonate (1) causing neonatal sepsis	Not stated	[18]
Bacteraemia in a patient with acute gangrenous appendicitis (1)	IV cefuroxime and metronidazole	[20]
Bacteraemia in a liver cirrhosis patient (1)	IV cefuroxime	[19]
Peritoneal dialysis (PD) peritonitis (1)	IV ticarcillin-clavulanate x 2 weeks	[21]

been observed in Europe and South Africa across the 1990s and 2000s [12–14]. Gastrointestinal infection and colonisation with *A. butzleri* have since demonstrated increasing prevalence; *A. butzleri* was identified as a causative organism for 24 out of 4636 cases of gastroenteritis in a prospective study in Germany [15], while several studies have identified *A. butzleri* to be amongst the most frequently isolated *Campylobacteraceae* strain in human clinical samples [16, 17].

While gastrointestinal infections with *A. butzleri* are becoming more common, severe infections such as bacteraemia remain rare. A case of *A. butzleri* bacteraemia was observed in a neonate in the United Kingdom [18], while in Hong Kong, two cases of *A. butzleri* bacteraemia have been reported, both patients with underlying diseases of liver cirrhosis and gangrenous appendicitis, respectively [19, 20]. A single case of *Arcobacter* causing peritonitis has been reported in a patient on peritoneal dialysis, occurring after repositioning of a Tenckhoff catheter [21]. Case studies documenting *A. butzleri* infection, ranging from gastrointestinal infections to bacteraemia, are appraised in Table 1. Despite the well-documented phenomenon of enteral infections with *A. butzleri*, there have yet to be documented cases of infection in HIV patients, although it is highly likely that the true global prevalence is underestimated. We believe that this is the first documented case of its kind, in addition to being the first in Singapore to document a case of *A. butzleri* infection locally.

Differential diagnoses to be considered for this patient would include cytomegalovirus (CMV) colitis, *Mycobacterium avium* enteric infection, as well as HIV-associated enteropathy [24], along with other *Campylobacter* species that are found more commonly in HIV patients [25, 26].

The majority of *A. butzleri* infections are self-limiting and do not require treatment with antibiotics unless clinically indicated, such as in cases of severe and persistent symptoms [17], as in our patient. Despite its status as an emerging pathogen, data on antibiotic susceptibility of *A. butzleri* remain sparse. The most optimal antibiotic choice for treatment of *A. butzleri* is still unclear. The species has been classified as a potential multidrug resistant (MDR) organism as it has demonstrated varying levels of

susceptibility toward different classes of agents [27]. In a Belgian antibiotic susceptibility study of 63 strains of *A. butzleri*, most strains (87%) were susceptible to ciprofloxacin (MIC<sub>90</sub> 32 mg/L), while moderate levels (36%) of resistance to doxycycline (MIC<sub>90</sub> 4 mg/L) were reported [22]. Combined resistance to erythromycin and doxycycline was observed in 10 out of 13 strains of *A. butzleri* [22]. Bruckner et al. also showed that ciprofloxacin was the most effective antibiotic agent for treatment of *A. butzleri* as compared to other antibiotics such as azithromycin [15], which are commonly used for *Campylobacter*. However, another meta-regression analysis revealed emerging resistance of *Arcobacter* species against fluoroquinolones [28]; this was corroborated in the case of our patient, whose specimens instead demonstrated the greater efficacy of erythromycin as opposed to ciprofloxacin (Figure 2).

In summary, *A. butzleri* is an emerging pathogen which is recognised increasingly in Europe and probably under-recognised in the rest of the world. Ours is the first documented case of *A. butzleri* in Singapore and possibly the first in an HIV patient. Clinicians should recognise the pathogenicity of *A. butzleri* in immunocompromised hosts and should always send stool cultures to test for bacterial strains especially in cases of persistent diarrhoea. Given that *A. butzleri*'s antibiotic susceptibility pattern is different from *Campylobacter*'s, laboratories in centres treating individuals with HIV should also be alert to this treatable pathogen to reduce morbidity.

## Abbreviations

*A. butzleri*: *Arcobacter butzleri*.

## Data Availability

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

## Ethical Approval

The Institutional Review Board of National University Hospital waived the need for ethics approval for the purpose of this case report.

## Consent

Verbal informed consent for publication of this case report was obtained from the patient. Written informed consent from the patient's next-of-kin was also obtained for publication of this case report as the patient had unfortunately passed away at the time of writing.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Authors' Contributions

THY Tan conducted the conception of the work, design of the work, acquisition of data, analysis of data, interpretation of data, drafting, and submission of the work. The author was also responsible for final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. SM Tham conducted analysis and interpretation of data, revising of the work critically for important intellectual content. The author agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. PA Tambyah conducted conception of the work, design of the work, revising of the work critically for important intellectual content. The author agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Trevor Hwee Yong Tan, Sai Meng Tham, and Tambyah Paul Anatharajah have contributed equally to the work.

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