CASE REPORT

# *Streptococcus plurianimalium* Peritonitis in a Patient on Continuous Ambulatory Peritoneal Dialysis: A Case Report

Durga Arinandini Arimuthu[1], Christopher Thiam Seong Lim[2]

[1] Department of Medicine, Serdang Hospital, Jalan Puchong, 43000 Kajang, Selangor, Malaysia
[2] Unit of Nephrology, Department of Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

**ABSTRACT**

*Streptoccoccus plurianimalium* is a rare pathogen that has recently made a crossover from its common host, animals to humans. As reports start to emerge from this pathogen, it has come to light that it can cause clinically significant infections in a broad spectrum of systems. However, the mode of transmission of this pathogen has not yet been fully established. We report here a case of *Streptoccoccus plurianimalium* peritonitis in a patient undergoing continuous ambulatory peritoneal dialysis in our centre. To the best of our knowledge, this is the first case report of a *Streptoccoccus plurianimalium* peritonitis in an end-stage kidney disease patient.

**Keywords:** *Streptoccoccus plurianimalium*, Peritoneal dialysis, Peritonitis, End-stage renal disease

**Corresponding Author:**
Christopher Lim, FRCP
Email: drchrislim@gmail.com
Tel: +603-97692568

## INTRODUCTION

Streptococcal infections had plagued humankind since the 19th century when the Austrian surgeon, Thomas Billroth described it (1). Since then, our understanding of this pathogen has expanded tremendously, whereby nearly 163 species have been described in both humans and animals (1). One of the emerging pathogens that were described in animals in 1999 by Devriese is *Streptococcus plurianimalium* (2). Its name is derived from the fact that it is found in a wide variety of animals, including mammals and avians (3). The pathogen can be found on various parts of these animals, such as skin, mucous membrane, respiratory and gastrointestinal tract (1). Transmission of the pathogen from animals to humans is believed to be via infected bodily fluids of the animal reservoirs (1).

In recent years, reports have emerged of this pathogen, causing clinically significant infections in both the pediatric and adult human populations. Diseases range from periodontitis, cerebral abscess, subdural empyema, infective endocarditis and septicaemia (1-5). Antibiotics that have been used in literature includes carbapenem, vancomycin, ceftriaxone and amoxicillin/clavulanic acid with similar outcomes (1-4). We describe here a rare case of *Streptoccoccus plurianimalium* infection that we encountered and its clinical course.

## CASE REPORT

We report a case of a 42-year-old Chinese gentleman with underlying hepatitis B and end-stage kidney disease on continuous ambulatory peritoneal dialysis since 2015 who presented to us in May 2019 with 2 days history of abdominal pain and turbid peritoneal dialysis flu. He denied any fever, diarrhoea or vomiting. He had recently returned from holidays where he visited Pattaya, Thailand with his family. He denied any exposure to livestock or exotic animals. He also denied consuming any raw meat. He had continued his peritoneal dialysis while vacationing and mentioned that the place where he had stayed was clean and was devoid of any animal exposure.

He has two previous histories of peritonitis in July 2016 and October 2018. He presented with abdominal pain, turbid fluid and had elevated cell counts in those episodes. During the July 2016 episode of peritonitis, his peritoneal fluid culture grew *Streptococcus mitis* while the October 2018 culture grew *Klebsiella rhinoscleromatis*. These strains were sensitive organisms, and he was treated with antibiotics during both episodes and was discharged well.

On this occasion, when he arrived to our emergency department, he was hypotensive and required inotropic support as he did not respond to fluid resuscitation. He was started on Intraperitoneal (IP) Ceftazidime and Cloxacillin as per empirical treatment for a provisional diagnosis of peritoneal dialysis-related peritonitis. Peritoneal fluid on the day of admission showed a total white cell count

of 250 cell/mm$^3$ with predominant polymorphs. Fluid culture revealed *Streptococcus plurianimalium* that was sensitive to ampicillin, penicillin, erythromycin and trimethoprim/sulfamethoxazole. He had completed four days of Ceftazidime and Cloxacillin when we received the culture results. He had also been weaned off the inotropic support by this point.

Upon receiving the culture results, antibiotics were then changed to intraperitoneal penicillin G 50,000 iu qid for two weeks in total. His antibiotics were delivered on an outpatient basis in our peritoneal dialysis unit due to patient's personal reasons. Repeated fluid cell count showed reducing counts and he completed the antibiotics as an outpatient. His peritoneal dialysis has been continued uneventfully subsequently.

## DISCUSSION

*Streptococcus plurianimalium* has been reported to cause a series of infections in both humans and animals. Only a handful of human cases have been reported and those have been in both adults and paediatric populations. The cases have been of either brain abscess, infective endocarditis or septicaemia (1).

*S.plurianimalium* is phylogenically related to the *S.hyovaginalis, S thoraltensis, S.halotolerans* and salivarius group. Phenotypically it produces a white small needle-like colonies along with α-hemolysis (1). Though *Streptococcus sp* have been known to cause peritonitis in dialysis patients, this specific organism has not been reported before this as a causative agent and its pathogenesis remain unclear.

Peritoneal dialysis is a form of renal replacement therapy for end-stage kidney disease patients. In this form of replacement, side effects include peritonitis. Though common, it is life-threatening in certain situations. Besides, it can also cause impairment of the peritoneal membrane, recurrence of infection and failure of peritoneal dialysis. Organisms that cause peritonitis may be either gram-positive or negative and thus antibiotics therapy is usually directed towards both. Antibiotics are also given intraperitoneally unless in the event of evidence of systemic inflammatory response. In our patient, he had been on peritoneal dialysis for 4 years with two prior histories of peritonitis. However, he managed to survive both those episodes without any systemic response. In this occasion, he had developed hypotension and required inotropic support besides the empirical IP antibiotics. We believe this was due to the delay nature of his presentation to the hospital. Neverteless, his clinical status and peritoneal dialysis total white cell counts improved rapidly with empirical antiotics even before converting to the penicillin G treatment.

Previous case reports have suggested the possibility of zoonoses as a mode of transmission as individual patients had been exposed to farm animals before their presentation (3). In our case, however, we were not able to demonstrate this as the patient neither worked with animals nor did he have any contact with animals during his overseas trip. However, environmental contamination cannot be entirely ruled out as we were not able to sample the surroundings. Thus, we might attempt to postulate that there is a possibility of transmission via environmental contamination of infected bodily fluids even without proximity to the infected animals.

In our institutiton, the organism was identified using the Vitek system. However, no additional RNA sequencing was done for further identification. The Vitek system is considered an acceptable identification method (1).

Various antibiotics have been reported as effective against this organism, including carbapenem and vancomycin. However, our isolated strain demonstrated sensitivity to the empirical antibiotics and subsequently to the antibiotic of choice – penicillin. Our patient also responded well to this antibiotic with no long term complications.

## CONCLUSION

We have demonstrated a case of *S.plurianimalium* peritonitis in a patient with end-stage kidney disease on peritoneal dialysis who presented with peritonitis in septic shock state. Despite his initial severe presentation, he improved rapidly with antiotics with no long term sequelae.

## AKNOWLEDGEMENTS

Nil

## REFERENCES

1. Ghazvini K, Karbalaei M, Kianifar H, Keikha M. The first report of *Streptococcus pluranimalium* infection from Iran: A case report and literature review. Clinical Case Report. 2019; 00: 1– 5.
2. Devriese LA, Vandamme P, Collins MD, Alvarez N, Pot B, Hommez J, Butaye P, Haesebrouck F. *Streptococcus pluranimalium* sp. nov., from cattle and other animals. International Journal of Systematic and Evolutionary Microbiology. 1999 Jul 1;49(3):1221-6
3. Ahmed A, Zaman G, Gardezi A, Satti L, Sabir N, Haleem A. Cerebral Abscess caused by Novel Species: *Streptococcus Pluranimalium*. Journal of College of Physicians and Surgeons Pakistan. 2018 Sep 28;9:181-183.
4. Aryasinghe L, Sabbar S, Kazim Y, Awan LM, Khan HK. *Streptococcus pluranimalium*: A novel human pathogen?. International Journal of Surgery Case

Reports. 2014;5(12):1242–1246.
5. Dhotre S, Suryawanshi N, Nagoba B, Selkar S. Rare and unusual isolates of viridans streptococci from the human oral cavity. Indian Journal of Pathology and Microbiology. 2016;59(1):47–49.