

# *Staphylococcus pseudintermedius*: a common zoonotic pathogen causing postprocedural urosepsis in humans

Pawina Subedi, Masood Pasha Syed , Yugandhara Kate, Bibek Koirala

Internal Medicine, Saint Vincent Hospital, Worcester, Massachusetts, USA

**Correspondence to**  
Dr Masood Pasha Syed;  
dr.syedmasoodpasha@gmail.com

Accepted 23 February 2021

## SUMMARY

*Staphylococcus pseudintermedius* is a common cause of zoonotic infections in dogs and cats. Recently, there has been an increasing number of infections being reported in humans caused by this organism. We report a case of complicated urinary tract infection in an elderly patient with recent bilateral ureteral stent placement caused by this organism with associated persistent high-grade bacteraemia.

## BACKGROUND

*Staphylococcus pseudintermedius* is an opportunistic pathogen recognised as the leading cause of skin, ear and postoperative bacterial infection in dogs and cats.<sup>1</sup> It is a common element of their microbiota or agent of infection, and also isolated from people associated with animal habitat, including pet owners.<sup>2</sup> The first human case of this organism was described by Van Hoovels *et al* when it was associated with endocarditis occurring after the implantation of a cardioverter-defibrillator device.<sup>3</sup> Since then there have been sporadic community-acquired infections as well as nosocomial outbreaks with an increasing number of infections with methicillin-resistant *S. pseudintermedius* being reported in Sweden.<sup>4</sup> Skin infection caused by *S. pseudintermedius* has also been reported in a Siberian husky dog owner in Scotland.<sup>5</sup> Most of the initial case reports of this organism causing human infections were reported from Europe.<sup>4-6</sup>

## CASE PRESENTATION

A 79-year-old current smoker man with history of hypertension, hyperlipidaemia, type 2 diabetes mellitus, chronic kidney disease (CKD) stage II, history of castrate-resistant prostate cancer with bilateral hydronephrosis on maintenance prednisone therapy as outpatient presented with generalised weakness for 5 days in November 2019. Other home medications include atorvastatin, lisinopril, finasteride, metformin, insulin glargine, tamsulosin, vitamin B<sub>12</sub>, ferrous sulfate, aspirin, and hydrochlorothiazide. He is a dog owner. He had recently undergone bilateral ureteral stents 19 days prior with foley catheter placement postprocedure and subsequent removal 6 days prior to presentation. Four days ago, he had passed a postvoid residual test at his urologist's office. His blood pressure (BP) during that visit was noted to be borderline low and he was advised not to take his antihypertensive medications. He had decreased appetite and

was noted to have a very poor oral intake over the past 2 days, having maximally ingested 5 ounces of water per day. He also complained of 10 pounds weight loss in 1 month.

On presentation, the patient had a temperature of 38.1°C, heart rate 90/min, BP 111/47 mm Hg, respiratory rate 20/min saturating at 96% on room air.

Blood cultures were obtained. He was admitted to the medical floor with ampicillin and ceftazidime, the empiric antibiotic at our centre for coverage of enterococcus and gram negative organisms respectively. He developed a fever of 38.7°C the next day. Preliminary blood cultures grew gram-positive cocci in clusters in four out of four bottles. His antibiotic was changed to vancomycin to cover gram positive organisms, ampicillin was continued while ceftazidime was stopped. He started requiring 2 L oxygen as he desaturated to 86% on room air. He spiked another fever of 38.6°C in the afternoon and another set of blood cultures were sent. Chest X-ray did not show any acute cardiopulmonary process. Given his active malignancy and hypoxia, ventilation/perfusion scan (V/Q scan) was done which showed low probability of pulmonary embolism. We deferred from CT angiogram as he had raised creatinine from his CKD. His urine culture grew *S. pseudintermedius*. His blood cultures also grew pan-sensitive *S. pseudintermedius* the next day. His antibiotic was switched to cefazolin based on infectious disease recommendations and other antibiotics were stopped in order to taper the broad-spectrum antibiotics and start him on targeted therapy. The next day, he developed atrial fibrillation, likely driven by infection. He converted to normal sinus rhythm after receiving diltiazem. Since the patient was anaemic with guaiac positive stool anticoagulation was held. Repeat blood cultures that were sent on the third day after his fever spike still showed *S. pseudintermedius*.

## INVESTIGATIONS

On admission, white cell count (WCC) count was  $11.2 \times 10^9/L$ , haemoglobin 8.1 g/L, platelet  $20.5 \times 10^9/L$ , glucose 237 mg/dL, probrain natriuretic peptide 3368 pg/mL and lactate 1.4 mmol/L. Urinalysis was positive for large blood, protein 100, large leucocyte esterase, many WBCs, and negative for nitrites. Chest X-ray revealed no acute cardiopulmonary process. Retroperitoneal ultrasound showed moderate to significant left and moderate right hydroureteronephrosis. Bilateral ureteral



© BMJ Publishing Group Limited 2021. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Subedi P, Syed MP, Kate Y, *et al*. *BMJ Case Rep* 2021;**14**:e238170. doi:10.1136/bcr-2020-238170

stents were in place with proximal ends in renal pelvises and distal ends in the urinary bladder. Bilateral ureteral jets were visualised. Preliminary blood cultures grew gram-positive cocci in clusters in four out of four bottles which was later found to be *S. pseudintermedius* which was pan-sensitive. Due to hypoxia a repeat chest X-ray was done and it did not show any acute cardiopulmonary process. Given his active malignancy and hypoxia, V/Q scan was done which showed low probability of pulmonary embolism. CT angiogram of chest to evaluate for pulmonary embolism was avoided due to deranged renal function. Repeat blood cultures that were sent on the third day still showed *S. pseudintermedius*.

### OUTCOME AND FOLLOW-UP

The patient was continued on cefazolin and repeat blood cultures were sent on the 5th day of admission. Transthoracic echocardiogram was negative for any vegetation. The third set of blood cultures were negative. He was subsequently discharged home without supplemental oxygen to complete a 2-week course of antibiotics from the last date of negative blood cultures. He was discharged with a midline to continue the same intravenous antibiotics.

### DISCUSSION

Urinary tract infections are common in women of childbearing age, individuals with anatomical/functional abnormalities of the urinary tract, and chronic foley catheter. Common organisms include gram-negative organisms like *Escherichia coli*, *Klebsiella*, *Enterobacter*, *Pseudomonas* and some gram-negative organisms like enterococcus. *S. pseudintermedius* is a common zoonotic pathogen and is uncommon in human beings. However, recently, there have been an increasing number of cases being reported in human beings-associated with skin and soft-tissue infections, ear, nose and throat infections, bedsores, and also skin colonisers in some cases. Our patient was at an increased risk of urinary tract infection because of the outflow obstruction caused by the advanced prostate cancer and recent stenting of the bilateral ureters in addition to his immunocompromised state from the chronic prednisone therapy. He also was a dog owner. The exact mechanism of how our patient acquired the infection is unclear. It was presumed to be from a combination of all these factors.

### Learning points

- ▶ *Staphylococcus pseudintermedius* is primarily associated with zoonotic infections in dogs and cats.
- ▶ *S. pseudintermedius* is being increasingly isolated from skin, prosthetic joints, bloodstreams, and soft-tissues of human beings with few emerging cases of antibiotic resistance.
- ▶ Complicated urinary tract infections are associated with structural and functional abnormalities of the urinary tract like bladder outlet obstruction, neurogenic bladder among others.
- ▶ Invasive procedures, immunocompromised state, close contact with pets increase the risk of urinary tract infections from uncommon organisms like *S. pseudintermedius*.

**Contributors** PS: concept, design, writing manuscript, literature search, analysis and interpretation, critical review, supervision. MPS: concept and design, writing manuscript, literature search, critical review, supervision. YK: writing manuscript, literature search, critical review, supervision. BK: literature search, critical review, supervision.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

**Competing interests** None declared.

**Patient consent for publication** Next of kin consent obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

### ORCID iD

Masood Pasha Syed <http://orcid.org/0000-0002-3252-9094>

### REFERENCES

- 1 Kmieciak W, Szweczyk EM. Are zoonotic *Staphylococcus pseudintermedius* strains a growing threat for humans? *Folia Microbiol* 2018;63:734–47.
- 2 Pompilio A, De Nicola S, Crocetta V, et al. New insights in *Staphylococcus pseudintermedius* pathogenicity: antibiotic-resistant biofilm formation by a human wound-associated strain. *BMC Microbiol* 2015;15:109.
- 3 Van Hoovels L, Vankeerberghen A, Boel A, et al. First case of *Staphylococcus pseudintermedius* infection in a human. *J Clin Microbiol* 2006;44:4609–12.
- 4 Starlander G, Börjesson S, Grönlund-Andersson U, et al. Cluster of infections caused by methicillin-resistant *Staphylococcus pseudintermedius* in humans in a tertiary hospital. *J Clin Microbiol* 2014;52:3118–20.
- 5 Robb AR, Wright ED, Foster AME, et al. Skin infection caused by a novel strain of *Staphylococcus pseudintermedius* in a Siberian husky dog owner. *JMM Case Rep* 2017;4:jmmcr005087.
- 6 Lozano C, Rezusta A, Ferrer I, et al. *Staphylococcus pseudintermedius* human infection cases in Spain: Dog-to-Human transmission. *Vector Borne Zoonotic Dis* 2017;17:268–70.

Copyright 2021 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <https://www.bmj.com/company/products-services/rights-and-licensing/permissions/>  
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

### Customer Service

If you have any further queries about your subscription, please contact our customer services team on +44 (0) 207111 1105 or via email at [support@bmj.com](mailto:support@bmj.com).

Visit [casereports.bmj.com](http://casereports.bmj.com) for more articles like this and to become a Fellow