

Pyonephrosis caused by *Salmonella* sp. in a patient with polycystic kidney disease undergoing hemodialysis

Pionefrose causada por Salmonella sp. em um paciente com doença renal policística submetido a hemodiálise

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ABSTRACT

AIMS: This article reports a case of pyonephrosis caused by *Salmonella* sp. in a patient with polycystic kidney disease undergoing hemodialysis treatment.

CASE DESCRIPTION: An elderly male patient previously diagnosed with polycystic kidney disease undergoing standard hemodialytic treatment presented uronephrosis, evolving to pyonephrosis caused by *Salmonella* sp., and was successfully treated with ciprofloxacin.

CONCLUSIONS: The polycystic kidney disease may have contributed to the bacteria's attachment to the kidney, due to increase of permeability of the intestinal mucosa, easier bacterial translocation to bloodstream and its subsequent accommodation in the infected organ.

KEY WORDS: *Salmonella* infections; hydronephrosis; pyonephrosis.

RESUMO

OBJETIVOS: Este artigo relata um caso de pionefrose causada por *Salmonella* sp. em paciente com doença renal policística em tratamento por hemodiálise.

DESCRIÇÃO DO CASO: Um paciente idoso do sexo masculino, previamente diagnosticado com doença renal policística, em tratamento convencional por hemodiálise, apresentou uronefrose, evoluindo a pionefrose causada por *Salmonella* sp., sendo tratado com sucesso com ciprofloxacino.

CONCLUSÕES: A doença renal policística pode ter contribuído para a instalação da bactéria no rim, visto o aumento da permeabilidade da mucosa intestinal e maior facilidade de translocação da bactéria para a corrente sanguínea e seu posterior alojamento no órgão infectado.

DESCRIPTORIOS: infecções por *Salmonella*; hidronefrose; pionefrose.

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Abbreviation: PKD, polycystic kidney disease.

INTRODUCTION

Salmonella sp. is a gram-negative bacillus responsible for outbreaks of food-borne infections worldwide, as well as high rates of morbidity and mortality, especially in developing countries [1, 2]. There is a great variety of *Salmonella* spp. serotypes pathogenic to human beings, the most common clinical disease being gastroenteritis [1, 3]. Nevertheless, infections may occur in other sites out of the gastrointestinal tract, as well as may cause a septicemia [3]. Obstructions to urine drainage, like those caused by calculi, may lead to complications such as pyonephrosis, when urine becomes infected. In such cases the combination of prompt drainage associated with antibiotic therapy is imperative [4, 5].

This study aimed to report the isolation of *Salmonella* sp. from secretion drained from the surgical site of nephrostomy in a patient with chronic kidney disease admitted to a tertiary public hospital. The report was approved by the Research Ethics Committee of Universidade Federal de Santa Maria under the registration number 0285.0.243.000-09.

CASE REPORT

An 83-year-old male patient was admitted with a two month history of nausea, occasional vomiting, epigastric pain, prostration, fever, weight loss, lower limbs edema and oliguria. He was on chronic hemodialytic treatment, over the last three years, through an arteriovenous fistula in the left upper limb. His past medical history included chronic renal failure due to polycystic kidney disease (PKD), systemic arterial hypertension, benign prostatic hyperplasia, secondary hyperparathyroidism and an ischemic stroke two years before.

Laboratory workup revealed erythrocytes 3,21 million/mm³; hemoglobin 9,6 g/dL; hematocrit 29,6%; leucocytes 11900 mm³; neutrophils 84,4%; high C-reactive protein levels, 58,67 mg/dL (reference value: <0,3 mg/dL), and blood creatinine 3,42 mg/dL (reference value for adult males: 0,8 to 1,2 mg/ml). The urine test showed marked proteinuria and presence of blood with normal leukocytes and erythrocytes count; nitrite was absent and culture was negative.

A computed tomography showed marked dilation of the left pyelocalyceal system and ureter until the

intramural urinary bladder segment, which was filled in by a dense fluid. Both kidneys presented exophytic cysts of varying sizes. The largest cyst measured 6.4 cm at its longest axis and had a thin wall (**Figure 1**). The patient was diagnosed with uronephrosis evolving to pyonephrosis, and was submitted to a nephrostomy. During the surgery, 30 ml of purulent secretion were drained, from which *Salmonella* sp. was isolated. Blood cultures were negative.

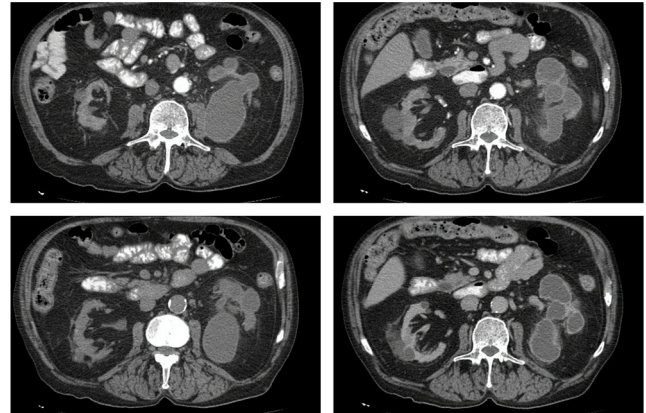


Figure 1. Computed tomography of the abdomen showing dilatation of the left pyelocalyceal system and ureter, and kidneys with exophytic cysts.

Antibacterial therapy with ceftriaxone was started. Antibiogram showed sensitivity to ampicillin, ampicillin/sulbactam, piperacillin/tazobactam, ceftazidime, ceftriaxone, cefepime, ertapenem, imipenem, meropenem, ciprofloxacin, tigecycline, and colistin, and resistance to cefuroxime, cefuroxime/axetil, amikacin, and gentamicin. Empiric antibiotic therapy with ceftriaxone was started and further replaced by ciprofloxacin after the sensitivity result. The patient was discharged six days after the nephrostomy and scheduled for 14 days of antibiotic therapy.

DISCUSSION

The genus *Salmonella* sp. may be divided into typhoid serotypes, which include *Salmonella enterica* var. *typhi*, *Salmonella enterica* var. *paratyphi* A, and hundreds of serotypes of non-typhoid *Salmonella*. The first group is responsible for typhoid fever and systemic infections, and the second is commonly associated to limited diarrheal episodes in developed countries, and septicemia in developing countries [1, 6]. Infections involving *Salmonella* spp. in humans may present different clinical manifestations such as

enteric fever, septicemia, focal disease (associated to bacteremia or not), gastroenteritis, and chronic carrier state [7]. Patients with gallbladder diseases are more prone to chronic colonization by this microorganism, which may remain in the reticuloendothelial system, from where it is continuously disseminated [1].

Complications resulting from infections in patients with PKD, especially those who are on chronic hemodialysis, are recurrent, tend to relapse and are life-threatening [8]. The cysts raise the intra-abdominal pressure and increase the permeability of the intestinal mucosa due to reduction of the blood flow in the microcirculation, therefore favouring bacterial passage through the intestinal wall [9, 10].

Patients who undergo hemodialysis are more prone to bacterial translocation, due to predisposing factors such as slow intestinal transit and heart failure [8]. The patient in this case was immunocompromised due to chronic kidney disease, a group of increased risk for this occurrence. *Escherichia coli*, *Klebsiella* spp., *Proteus* spp. and *Pseudomonas* spp. are frequently isolated from nephrostomy cultures, but *Salmonella* spp. are rarely found [1].

Due to virulence factors which enable multi-resistance, the *Clinical and Laboratory Standards Institute* [11] advises that sensitivity tests should be performed for *Salmonella* spp. regarding the antimicrobials ciprofloxacin, levofloxacin, ofloxacin, pefloxacin, nalidixic acid, and azithromycin for *S. typhi*. In this report, the patient was treated with ciprofloxacin. However, there are reports of bacteria resistance to fluoroquinolones in developing countries. For this reason, treatment with third generation cephalosporins is an adequate alternative in these cases [3, 12].

A case similar to this was reported in 2011, in a 40 years old male patient with autosomal dominant PKD, hospitalized with fever and flank pain after diarrhea. *Salmonella enteritidis* was isolated from coproculture and blood culture. Magnetic resonance and tomography identified kidney cysts, which were aspirated and from which the same microorganism was isolated, but no urinary obstruction was reported. The patient was successfully treated with ciprofloxacin. Those researchers supposed that bacterial translocation from the gastrointestinal tract caused bacteremia and may be responsible for infection of the renal cysts [13].

As the patient in this case report had PKD and was on chronic hemodialysis, we suppose that the infection was favoured by the bacterial translocation in a immunocompromised host. To the best of our knowledge, this is the first report of isolation of *Salmonella* sp. of pyonephrosis in the referred hospital.

NOTES

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Conflicts of interest disclosure

The authors declare no competing interests relevant to the content of this study. They claim to have had full access to all available data and they take full responsibility for the integrity of the results described herein.

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