

Listeria Peritonitis in a Patient Treated with Peritoneal Dialysis

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Infection with *Listeria monocytogenes* is rare, with a reported annual incidence of 4.4 cases per million individuals. It is caused by a Gram-positive rod-shaped bacterium that can be found in soil, vegetation, water, sewage, silage and in feces of humans and animals. *Listeria* is a facultative, intracellular pathogen with the ability to survive and multiply in phagocytic host cells, even in adverse environmental circumstances. This uncommon yet virulent infection carries a 20%–30% mortality rate in affected individuals suffering from a blood-borne *Listeria* infection [1].

Listeria monocytogenes as a pathogen causing spontaneous bacterial peritonitis (SBP) was reported previously, mainly in patients with liver cirrhosis [2]. In contrast to Gram-negative rods (*Escherichia coli*, *Klebsiella pneumoniae*), and Gram-positive cocci (streptococci, staphylococci), which are the most frequently cultured pathogens from patients' ascites, *Listeria* is scarcely reported as a causative agent. It has been claimed that *Listeria* should be suspected whenever ascitic fluid Gram stain reveals diphtheria-like organisms, in patients with predispositions such as iron overload/hemochromatosis, following exposure to farm animals, in geographic areas with a high incidence of listeriosis, and in cases

of poor response to empiric therapy within 48–72 hours [3]. Even after suspected, the diagnosis of *Listeria* SBP is quite difficult to establish since blood cultures and Gram stain of peritoneal fluid do not tend to be positive. It should be noted that the peritoneal fluid protein concentration is relatively high compared with other causes of bacterial peritonitis [4].

Peritonitis remains a significant cause of morbidity in end-stage renal disease (ESRD) patients undergoing continuous ambulatory peritoneal dialysis (CAPD). *Staphylococcus* species, *Streptococcus* species, and less commonly, Gram-negative rods, comprise the majority of isolated organisms. Other organisms, including unusual bacteria, fungi [5] and *Mycobacteria*, comprise 5% or less of cases. In patients on peritoneal dialysis, *Listeria monocytogenes* is a very rare cause of peritonitis, reported mainly to occur in immune compromised patients. In such cases, evolution of septic shock is imminent.

PATIENT DESCRIPTION

A 70 year old man, treated with CAPD, was referred to our department from a geriatric ward due to clinical presentation of septic shock without an overt origin. On admission, the patient was mechanically ventilated, febrile, hypotensive and responsive only to pain. Laboratory blood tests revealed leukocytosis (with a left shift), elevated C-reactive protein (CRP) and combined respiratory and metabolic acidosis. Although the patient was known to suffer from end-stage renal disease, his daily urine excretion was approximately 1 L per day. However, upon presentation, he had significant oliguria, with a

urine output of 200 ml only during the 24 hours prior to his admission to our ward. Before his arrival, blood and peritoneal fluid (via catheter) cultures were taken and antibiotic treatment with intravenous piperacillin and tazobactam was initiated. Chest X-ray did not reveal any pathologic findings. The peritoneal fluid initial analysis demonstrated a total white blood cell count of 290 cells/ μ l and the Gram stain revealed Gram-positive rods. On admission, his differential diagnosis for severe sepsis included hospital-acquired pneumonia, catheter-related peritonitis, and a complicated urinary tract infection.

The patient's past medical history included several severe co-morbidities: ischemic cardiomyopathy (status post-non-ST-elevation myocardial infarction, which led to a CABG operation) with resultant congestive heart failure stage 3 to 4 New York Heart Association functional status, cardiomyopathy due to valve disorders (status post-replacement of the aortic and mitral valves with mechanical prosthesis), and persistent atrial fibrillation treated with implantation of a permanent pacemaker and chronic oral anticoagulation therapy. The patient also had chronic kidney disease, related to his heart failure and chronic volume overload, and refractory ascites that necessitated regular peritoneal dialysis via a Tenckhoff catheter (inserted several months prior to the index hospitalization). His current hospitalization in the geriatric ward, from which he arrived to our department, was due to his recovery from previous pneumonia.

Both blood and peritoneal fluid cultures taken upon admission to our department demonstrated growth of *Listeria monocytogenes*. Intravenous treatment with ampicillin

and gentamycin was initiated after consultation with a nephrologist. Intraperitoneal treatment with ampicillin was also started following consultation with a specialist in infectious diseases. Although considered, lumbar puncture was not performed due to the patient's refusal and as a consequence of his frailty (it was decided that treatment would be given as if his cerebrospinal fluid was positive for *Listeria* infection).

During his stay in our department the patient completed a 3 week course of antibiotic treatment, as detailed above, with slow general recovery: his vital signs stabilized and he was weaned from mechanical ventilation. Throughout his hospitalization peritoneal dialysis was continued, without replacing his peritoneal dialysis catheter, with no sequelae. He was re-admitted to the geriatric ward in a relatively good condition, afebrile and with no signs of infection, for further in-hospital rehabilitation.

COMMENT

The presentation of *Listeria* peritonitis in ESRD patients undergoing continuous ambulatory peritoneal dialysis is quite rare, despite previous reports in the literature. Since these patients are complicated and suffer from significant co-morbidities, similar to our patient, this infection should be considered as a life-threatening disease. The fact that *Listeria* is rare and that it necessitates empiric therapy upon presentation further endangers the lives of such patients.

Since increasingly more patients are being treated with long-standing CAPD, the risk of *Listeria* peritonitis should be borne in mind and empiric therapy with ampicillin considered in such cases, especially when the patient presents with severe disease (e.g., septic shock).

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“The most important discoveries will provide answers to questions that we do not yet know how to ask and will concern objects we have not yet imagined”