

An unusual infection in a patient with peripherally inserted central catheter

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Abstract

A peripherally inserted central catheter (PICC) is widely used in transfusion therapy and for monitoring many kinds of diseases, especially in critically ill patients. Compared with other catheters, it has a lower risk of catheter-related bloodstream infections. *Aeromonas Hydrophila* (AH) is a kind of opportunistic pathogen, vibrionaceae aeromonas, and gram-negative brevibacterium, widely distributed in nature, in all kinds of body fluid. It usually causes gastrointestinal infections, and rarely causes *Aeromonas* septicemia. To date, there has been no report of a PICC-related AH infection. We report the case of a 40-year-old female with breast cancer, who suffered post-op. severe sepsis and double lower limb cellulitis with multiple organ failure. All of this was due to AH invading the blood through the PICC.

Key words: *Aeromonas Hydrophila*, peripherally inserted central catheter, sepsis, multiple organ failure

Introduction

Aeromonas Hydrophila (AH) is a Gram-negative, aquatic bacterium which causes infection in both human beings and animals. (1) Less than 5 cases of catheter-related infections due to AH have been reported in the medical literature, and most of the reports involved infections that were not very serious. However, we present a case of severe sepsis and cellulitis of both lower limbs due to AH in a breast cancer patient receiving postoperative chemotherapy. Despite aggressive treatment, this terrible infection caused multiple organ failure. Our aim is to highlight the threat of AH to patients with an indwelling peripherally inserted central catheter (PICC).

Case report

A 40-year-old female farmer was admitted to our hospital with a fever and left lower limb pain after flushing the PICC by herself 2 days ago. She had received 5 cycles of postoperative chemotherapy (docetaxel 120mg, pirarubicin 60mg, cyclophosphamide 800mg for 1 day) for left breast invasive carcinoma, over the past 4 months. The PICC was inserted via ultrasound-guided venepuncture of the right brachial vein. Her vital signs were normal except for a high body temperature (38.6°C). Her left breast was absent, and left lower limb was obviously swollen, with thinning skin, local visible blister formation and tenderness. No infection at the PICC puncture point was observed. Lab tests revealed leukocytosis (white blood cell $36.6 \times 10^9/l$, with 95.3% neutrophils), severe renal impairment (creatinine 586.9 $\mu\text{mol}/l$), and negative viral hepatitis serology.. The patient had no history of chronic disease.

We removed the catheter, and cultured the tip and percutaneous peripheral blood for microbiological examination (two sets each in aerobic and anaerobic bottles ; Becton, Dickinson and Company). However, her condition deteriorated after admission with apparent chills and fever (41.6°C), apathetic facial expressions, hypotension, tachycardia, oliguria, and altered consciousness. Her left lower limb showed cyanopathy, local bursting of blisters, with a reddish, transparent exudate, which was diagnosed as cellulitis by the consultant dermatologist. , We then swabbed the tissue to perform a microbiological examination. The empirical intravenous antibiotic imipenem/cilastatin

was initiated (500mg every 8h).

The patient was transferred to the Intensive Care Unit with multiple organ failure and double lower limb cellulitis on day 3. Her lab tests showed leukocytosis (white blood cell $16.9 \times 10^9/l$ with 95.84% neutrophils), and thrombocytopenia ($25 \times 10^9/l$), severe liver and kidney damage (alanine aminotransferase 1809.4u/l, aspartate aminotransferase 2914.2u/l, total bilirubin 102.6umol/l, direct bilirubin 89.0umol/l, urea nitrogen 30.10umol/l, creatinine 409.9umol/l), coagulation dysfunction (prothrombin time 68.9s, activated partial thromboplastin time 128.5s, international normalized ratio 8.09, D-Dimer 31.58ug/ml), and obvious tissue oxygen hypoperfusion (myoglobin 10279.5u/l, blood lactate 3.1mmol/l), high procalcitonin (55.60ng/ml). We give her blood products transfusion, analgesia, liver protection treatments, and continuous renal replacement therapy.

On day 4, the strain isolated from the percutaneous peripheral blood specimens (collected on admission) was identified as AH, which was susceptible to amikacin, aztreonam, ceftazidime, ciprofloxacin and meropenem, but was resistant to imipenem. The pathogen and drug susceptibility testing of the PICC tip was the same as the above. Therefore, the intravenous antibiotic was changed to meropenem (1000mg every 8h).

Unfortunately, the patient remained febrile, with high infection parameters (figure 1). She experienced a variety of bacterial and fungal infections, including Coagulase-negative staphylococcus, Acinetobacter baumannii (generic drug resistance), Pseudomonas aeruginosa (multiple drug resistant), and Tropical candida. After 33 days of anti-infection treatment, the patient was finally discharged from hospital.

Discussion

Because of its particularly low incidence of catheter related bloodstream infections, PIC lines have been widely used globally. (2) AH is an opportunistic pathogen, vibriaceae aeromonas, and gram-negative brevibacterium, which is widely distributed in nature, in all kinds of body

fluid. AH produces exotoxins of highly toxic nature, such as: hemotoxin, histotoxin, necrotoxin, enterotoxin and protease. All 7 patients, reported by Morinaga Y, over 10 years were infections occurring in the summer and fall season, and immunosuppressive state and eating raw fish or shellfish were the common causes. (3) Venous access devices (VADs) related infections caused by AH have only been reported in a dialysis catheter. (4)

There were only several cases of catheter-related infections caused by AH that have been reported in the past 5 years, mostly in central venous catheters (dialysis catheter) or peritoneal dialysis catheters (table 1). (4-7) The catheter indwelling times ranged from several days to several years, and patients were a combination of immunosuppressive state or not. The symptoms varied according to invasive positions: hemodialysis patients often had a cough, respiratory distress and shock as the main symptoms, (4,5) whereas peritoneal dialysis (PD) patients had nausea, vomiting, abdominal pain, abdominal muscle tension in the abdominal cavity infection. (6,7) Antibiotic administration times were between 14 and 21 days, the prognoses were relatively good, with no other infections.

This case is the first one about AH infection in patients through a PICC. Both of the primary microbiological results of percutaneous peripheral blood and PICC tip revealed AH infection. These indicated that PICC may be the infection source. Considering the patient had a history of flushing the catheter by herself before hospitalization, we speculate that the fluid for PICC infusion or some other devices were contaminated with AH. The severity of the infection and the time of hospitalization are both more than in previous similar cases.

In conclusion, prevention is the key to avoiding PICC related sepsis caused by AH. In China, there are a lot of outpatients carrying VADs, especially cancer patients and other chronically ill patients. PICC is one of the most used VADs. It suggests doctors should be alerted to PICC related sepsis caused by AH and strengthen the awareness of the importance of hand hygiene and sterile conditions.

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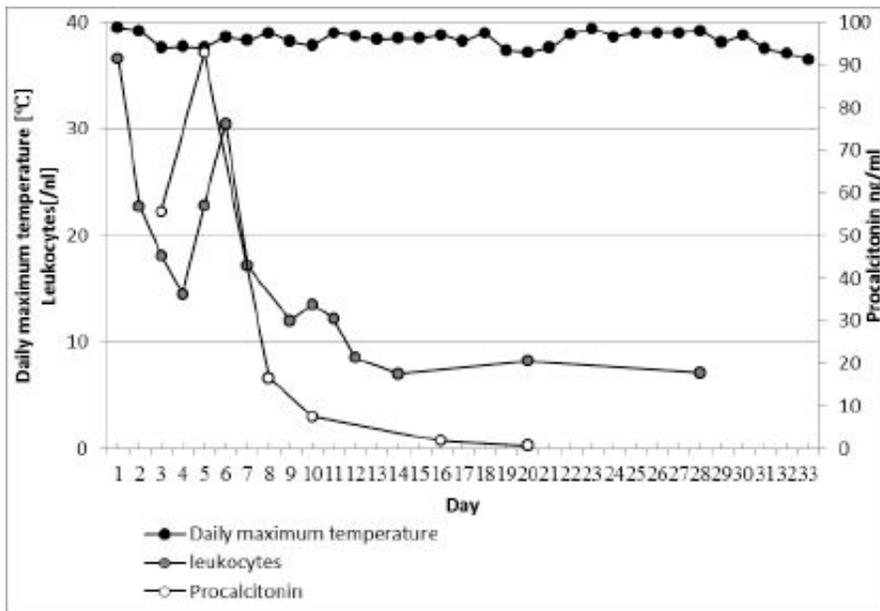


Figure 1. Infection parameters during the hospital stay: daily maximum temperature, leukocytes, procalcitonin.

Table 1. Case reports of catheter-related infections caused by *Aeromonas Hydrophila*.

Author	Catheter type and indwelling time	Co-morbidity	Antibiotics-using time(days)
Zhou Z (5)	Dialysis catheter,16days	Diabetic nephropathy	21
Khalil MA (4)	Dialysis catheter,12days	IgA nephropathy	14
Sahin I (6)	Peritoneal dialysis catheter,5years	Chronic glomerulonephritis	14
<u>Liakopoulos V</u> b (7)	Peritoneal dialysis catheter,11months	Systemic lupus erythematosus	21
Present case	PICC,4months	Postoperative chemotherapy due to breast cancer	33

PICC, peripheral inserted central catheter.

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