CASE REPORT

Repeat exit site infection in peritoneal dialysis patient with polycythemia vera – a case report

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Abstract

Background: Infectious complications of peritoneal dialysis (PD) remain a common cause of catheter loss and discontinuation of PD. Exit site infection (ESI) constitutes a significant risk factor for PD-related peritonitis and determination of predisposing states is relevant. We here present a case of repeat ESI due to Pseudomonas aeruginosa in a PD patient with skin changes in the course of polycythemia vera (PV).

Case presentation: A 73-year-old PD patient with chronic kidney disease secondary to renal amyloidosis and ankylosing spondylitis, presented to the nephrology unit with signs of ESI. In 2006 he was diagnosed with PV and since then has was successfully treated with hydroxyurea; however, he reported recurrent episodes of developing skin nodules in the course of the disease. Exit site swab yielded Pseudomonas aeruginosa and the infection developed in the ulcerated PV nodule that appeared in exit site 2 weeks earlier. Patient was treated with intraperitoneal amikacin and oral ciprofloxacin, however, due to neurological complications, the treatment had to be interrupted and finally catheter was removed. Similar episode of ESI with Pseudomonas aeruginosa developed in the patient two years earlier and also required catheter removal.

Conclusion: This is the first case report demonstrating the development of ESI on the polycythemia vera skin lesion in this area. Skin manifestations of PV might be a predisposing factor to ESI in PD patients.

Keywords: Case report, Exit site infection, Peritoneal dialysis, Polycythemia vera

Background

Infectious complications of peritoneal dialysis (PD) include exit site infection (ESI), tunnel infection (TI) and peritoneal dialysis-related peritonitis (PD-related peritonitis) and remain a common cause of catheter loss and discontinuation of PD. ESI constitutes a significant risk factor for peritonitis and determination of predisposing states is relevant [1, 2]. Most ESIs are caused by skin flora, however, resilient microorganisms such as Pseudomonas spp. play a significant role in the etiology of this condition. Thus, prevention and appropriate management of ESI is of critical importance in improving patient outcomes. Here, we present a case of repeat ESI caused by Pseudomonas aeruginosa in a PD patient with polycythemia vera (PV).

Case presentation

A 73-year-old peritoneal dialysis patient with PV presented to the nephrology unit with signs of ESI. He complained of pericatheter redness, tenderness as well as bloody and purulent discharge in the area of exit site (ES). In 2016 he started continuous ambulatory peritoneal dialysis (CAPD) with four 2 L exchanges of 1.5% glucose fluid as renal replacement therapy for end-stage renal disease due to renal amyloidosis. This condition developed as a complication of ankylosing spondylitis.
diagnosed 33 years earlier. PV was diagnosed in 2006 and since the diagnosis the patient was successfully treated with hydroxyurea. The disease remained stable, however, the patient complained of recurring episodes of skin papulas and subcutaneous nodules of red colour. Some of these skin lesions developed ulcerations. The patient reported that episodes of these skin manifestations of PV used to appear with frequency of once per year. He also reported that he had noticed the development of skin changes 2 weeks before the symptoms of ESI, one of the lesions developed in exit site. Later he noticed ulceration of the lesion and purulent discharge in this area (Fig. 1). Swab was taken which yielded Pseudomonas aeruginosa. There were no signs of peritonitis and white cell count in dialysis effluent was 8/μL. Patient’s general condition was good, with body temperature 36.5°C. His blood pressure was 124/74 mmHg, his heart rate was 72 beats per minute. White blood cell count was within normal limits (7.3 × 10^9 cells/L), C-reactive protein (CRP) was 24 mg/L. Topical gentamicin 1% cream was used to exit site and treatment with intraperitoneal amikacin and oral ciprofloxacin was started, however, after 10 days of therapy patient complained of severe vertigo and hearing loss. Computed tomography of the brain revealed no pathological changes and neurological signs were attributed to aminoglycoside toxicity. Treatment was reduced to ciprofloxacin, but because of maintaining signs of ESI the decision was taken to transfer the patient to hemodialysis treatment and to remove the peritoneal catheter. The neurological symptoms disappeared within a few days after discontinuation of aminoglycoside therapy. Patient has been undergoing chronic hemodialysis treatment for 9 months now and presents no complaints. Similar episode of ESI with Pseudomonas aeruginosa that started with the development of nodule in ES area developed in the patient two years earlier. That episode of ESI was treated with intraperitoneal ceftazidime and oral ciprofloxacin but was also complicated by cuff protrusion what finally led to catheter removal and subsequent implantation of a new Tenckhoff catheter on the other side of abdomen.

Discussion and conclusions
This case calls attention to skin manifestations of PV as possible predisposing factor to the development of ESI. It also emphasizes that not only peritoneal dialysis-related peritonitis but catheter-related infections lead to technique failure and transfer to hemodialysis. Cutaneous lesions such as nodules and papules have been rarely reported in patients with PV and involve mainly face, chest or limb area. The appearance of pustules and nodules is usually associated with progressive disease and poor prognosis [3, 4]. In our patient the disease remained stable with recurring episodes of development of skin nodules with some of them undergoing subsequently eruption and involution leaving superficial scars. The development of small skin nodules in our
patient can be explained by microvascular and vaso-
motor complications with arteriolar inflammation and
thrombotic occlusions rather than the development of
subcutaneous extramedullary hematopoiesis suggesting
the possibility of progression of PV to myelofibrosis.
Cytokine excess and predisposition to systemic inflam-
mation has also been reported as an important factor
explaining many of PV-associated symptoms [4]. In the
case of presented patient, apart from inflammation gen-
erate by PV, his comorbid disease – ankylosing spond-
dylitis – presents another inflammatory disease which
might have influenced experienced symptoms.

ESI is an infectious complication of PD and a known
risk factor for subsequent tunnel infection and periton-
itis. Therefore, prevention and treatment of ESI is crucial
for the long-term outcome of PD patients. The rates of
ESI are reported to be within the range of 0.06–0.42 ep-
isodes per year. Risk factors of ESI include poor compen-
tency of ES care, poor catheter immobilization, history
of catheter-pulling injury and mechanical stress on ES
[1]. This strengthens the importance of methods of exit
site care as well as proper teaching and PD training. Re-
cent study of a standardized education training pro-
gramme for both PD trainers and PD patients has
demonstrated feasibility of implementation in a renal
clinical setting [5]. Also, the catheter should be tightly
anchored and immobilized. In addition, patients should
be educated how to avoid mechanical stress on PD cath-
eter while using their waist belts or protective bag of
catheter. In our case, the ulceration of the nodule in the
close area of ES might have led to the development of
infection as the skin barrier was lost what made an easi-
er way for pathogen invasion and its spreading.

Coagulase-negative staphylococci, Gram positive rods
and Staphylococcus aureus are the most common patho-
gens responsible for ESI. However, Pseudomonas spp.
can be isolated even in 10% of all ESIs and such infect-
ion is associated with high risk of catheter loss due to
refractory, recurrent or repeat ESI or peritonitis due to
ability of Pseudomonas spp. to form biofilm [6, 7].
Therefore, early detection of Pseudomonas ESI is very
important and prompt aggressive treatment might pre-
vent the invasion of external cuff, catheter tunnel and fi-
nally the development of peritonitis.

The reported cure rate of ESI caused by Pseudomonas
and treated with different systemic antibiotic regimen
ranges from 38 to 83% [7]. International Society of Peri-
toneal Dialysis (ISPD) recommends that ESIs caused by
Pseudomonas species require prolonged therapy with
two antibiotics. Oral fluoroquinolones are suggested as
first-line therapy, however, these should not be given in
monotherapy due to rapidly developing resistance. In
cases of recurrent Pseudomonas ESI, ISPD recommends
adding intraperitoneal aminoglycoside or ceftazidine [8].

In our patient, treatment with aminoglycoside had to be
discontinued after 10 days because of toxic side effects.
Little is known about the pharmacokinetics of amikacin
in CAPD patients what makes the appropriate dosing in
the treatment of ESI or PD-related peritonitis difficult.
The implementation of therapeutic drug monitoring
may be useful in controlling amikacin serum concentra-
tion and prevention of its side-effects [9]. In our patient,
as ESI did not resolve, peritoneal catheter was removed
and patient was transferred to hemodialysis.

This case is unique as this is the first report of the re-
peated development of ESI following the episode of the
appearance of skin manifestation of PV in the area of
ES. The presence of nodular and pustular lesions in the
ES might be a predisposing factor to infectious complica-
tions of PD.

Abbreviations
CAPD: continuous ambulatory peritoneal dialysis; CRP: C-reactive protein;
ES: exit site; ESI: exit site infection; ISPD: International Society of Peritoneal
Dialysis; PD: peritoneal dialysis; PV: polycythemia vera; TI: tunnel infection

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of manuscript: KC. Both authors have read and approved the final version of
the manuscript.

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Competing interests
The authors declare that they have no conflict of interest.

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