

Bulletin de la Dialyse à Domicile

A case of peritoneal-pericardial leak in a 19-year-old patient on peritoneal dialysis

(Un cas de fuite péritonéo-péricardique chez une patiente de 19 ans en dialyse péritonéale)

Birrou Meryem¹, Agrou Mina¹, Guerrouj Hasnae², Bayahia Rabia¹, Benamar Loubna¹

¹Service de néphrologie, dialyse et transplantation rénale ; CHU Ibn Sina ; Université Mohammed V, Rabat, Maroc

²Service de médecine nucléaire ; CHU Ibn Sina ; Université Mohammed V, Rabat, Maroc

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Résumé

Nous rapportons un cas de fuite péritonéo-péricardique en dialyse péritonéale.

Il s'agit d'une patiente de 19 ans, sans antécédent cardiaque, porteuse d'une maladie rénale chronique indéterminée, traitée en dialyse péritonéale continue ambulatoire (DPCA) pendant 10 mois. Elle a consulté devant une douleur thoracique et tachycardie, révélant un épanchement péricardique de grande abondance nécessitant un drainage en urgence.

L'analyse du liquide péricardique était en faveur d'un transsudat avec un taux de glucose 5 fois supérieur au taux plasmatique. Une scintigraphie péritonéale a été réalisée objectivant une répartition du radio-traceur au niveau de la cavité péritonéale sans image de fuite.

Devant des arguments cliniques et surtout biologiques, le diagnostic d'une fuite péritonéo-péricardique a été retenu. L'évolution a été favorable après drainage péricardique et arrêt temporaire de la dialyse péritonéale avec passage en hémodialyse, permettant la reprise ultérieure en dialyse péritonéale automatisé avec augmentation progressive des volumes, sans récurrence de la fuite après un recul de 6 mois.

Mots clés : dialyse péritonéale, épanchement péricardique, fuite péritonéo-péricardique

Summary

We report a case of a peritoneal-pericardial leak in peritoneal dialysis.

A 19-year-old patient, with no history of heart disease, with unknown chronic kidney disease, treated with continuous ambulatory peritoneal dialysis (CAPD) for 10 months. complained of chest pain and tachycardia, revealing pericardial effusion of great abundance. Pericardial drainage was necessary. The fluid analysis was a transudate with glucose levels 5 times higher than glucose plasma levels. A peritoneal scintigraphy was performed and showed a distribution of the radio-tracer in the peritoneal cavity without any image of a leak.

With clinical and especially biological arguments, the patient was diagnosed with a peritoneal-pericardial leak.

After pericardial drainage and temporary switch to hemodialysis, automated peritoneal dialysis was resumed with progressive increase in volumes, without recurrence of the leak after a 6 months follow-up.

Key words : peritoneal dialysis, pericardial effusion, peritoneo-pericardial leak

INTRODUCTION

Dialysate leakage is one of the most frequent non-infectious complications in peritoneal dialysis (PD), and can permanently compromise the continuation of the technique.

It can take various clinical forms with a variable incidence depending on the location. It is estimated that it occurs in more than 5 % of CAPD patients; it can be at the emergence site of the catheter, in the external genitalia, in an abdominal hernia or in the pleura [1]. Peritoneal-pericardial leaks are much rarer.

CLINICAL CASE

We report the case of a 19-year-old patient with stage V chronic renal failure of undetermined origin and with no history of heart disease. She underwent a PD catheter placement in December 2019 without incident, with peritoneal exchanges beginning 5 days later on CAPD. During 2020, she presented two episodes of peritonitis 6 months apart, the first with *Escherichia coli* and the second with a negative culture in July. In October 2020, the patient consulted with chest pain. On clinical examination, her blood pressure was 120/80 mmHg, with a 113 beats/minute regular tachycardia; her weight was stable at 40 kg and her body mass index (BMI) was 17.77 kg / m² with no sign of fluid overload.

She was on CAPD, using three exchanges per day with 2-liter 2.27% Dianeal® bags, and her ultrafiltration (UF) was between 750 and 1800 ml/day. Her intraperitoneal pressure (PIP) was 15-16 cm H₂O. The electrocardiogram showed left ventricular hypertrophy (LVH) and sinus tachycardia. Further exploration by trans-thoracic ultrasonography (TTU) showed good systolic function and moderate pericardial effusion measuring 09 mm, without hemodynamic consequence.

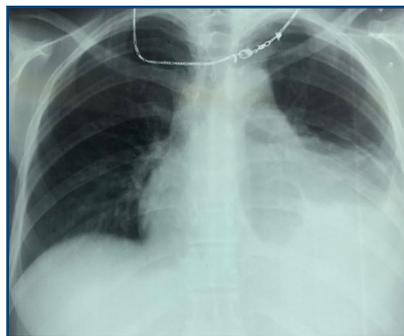


Figure 1. AP chest x-ray: Left pleural effusion

The initial policy was to lower the infusion volumes to 1.5 liters. Ten days later, the patient consulted again with tightness-type chest pain without radiation. On clinical examination, her blood pressure was 150/100 mmHg with a tachycardia at 100 bpm; she had left pleural effusion syndrome, which was confirmed on chest x-ray. The x-ray also revealed a cardiomegaly.

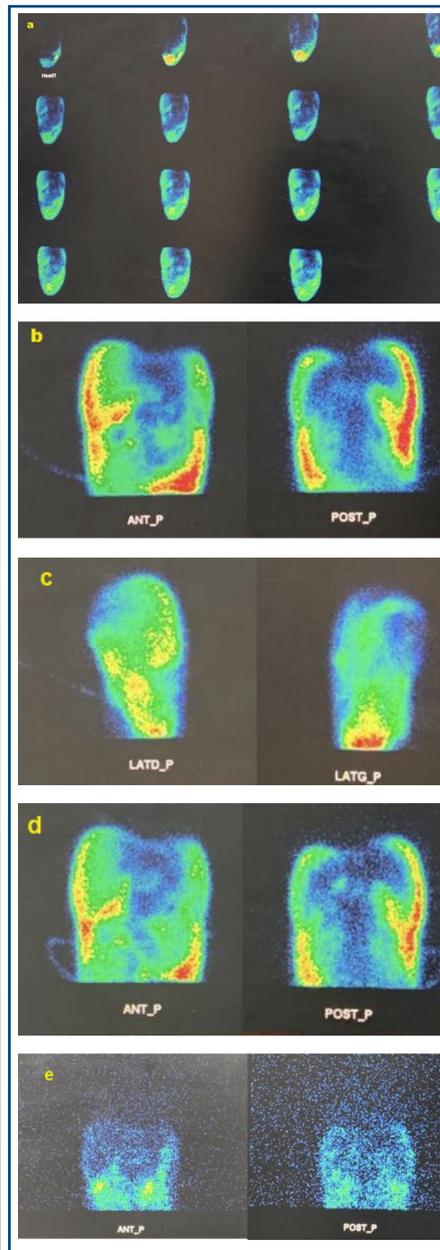
(Figure 1)



Figure 2. Trans-thoracic ultrasound: Circumferential pericardial effusion.
A: Latero-RV: 15 mm. B: Retro-OD: 8mm and C: Latero-VG: 27mm

On CAPD, she had very variable UFs depending on the day: from 300 ml to 1000 ml/day. The TTU confirmed the presence of a pericardial effusion, this time circumferential in great abundance, measuring 27 mm (latero-LV) with signs of compression. (Figure 2).

She underwent an emergency pericardial puncture, with the insertion of a drain which brought back 4 liters over 48 hours. The chemical analysis of the pericardial fluid was in favor of a transudate, with a total protein level less than 8 g/l. The glucose dosage was 6.94 g/l compared to a plasma glycemia of 1.36 g/l and, urea and



↑ Figure 3 : peritoneal scintigraphy

creatinine levels were comparable to plasma levels, at 1.83 g/l and 110 mg/l, respectively. Cytobacteriological examination of pericardial fluid and screening for tuberculosis by PCR test were negative.

A peritoneal scintigraphy was carried out in search of a leak, with acquisition of dynamic images after infusion of dialysate containing 74 MBq of technical nano-colloids, followed by static images of 5 min and late images at 1 hour, at 24 hours and post-emptying. The examination revealed a distribution of the radio-tracer in the peritoneal cavity, without any image of leakage in the thoracic area. (Figure 3).

In the face of clinical and especially biological arguments, the diagnosis of a peritoneal-pericardial leak was retained, despite the absence of scintigraphic evidence, justifying a temporary stoppage of the CAPD for 11 days with passage to hemodialysis on a temporary central catheter.

The course was marked by disappearance of the pleural effusion on chest x-ray and regression of pericardial effusion on TTU. The PD was resumed on APD (automated peritoneal dialysis), with an injection volume initially at 1.2 liters and an empty peritoneum during the day, then gradual increase in volumes under regular clinical and ultrasound control. After 6 months of follow-up, the patient is on APD with 2.27% Dianeal® bags. Injection volumes are 1.7 liters night time and 1 liter during day time. UF is between 780 and 1100 ml/day, without clinical, radiological or ultrasound evidence of recurrence of the leak.

DISCUSSION

Peritoneal-pericardial leakage, whether isolated or associated with pleural effusion, is very rare. Only 8 cases have been described in the literature [2 - 9]: 5 cases after cardiac surgery, and/or pericardiocentesis, including a 15-year-old girl; one case of an 86-year-old female patient with a large hiatus hernia; two pediatric cases, including a 9-year-old girl with a history of abdominal surgeries and malnutrition; and a 2-year-old boy with a history of multiple hernias. (Table I)

The risk factors for peritoneo-pericardial leakage described in the literature are: a history of cardiovascular interventions or multiple abdominal surgeries, which may be responsible for a breach; a congenital anomaly responsible for tissue fragility, with the occurrence of fistulas and

↓ Table I. Published case of peritoneal pericardial leakage (one patient per line)

Authors	Year	Age	PD modality	PD duration	Cause of peritoneal-pericardial leakage	Confirmation of diagnosis	Patient outcome
Hou CH et al	1994	41 yrs	CAPD	6 yrs	Peritoneal-pericardial fistula after pericardiocentesis.	- Glucose concentration in pericardial fluid. - Peritoneal scintigraphy	Transfer to HD
Näther S et al	1996	69 yrs	CAPD	3 yrs	Post cardiac surgery peritoneal-pericardial fistula	- Glucose concentration in pericardial fluid. - Peritoneal scintigraphy	Transfer to HD
Senecal L et al	2002	67 yrs	-	-	Post cardiac surgery peritoneal-pericardial fistula	- Chemical analysis of pericardial fluid. - Peritoneal scintigraphy	Transfer to HD
Borzycz D et al	2008	2 yrs	APD	2 yrs	Peritoneal-pericardial fistula in a patient with history of multiple peritonitis, hernia and malnutrition.	- Peritoneal MRI	Renal graft
Morimoto, S et al	2014	73 yrs	-	2 yrs	Post cardiac surgery peritoneal-pericardial fistula	- Glucose concentration in pericardial fluid.	14 days HD then PD resume without recidive after 59 months
Teoh CW et al	2015	15 yrs	APD	1 wk	Fistula after pericardiocentesis in a patient with inflammatory disease and long term corticotherapy.	- Glucose concentration in pericardial fluid. - Peritoneal scintigraphy	Transfer to HD
Derynck MR et al	2018	9 yrs	-	1 an	Peritoneal-pericardial fistula in a patient with recurrent abdominal surgery, prolonged immuno suppression and previous malnutrition.	- Peritoneal scintigraphy	9 months HD then PD resume without recidive after 4 months
Kahoul et al	2019	86 yrs	-	2 wks	breach in a patient with a large hiatus hernia	- Peritoneal scintigraphy	Transfer to HD

hernias; a history of malnutrition; long-term immunosuppression; previous peritonitis; and an excessive or too-rapid increase in the volume of infusion [6 - 8].

Our patient had as risk factors malnutrition, with a BMI of 17.77 kg/m², and hypoalbuminemia between 25 and 30 g/l, as well as two episodes of peritonitis in the previous months.

The clinical presentations are variable, ranging from minor signs such as a cough to more serious signs such as fluid overload associated with a decrease in UF, abdominal and chest pain, dyspnea or hemodynamic instability in the event of tamponade [1; 8].

The peritoneo-pericardial leakage of dialysate has been evoked in the clinical context, and confir-

med by a biochemical analysis of the pericardial fluid with a high glucose level in the majority of cases.

Radiological investigations, such as peritoneography with injection of iodinated contrast medium by computerized tomography (CT) or by magnetic resonance (MRI) and peritoneal scintigraphy, can be used for the diagnosis of dialysate leakage. The usefulness of peritoneal scintigraphy in the diagnosis of peritoneal leaks has been illustrated in various publications [10; 11]. The radiopharmaceutical agent used should consist of large, non-absorbable particles to prevent them from being transferred through the peritoneal membrane and from communicating with the lymphatics. Several agents, including Tc-99m sulfur colloid, Tc-99m MAA and Tc-99m DTPA, have been used. This technique has a sensitivity of between 40% and 50% [6], but remains the standard radiological examination in cases in the literature with recourse to MRI in a single patient [8].

In a case reported by Ortiz et al, a first scintigraphy performed in a child with a hydrothorax was negative, but, faced with the strong suspicion of a dialysate leak, a second scintigraphy was performed using another modality, this time immediately after complete drainage. It showed an accumulation of the radio-tracer at the level of the hemi-thorax. The authors reviewed the false negatives of different diagnostic methods for communication with the peritoneum, and concluded that the presence of the effusion prevented tracer migration due to high intra-pleural pressure [12].

In our clinical case, the scintigraphy was not contributory because it did not show any passage of the tracer outside the peritoneal cavity. It was the dosage of glucose, as well as the clinical picture, that allowed the diagnosis.

Complementary imaging by peritoneography with injection of contrast product by CT or MRI would have been interesting in our clinical case in order to support the diagnosis by providing visual confirmation of the origin of the leak.

Therapeutic management can vary from a conservative approach to active treatment with thoracotomy for surgical repair. In all cases, a decrease in intraperitoneal volumes or even a temporary suspension of the PD are necessary, while waiting for a spontaneous resolution of the communication or even a definitive stoppage of the technique. There is no comparative study between an active approach and a conservative approach in adults or in the pediatric population [7; 13].

CONCLUSION

Peritoneo-pericardial leakage is an exceptional but potentially serious complication that can be life-threatening. The measurement of glucose in the pericardial fluid should be performed by puncture to confirm the diagnosis. The use of radiological explorations such as scintigraphy and/or peritoneography with injection of contrast product can be useful to visualize the peritoneal leak. The therapeutic management is very variable, with a conservative approach in the majority of cases [13].

Contribution of authors

Meyryem Birrou a conçu le projet et rédigé le texte, Mina Agrou a analysé les résultats et corrigé le texte, Guerrouj Hasnae a réalisé les scintigraphies et effectué des corrections dans le texte, Rabia Bayahia a effectué les analyse et corrigé le texte, Loubna Benamar a supervisé le travail.

Disclosure

Authors declared they have not conflict of interest for this article.

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