

Bulletin de la Dialyse à Domicile

Home Dialysis Bulletin (BDD)

International bilingual journal for the exchange of knowledge and experience in home dialysis

(English edition) (version française disponible à la même adresse)

Recurrence of inguinal hernia and scrotal edema due to dialysate leakage through the processus vaginalis: clinical case

(Récidive de hernie inguinale et oedème scrotal par fuite de dialysat à travers le processus vaginalis : cas clinique)

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To cite: Calderon V, Taghavi M, Al Barajraji M, El Khoury M, Mboti F, Noels J. Recurrence of inguinal hernia and scrotal edema due to dialysate leakage through the processus vaginalis: clinical case. Bull Dial Domic [Internet];8(4). Available from doi: <https://doi.org/10.25796/bdd.v8i4.87093>

Summary

Peritoneal dialysis is a treatment option for patients with stage V chronic kidney disease that offers a better quality of life compared to hemodialysis. Abdominal wall hernias and scrotal edema are potential complications of peritoneal dialysis that may require discontinuation of the technique. However, radiological diagnosis and treatment of the hernia allow peritoneal dialysis to be resumed. We report here the case of a 72-year-old patient presenting with unilateral recurrence of an inguinal hernia with scrotal edema after bilateral open repair due to leakage of peritoneal dialysis fluid through a patent processus vaginalis, and we reviewed the existing literature. The literature reports that 4 to 14% of peritoneal dialysis patients develop an abdominal hernia and that dialysate leakage or scrotal edema, which are rarer, are often associated with an indirect inguinal hernia or a persistent patent processus vaginalis. Several risk factors have been identified: age, male gender, obesity, polycystic kidney disease, history of hernia, and high dialysate volumes. The diagnosis is based mainly on peritoneal computed tomography. Management may be conservative, but surgical repair using a tension-free technique, preferably according to Lichtenstein, is recommended in cases of confirmed primary or recurrent hernia. The optimal time to resume peritoneal dialysis remains variable, but is most often between 2 and 6 weeks.

Keywords: End-stage kidney disease, peritoneal dialysis, hernia, scrotal edema, patent processus vaginalis

Résumé

La dialyse péritonéale est une option thérapeutique pour les patients atteints maladie rénale chronique stade V qui offre une meilleure qualité de vie par rapport à l'hémodialyse. Les hernies de la paroi abdominale et l'œdème scrotal sont des complications potentielles de la dialyse péritonéale qui peuvent obliger à interrompre la technique. Le diagnostic radiologique et le traitement de la hernie permettent toutefois de reprendre la dialyse péritonéale. Nous rapportons ici le cas d'un patient de 72 ans présentant une récurrence unilatérale d'une hernie inguinale avec œdème scrotal après une réparation ouverte bilatérale due à une fuite de liquide de dialyse péritonéale à travers le processus vaginalis patent, et nous avons passé en revue la littérature existante.

Dans la littérature il est rapporté que 4 à 14 % des patients sous DP développent une hernie abdominale et que les fuites de dialysat ou l'œdème scrotal, plus rares, sont souvent liés à une hernie inguinale indirecte ou à un processus vaginalis patent persistant. Plusieurs facteurs de risque sont identifiés : âge, sexe masculin, obésité, polykystose rénale, antécédents de hernie ou volumes de dialysat élevés. Le diagnostic repose principalement sur la tomographie assistée par ordinateur péritonéale. La prise en charge peut être conservatrice, mais la réparation chirurgicale par technique sans tension, préférentiellement selon Lichtenstein, est recommandée en cas de hernie avérée, primaire ou récidivante. Le moment optimal de reprise de la DP reste variable, mais se situe le plus souvent entre 2 et 6 semaines.

Mots-clés : Insuffisance rénale terminale, dialyse péritonéale, hernie, œdème scrotal, processus vaginalis perméable



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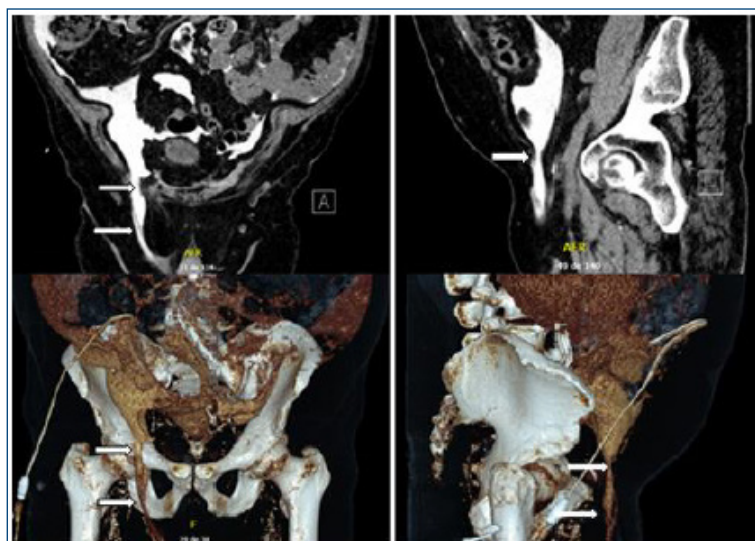
Introduction

Peritoneal dialysis (PD) is a therapeutic option for patients with end-stage kidney disease (ESKD) that offers better dynamism, independence, and quality of life than hemodialysis (HD) [1]. Patients usually initiate PD by manually performing dwells, a method known as continuous ambulatory peritoneal dialysis (CAPD). However, PD is associated with complications such as malfunctions of the dialysis catheter (DC), infections (peritonitis, infections of the peritoneal DC, and tunnel and exit site infections), and abdominal wall defects with inguinal hernia (IH) that may present rarely with acute scrotal edema [2]. Abdominal wall hernias and scrotal edema are potential complications of PD in adults that may force interruption of the therapy. In contrast to children, in whom inguinoscrotal hernia through a patent processus vaginalis (PPV) is common, such pathology is very rare in adults.

Clinical history

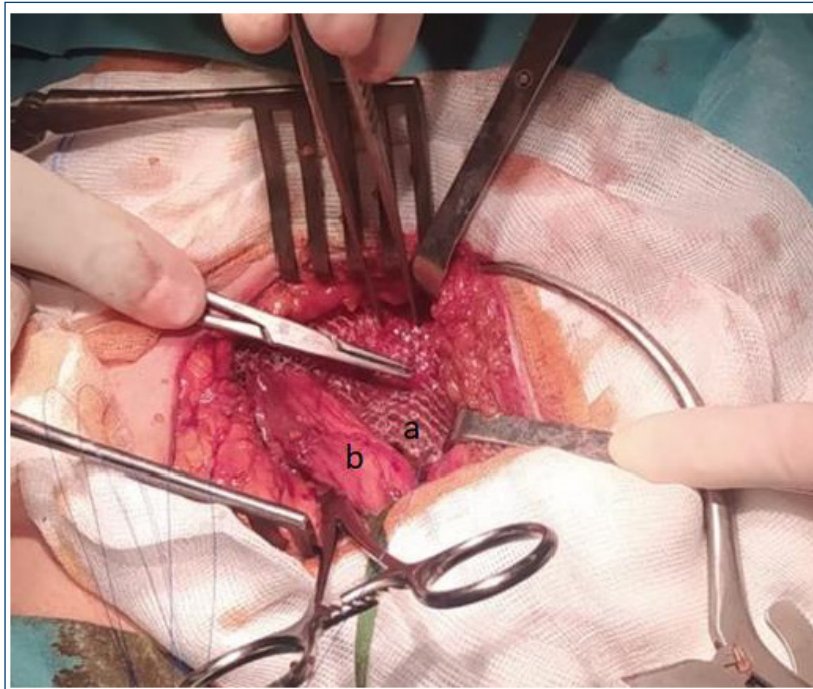
We herein report the case of a 72-year-old man with end-stage kidney disease (ESKD) and a history of type 2 diabetes, arterial hypertension, obesity (BMI>31 kg/m²), hypercholesterolemia, and a history of bilateral IH treated by open Stoppa tension-free mesh hernioplasty (TFMH). A Tenckhoff PD catheter had been placed simultaneously to hernia repair because of advanced chronic kidney disease, with a GFR of 13 ml/min/1.73m² according to the CKD-EPI equation. In the next six months, due to deteriorating renal function with uremic symptoms, the PD catheter was externalized, and PD was initiated after 4 weeks.

Within 48 hours after PD initiation, the patient presented with acute right-sided scrotal edema. CT-peritoneography was performed and revealed the recurrence of a right IH due to leakage of persistent dialysate fluid through a PPV (*Figure 1*).



↑ *Figure 1. CT-peritoneography with 3D reconstruction showing genital leakage associated with right PPV. Left images: anteroposterior vision. Right images: Side image. Arrows: PPV. PPV: patent processus vaginalis*

His right IH was treated by open Lichtenstein TFMH, and PD was resumed 4 weeks after the operation. Currently, after 12 months of follow-up, the patient remains recurrence-free while on CAPD due to his preference.



↑ Figure 2. Hernioplasty according to the Lichtenstein technique. a: Polypropylene mesh, b: Spermatic cord

Literature analysis

Abdominal wall hernias are estimated to affect 4% to 14% of PD patients and are commonly caused by chronic high intra-abdominal pressure [3]. When symptomatic, they may warrant interrupting PD until the problem is identified and resolved. If surgery is indicated, TFMH is the currently recommended treatment before resuming PD after a variable postoperative delay [2,3]. Unfortunately, undiagnosed IH may manifest primarily after PD initiation or rarely as a recurrence following previous TFMH [3]. Our patient experienced the recurrence of right IH through a PPV after bilateral open IH repair using the Stoppa approach 6 months ago. Acute scrotal edema manifested within 48 hours after his first PD session, and PD had to be stopped. To our knowledge, such recurrence in a CAPD-ESKD patient has not been reported yet. The patient was offered open surgical repair with tension-free mesh placement using the Lichtenstein approach and resection of the herniary sac. The postoperative course was uneventful, and PD could be restarted 6 weeks after the surgery; a one-year follow-up found no herniary recurrence or related complications.

PD patients have a high risk of abdominal wall complications such as dialysate leak (5-10%), hernias (10-37%; mostly inguinal and umbilical hernias), or acute scrotal edema (2-4%) [4,5]. Acute scrotal edema is uncommon and often associated with an IH. There are risk factors for ESKD patients that may increase the likelihood of abdominal hernias (elderly males and those with polycystic kidney disease, previous hernia repair, midline incision for PD catheter placement, high BMI, greater residual volume, and prolonged PD duration are at greater risk) [3,6-8]. Additionally, the large volumes of fluid injected into the peritoneal cavity during CAPD may increase intra-abdominal pressure [3,6-8] and force the fluid into the genitalia indirectly through an abdominal wall defect, or directly through an IH or PPV, causing scrotal edema [9]. This process affects ultrafiltration efficiency and PD [3,7]. In adults, indirect IH is almost

always congenital and attributed to a failure of PV closure [10,11]. A small, indirect IH may unfortunately be missed before PD initiation and become clinically evident 3 to 105 months later [4, 10-11]. When an IH is diagnosed before PD initiation, surgical treatment should be considered to prevent complications (decreased ultrafiltration efficiency, discomfort, recurrent peritonitis, incarceration, strangulation, necrosis, and perforation), particularly for irreducible hernias, considering that other hernias, such as reducible umbilical hernia, can still be managed conservatively in up to 71.42% of cases [3,4,7].

When indirect IH is suspected in an ESKD patient with PD and scrotal edema, CT-peritoneography is considered the reference imaging study, considering its high detection rate [3]. However, factors such as the risks associated with radiation exposure and allergy to contrast product may indicate other imaging studies such as abdominal ultrasound, peritoneal scintigraphy, or peritoneal magnetic resonance imaging [12,13]. Diagnostic laparoscopy may also help to confirm the diagnosis by excluding the possibility of a contralateral IH and a concomitant open repair with mesh [5]. As of now, there is no consensus on the management of IH with scrotal edema in ESKD patients. Sometimes, a small indirect IH due to PPV can be treated conservatively with a 1-to-3-week rest from PD or a temporary shift to HD or modified PD to decrease the volume of peritoneal fluid and intra-abdominal pressure [14]. If surgery is indicated, the reference is open TFMH using the Lichtenstein technique [3,15]. However, recurrence occurs up to 60% of the time. Other TFMH techniques, such as an anterior, posterior (Stoppa technique), or laparoscopic approach, have been shown to have a low recurrence rate but a steeper learning curve [16]. Hernioplasty is usually performed simultaneously with the placement of the PD catheter. In the literature, a posterior open approach for IH repair (the Stoppa technique) is indicated for patients aged over 50 with bilateral IH; this approach results in a low recurrence rate of 0.7% [17,18]. However, as the mesh retracts by up to 20% over 6 months, an insufficiently large mesh may trigger recurrence [19]. In a case series involving 14 patients, the Lichtenstein procedure with sac excision was associated with a good outcome. No PD-related complications were observed, and no recurrence was observed during a follow-up after about 3 and a half years [20]. In our patient, the right IH reappeared after Stoppa hernioplasty and was treated by TFMH using the Lichtenstein approach without recurrence. Postoperatively, increased intra-abdominal pressure and chronic renal failure may impair tissue healing, and the optimal timing for PD reinitiation remains undefined [3,4].

PD is usually restarted at normal volumes within 2-4 weeks; during this interval, low-volume PD is used with frequent exchanges, which are gradually increased to regain the preoperative CAPD regimen [3,4].

Despite some conflicting data on the association between intraperitoneal volume infusion and intraperitoneal pressure [21], automated peritoneal dialysis (APD) using smaller-volume dwells while the patient is recumbent during the night is an attractive approach in these situations. Indeed, supine exchanges have been associated with decreased intra-abdominal pressure per volume of dialysate (as intraperitoneal pressure parallels intraperitoneal volume) with similar efficacy to other techniques [22].

Thus, APD has been used effectively in place of CAPD in ESKD patients who develop abdominal wall hernias [3,4,7,14]. Interestingly, laparoscopic transabdominal preperitoneal (TAPP) IH repair may decrease morbidity and the recurrence rate compared to open surgery and PD resumption

after 7 days [23]. In our case, PD was restarted with normal volumes after 6 weeks when the surgical wound had completely healed. Despite our short follow-up interval of 1 year, the patient remains recurrence-free, in line with the low recurrence rate reported in the literature [3].

Conclusion

In conclusion, TFMH should always be proposed before PD in ESKD patients when IH is diagnosed. The recurrence rate of IH after Stoppa bilateral TFMH is as high as 1.7%, and factors such as the failure to diagnose occult PPV before the initiation of PD may trigger this recurrence [19]. Scrotal edema arising after PD initiation suggests the existence of an indirect IH and potentially a PPV. Different imaging studies may help with the diagnosis depending on the context, but a CT-peritoneogram is still considered the reference. The surgical correction of the primary or recurring IH should not be delayed, allowing PD reinitiation as soon as possible.

Authors' Contributions

VC, MT, MAL, MEK, FM and JN contributed to the clinical management of the patient and data collection. VC and MT drafted the manuscript. MAL, MED, FM and JN participated in critical revision and improvement of the content. JN did the supervision. All authors approved the final version of the manuscript and agree to take responsibility for it

Ethical Considerations

No information that could identify the patient has been disclosed.

Patient Consent

Informed consent of the infant's parents was obtained for the publication of this case report.

Data Availability Statement

Not applicable

Funding

The authors did not receive any funding for the report

Conflicts of Interest

The authors declare no conflicts of interest

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