International Journal of Scientific Reports
Khan SA et al. Int J Sci Rep. 2025 Sep;11(9):334-336
http://www.sci-rep.com
pISSN 2454-2156 | eISSN 2454-2164
DOI: https://dx.doi.org/10.18203/issn.2454-2156.IntJSciRep20252526

Case Report

Intraperitoneal pseudocyst formation in a long-term peritoneal dialysis patient: a rare surgical complication

Shehla Ashraf Khan[1]*, Sai Deepthi Janaki Rani Ivaturi[2], Bhavya Bommadi[3], Musaab Abdalla Elhussein[4]

[1]Bharati Vidyapeeth Deemed University Medical College, Pune, Maharashtra, India
[2]Gandhi Medical College, Secunderabad, Telangana, India
[3]Sri Padmavathi Medical College for Women, Tirupati, Andhra Pradesh, India
[4]Shendi University, Sudan

Received: 18 June 2025
Revised: 14 July 2025
Accepted: 23 July 2025

***Correspondence:**
Dr. Shehla Ashraf Khan,
E-mail: shehlakhan555@gmail.com

ABSTRACT

Peritoneal dialysis (PD) is frequently used for renal replacement therapy due to its benefits such as patient independence and cost-efficiency. However, it can be accompanied by rare but potentially serious complications. We report an unusual case involving the development of an intraperitoneal pseudocyst in a patient undergoing long-term peritoneal dialysis. This rare entity, encapsulating the tip of the dialysis catheter, demanded surgical intervention. The underlying mechanisms remain speculative, though prior infections and intra-abdominal interventions appear contributory. Greater understanding of both common and uncommon PD complications is vital, as is further investigation into the etiology and optimal management strategies for pseudocyst formation.

Keywords: Peritoneal dialysis, Pseudocyst, Peritoneum, Renal dialysis, Complications

INTRODUCTION

Chronic kidney disease (CKD) is a globally prevalent issue, affecting approximately 10% of the population, with millions depending on renal replacement therapies such as dialysis or transplantation. In Mexico alone, data from 2017 indicated a CKD prevalence of 12.2%, resulting in over 50 deaths per 100,000 individuals annually.[1] Diabetes mellitus is the predominant cause of renal failure, implicated in nearly 45% of new end-stage renal disease (ESRD) cases.[2]

Peritoneal dialysis (PD) offers a home-based, cost-effective option for patients with ESRD and is often preferred over hemodialysis for its convenience and patient autonomy.[3,4] Despite these advantages, PD carries a spectrum of complications. While infectious issues like peritonitis and exit-site infections are well-documented, non-infectious complications - ranging from catheter malfunction to abdominal hernias and rare structural pathologies - pose significant challenges.[5,6] Some complications may manifest early, while others arise later in the treatment timeline (Table 1).[7] Among these, peritoneal pseudocyst formation is exceptionally rare and often necessitates surgical evaluation.[8,9]

Herein, we present a case involving pseudocyst development following three years of PD, ultimately requiring operative management.

CASE REPORT

A 61-year-old male with a medical history of type 2 diabetes mellitus, hypertension, and chronic renal failure had been undergoing continuous ambulatory peritoneal dialysis (CAPD) since early 2021. During this time, he

experienced three separate episodes of peritonitis, each managed conservatively with antibiotics.

In April 2024, the patient began reporting persistent discomfort at the catheter insertion site, decreased appetite, and reduced inflow during dialysis. A progressive bulge developed at the exit site, rendering him unable to complete home-based exchanges. Given these complications, PD was halted, and he transitioned to hemodialysis via a tunneled catheter.

He presented to the emergency department a few days later with acute left-sided abdominal pain accompanied by chills. On examination, there was a tender, erythematous protrusion at the site of the PD catheter, suggestive of an incarcerated hernia. Despite being afebrile, laboratory workup revealed leukocytosis and an elevated lactate concentration (3.1 mmol/l), prompting urgent exploratory surgery.

Intraoperatively, a well-encapsulated cystic mass measuring approximately 6.5×5.8 cm was discovered, firmly adherent to the anterior abdominal wall's aponeurosis. The dysfunctional dialysis catheter traversed the cyst cavity (Figure 1). Complete excision of the pseudocyst was performed, followed by fascial closure using absorbable sutures. A subcutaneous Blake drain was positioned, and skin approximation was achieved with interrupted nylon sutures.

The patient was discharged with instructions for follow-up. Drain removal occurred on the sixth postoperative day. Histological examination of the excised lesion confirmed a peritoneal pseudocyst measuring 6.3×5.5×5 cm, characterized by chronic inflammatory changes, fibrofatty tissue, and hemosiderin-laden macrophages (Figure 2). The patient remained on hemodialysis for ongoing renal support.

Follow-up

Following surgery, the patient recovered well postoperatively. The subcutaneous Blake drain was removed on postoperative day six, and wound healing was satisfactory. He reported significant symptomatic relief, with no recurrence of abdominal pain or mass formation during follow-up visits at 1 month and 3 months postoperatively. Serial ultrasonography confirmed no new cystic collections. Given the loss of peritoneal access, he continues on regular hemodialysis via a tunneled catheter and has been placed on a transplant waiting list. Nutritional status and glycemic control have improved with routine nephrology follow-up.

This case underscores the importance of long-term vigilance in PD patients, especially those with recurrent peritonitis or mechanical issues. Early recognition and surgical intervention can prevent further morbidity and optimize patient outcomes.

Table 1: Common early and late surgical complications associated with PD.

Early complications	Late complications
Surgical wound bleeding or catheter site bleeding	Hernia formation
Outflow obstruction of dialysate	Dialysate leakage into the scrotum
Hemorrhagic dialysate fluid	Persistent dialysate leakage from catheter site
Catheter-related infections (exit-site infections)	Recurrent peritonitis
Intestinal or urinary bladder perforation	Encapsulating peritoneal sclerosis

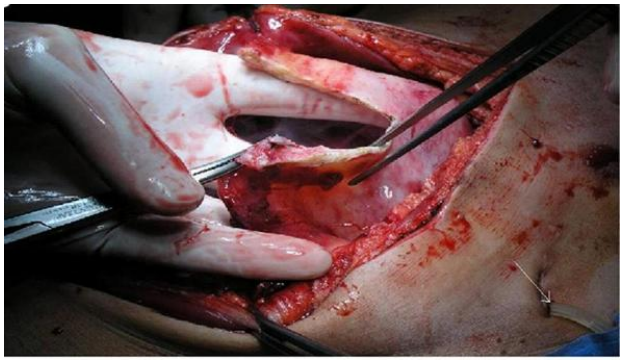

Figure 1: Pseudocyst attached to aponeurosis with presence of PD catheter.

Figure 2: Surgical specimen compatible with closed peritoneal pseudocyst and PD catheter.

DISCUSSION

PD has emerged as a practical and effective modality for renal replacement therapy, particularly in patients seeking autonomy and cost-effective solutions. However, like all long-term interventions, it is not devoid of complications. Infectious sequelae such as peritonitis and exit-site infections are well-documented, while non-infectious

complications are relatively rare but can be clinically significant. One such complication is the formation of intraperitoneal pseudocysts, an unusual entity that poses diagnostic and therapeutic challenges.

Peritoneal pseudocysts are encapsulated fluid collections within the abdominal cavity that lack a true epithelial lining. Their formation is hypothesized to result from chronic peritoneal irritation, repeated episodes of peritonitis, mechanical trauma from catheter movement, or prior surgical interventions.[4-6] The recurrent peritoneal inflammation may initiate a fibrotic response, promoting the development of fibrous-walled cystic cavities.[7]

In our patient, the development of the pseudocyst occurred after three years of CAPD and multiple episodes of peritonitis, suggesting a strong correlation between chronic inflammation and pseudocyst formation. Notably, the catheter tip was found within the cyst cavity during surgical exploration, reinforcing the theory of mechanical irritation and localized immune response as triggers. Similar findings have been reported in cases involving ventriculoperitoneal shunts, though such pseudocysts remain exceedingly rare in adult PD patients.[8,9]

Diagnosis often involves a combination of clinical suspicion and imaging modalities. Ultrasonography may reveal hypoechoic collections, while CT imaging can delineate the extent and adherence of the cystic mass to surrounding structures.[6] In our case, the emergency presentation and high suspicion for an incarcerated hernia prompted urgent surgical intervention, which turned out to be both diagnostic and curative.

Histopathology confirmed the nature of the lesion as a peritoneal pseudocyst with chronic inflammatory changes, hemosiderin deposition, and fibrofatty tissue. This supports findings in previous reports that emphasize the reactive and inflammatory basis of pseudocyst development.[10]

The definitive management of symptomatic pseudocysts is surgical excision.[5] Conservative options such as aspiration have been attempted but are often ineffective due to rapid reaccumulation of fluid or recurrence. In our patient, complete excision with removal of the catheter was necessary, followed by a transition to hemodialysis, which remains the mainstay in cases where the peritoneum is no longer viable for PD.[9-11]

CONCLUSION

PD continues to serve as a cornerstone of renal replacement therapy, particularly in resource-constrained environments and for patients who value treatment autonomy. While its benefits are substantial, clinicians must be vigilant about atypical complications such as intraperitoneal pseudocyst formation, which, although rare, can have significant clinical implications. This case underscores the necessity for early recognition of unusual signs especially in patients with a history of recurrent peritonitis or mechanical dialysis issues to prevent diagnostic delays and avoid adverse outcomes. Surgical exploration remains a valuable tool in both diagnosis and management, particularly when imaging is inconclusive or symptoms are acute. As the use of PD expands globally, further research into the pathogenesis, risk factors, and preventive strategies for pseudocyst development will be essential for optimizing patient care and preserving the viability of PD as a long-term treatment option.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Perfil epidemiológico de la enfermedad renal crónica en México. Secretaría de Salud. 2018: 5-60.
2. Hernández G. Una visión general de las últimas dos décadas y la situación actual de la enfermedad renal crónica en México. Rev Med UAS. 2019;9(4):208.
3. Cruz M, Totoli C. Peritoneal Dialysis. Review Article. Rev Assoc Med Bras. 2020;66(1):37-44.
4. Mihalache O, Doran H, Mustaea P, Bobirca F, Georgescy D, Agache A. Surgical complications of Peritoneal Dialysis. Rev Chirurgia. 2018;113(5):611-24.
5. Ratajczak A, Lange-Ratajczak M, Bobkiewicz A, Studniarek A. Surgical Management of Complications with Peritoneal Dialysis. Semin Dial. 2017;30(1):63-8.
6. Chama A, Borja C, Farrel J, Ruiz A. Pseudoquiste peritoneal: una complicación inusual en paciente con diálisis peritoneal. Rev Cir. 2021;73(3):343-6.
7. Nagaraj S, Khan M, Afroza F. Recurrent Peritoneal Pseudocyst: a rare complication of peritoneal dialysis. Cureus. 2018;10(7):e3043.
8. Baer G, Wagner A, Selbach J, Otto M, Weiner S. Abdominal Pseudocysts Following Peritoneal Dialysis-Associated Peritonitis: A Report of 3 Cases. Am J Kidney Dis. 2010;55(4):15-9.
9. Ercan Z, Yildirim T, Merhametsiz O, Yayar O, Haspulat A, Ayli MD. Abdominal pseudocyst development in a peritoneal dialysis patient with a ventriculoperitoneal shunt: an indication for switch to hemodialysis? Perit Dial Int. 2014;(34)4:470-1.
10. Ozçakar ZB, Yalçinkaya F, Yagmurlu A, Yüksel S, Acar B, Fitoz S, et al. An unusual complication of peritoneal dialysis. Pediatr Nephrol. 2006;21(1):129-30.
11. Kharsa A, Colvill K, Stevenson H, Fair J, Kulkarni R, Mujtaba M, et al. Intra-Peritoneal Pseudocyst as a Rare Complication After Peritoneal Dialysis: The Use of a Staged Surgical Approach in Management. Am Surg. 2023;89(11):4918-20.

Cite this article as: Khan SA, Ivaturi SDJR, Bommadi B, Elhussein MA. Intraperitoneal pseudocyst formation in a long-term peritoneal dialysis patient: a rare surgical complication. Int J Sci Rep 2025;11(9):334-6.