

**MOHAMAD HANOUNEH, MD**

Nephrology Fellow, Department of Medicine,  
Division of Nephrology, Johns Hopkins University,  
Baltimore, MD

**PRANAV DAMERA**

University of Maryland-College Park,  
College Park, MD

**MEHRDAD FETRAT, MBBS, MD**

Instructor of Radiology and Radiological  
Science, Department of Radiology, Johns  
Hopkins University, Baltimore, MD

**DUVURU GEETHA, MD**

Associate Professor of Medicine,  
Department of Medicine, Division of Nephrology,  
Johns Hopkins University, Baltimore, MD

# An unusual complication of peritoneal dialysis



**Figure 1.** Computed tomography showed diffuse parietal and visceral peritoneal calcifications encasing the small-bowel loops (arrows), consistent with encapsulating peritoneal sclerosis.



**Figure 2.** Several months later, computed tomography showed dilated small-bowel loops indicative of small-bowel obstruction (red arrows) and pneumoperitoneum (yellow arrow).

**A** 45-YEAR-OLD MAN with end-stage renal disease secondary to hypertension presented with abdominal pain, nausea, vomiting, and fever. He had been on peritoneal dialysis for 15 years.

Results of initial laboratory testing were as follows:

- Sodium 137 mmol/L (reference range 136–144)
- Potassium 3.7 mmol/L (3.5–5.0)
- Bicarbonate 31 mmol/L (22–30)
- Creatinine 17.5 mg/dL (0.58–0.96)
- Blood urea nitrogen 57 mg/dL (7–21)
- Lactic acid 1.7 mmol/L (0.5–2.2)
- White blood cell count  $14.34 \times 10^9/L$  (3.70–11.0).

Dr. Geetha has disclosed consulting for ChemoCentryx and Genentech.

doi:10.3949/ccjm.85a.17090

Blood cultures were negative. Peritoneal fluid analysis showed a white blood cell count of  $1.2 \times 10^9/L$  (reference range  $< 0.5 \times 10^9/L$ ) with 89% neutrophils, and an amylase level less than 3 U/L (reference range  $< 100$ ). Fluid cultures were positive for coagulase-negative staphylococci and *Staphylococcus epidermidis*.

Computed tomography (CT) showed diffuse parietal and visceral peritoneal calcifications encasing the small-bowel loops, consistent with encapsulating peritoneal sclerosis (**Figure 1**). His peritoneal dialysis catheter was removed, and he was transitioned to hemodialysis. He was discharged on a course of antibiotics and was started on prednisone and tamoxifen.

He presented again a few months later with abdominal pain. At that time, CT (**Figure 2**) demonstrated dilated small-bowel loops indicative of small-bowel obstruction and pneu-

moperitoneum consistent with bowel perforation. He declined surgical treatment and was referred for hospice care.

## ■ CAUSES AND CLINICAL FEATURES

Encapsulating peritoneal sclerosis is a devastating complication of peritoneal dialysis, occurring in 3% of patients on peritoneal dialysis. The mortality rate is above 40%.<sup>1,2</sup> It is characterized by an initial inflammatory phase followed by extensive intraperitoneal fibrosis and encasement of bowel. Causes include prolonged exposure to peritoneal dialysis or glucose degradation products, a history of severe peritonitis, use of acetate as a dialysate buffer, and reaction to medications such as beta-blockers.<sup>3</sup>

Clinical features result from inflammation, ileus, and peritoneal adhesions and include abdominal pain, nausea, and vomiting.

## ■ REFERENCES

1. Kawaguchi Y, Saito A, Kawanishi H, et al. Recommendations on the management of encapsulating peritoneal sclerosis in Japan, 2005: diagnosis, predictive markers, treatment, and preventive measures. *Perit Dial Int* 2005; 25(suppl 4):S83–S95. PMID:16300277
2. Lee HY, Kim BS, Choi HY, et al. Sclerosing encapsulating peritonitis as a complication of long-term continuous ambulatory peritoneal dialysis in Korea. *Nephrology (Carlton)* 2003; 8(suppl 2):S33–S39. doi:10.1046/J.1440-1797.8.S.11.X
3. Kawaguchi Y, Tranaeus A. A historical review of encapsulating peritoneal sclerosis. *Perit Dial Int* 2005; 25(suppl 4):S7–S13. PMID:16300267
4. Martins LS, Rodrigues AS, Cabrita AN, Guimaraes S. Sclerosing encapsulating peritonitis: a case successfully treated with immunosuppression. *Perit Dial Int* 1999; 19(5):478–481. PMID:11379862

A high peritoneal transport rate, which often heralds development of encapsulating peritoneal sclerosis, leads to failure of ultrafiltration and to fluid retention.

CT is recommended for diagnosis and demonstrates peritoneal calcification with bowel thickening and dilation.

## ■ TREATMENT

Treatment entails stopping peritoneal dialysis, changing to hemodialysis, bowel rest, and corticosteroids. Successful treatment has been reported with a combination of corticosteroids and azathioprine.<sup>4,5</sup> A retrospective study showed that adding the antifibrotic agent tamoxifen was associated with a decrease in the mortality rate.<sup>6</sup> Bowel obstruction is a common complication, and surgery may be indicated. Enterolysis is a new surgical technique that has shown improved outcomes.<sup>7</sup> ■

5. Wong CF, Beshir S, Khalil A, Pai P, Ahmad R. Successful treatment of encapsulating peritoneal sclerosis with azathioprine and prednisolone. *Perit Dial Int* 2005; 25(3):285–287. PMID:15981777
6. Korte MR, Fieren MW, Sampimon DE, Lingsma HF, Weimar W, Betjes MG; investigators of the Dutch Multicentre EPS Study. Tamoxifen is associated with lower mortality of encapsulating peritoneal sclerosis: results of the Dutch Multicentre EPS Study. *Nephrol Dial Transplant* 2011; 26(2):691–697. doi:10.1093/ndt/gfq362
7. Kawanishi H, Watanabe H, Moriishi M, Tsuchiya S. Successful surgical management of encapsulating peritoneal sclerosis. *Perit Dial Int* 2005; 25(suppl 4):S39–S47. PMID:16300271

ADDRESS: Mohamad Hanouneh, MD, Department of Medicine, Division of Nephrology, Johns Hopkins University, 1830 E. Monument Street, Room 416, Baltimore, MD 21287; mhanoun1@jhmi.edu

The complication occurs in 3% of patients on peritoneal dialysis, and the mortality rate is over 40%