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Pleural Effusion in a Peritoneal Dialysis Patient

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A 34-year-old female presented with end-stage renal disease (ESRD) treated by peritoneal dialysis (CAPD) complained of a dry cough. Chest X-ray and chest computed tomography (CT) scan revealed massive right hydrothorax. Because the glucose concentration of pleural fluid was markedly high compared with that of serum, we performed isotope and contrast peritoneography. We used CT for localizing it. MRI was also trying to show transdiaphragmatic leakage in peritoneoflural fistula. Temporary discontinuation of CAPD, tetracycline instillation into the pleural space and surgical patch grafting of the diaphragmatic leak have all been described. A novel method may be video-assisted talc pleurodesis.

Key Words: *Pleural effusion; Dialysis; Kidney*

Article History:
received 28 March, 2011
accepted 7 April, 2011

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WHAT IS THE CAUSE OF HER PLEURAL EFFUSION?

A 34-year-old female with end-stage renal disease treated by peritoneal dialysis (PD) complained of dry cough that had started 1 month previously. The patient's medications consisted of a calcium channel blocker, angiotensin receptor blocker, erythropoietin, ferrous sulfate, and sevelamer.

A chest X-ray showed a pleural effusion on the right side (Fig. 1). A thoracic drainage was placed into the pleural effusion and 1 L of clear liquid was emptied. Samples were sent to the chemistry laboratory, to microbiology, and to pathology for further studies. The following results were obtained: glucose, 278 mg/dL (plasma glucose, 115 mg/dL); total protein $<$ 1.0 g/dL (total protein in plasma, 7.9 g/dL); lactate dehydrogenase, 49 U/L (LDH in plasma, 459 U/L); ADA, 2.7 IU/L (4.3-20.3). The effusion contained no malignant cells and the culture grew out no microorganisms.

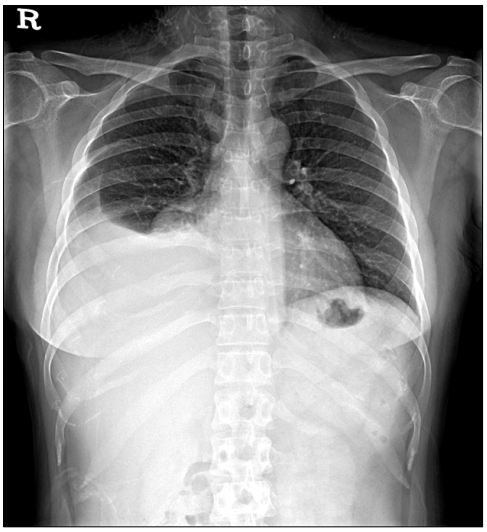

FIG. 1. Chest PA view.

DOI: 10.4068/cmj.2011.47.1.43

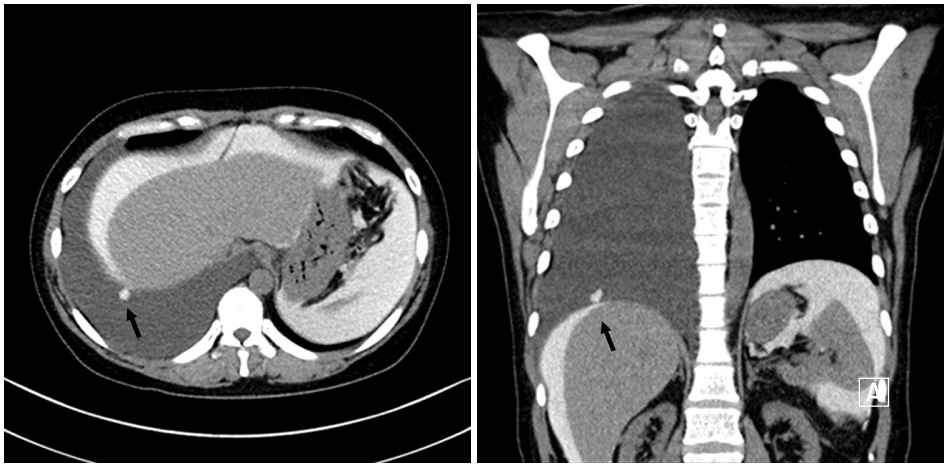

FIG. 2. Chest computed tomography 1 hour after injection of radiocontrast medium into the peritoneal fluid.

THE DIAGNOSIS: PERITONEOPLEURAL FISTULA

We performed chest computed tomography 1 hour after injecting radiocontrast medium intraperitoneally mixed with 4.25% PD solution. The scan showed focal penetration of intra-abdominal contrast medium via the right hemidiaphragm in the right posterior and lower hemithorax, suggesting a small peritoneopleural fistula (Fig. 2).

Pleural effusions and hydrothorax are rare complications in PD patients and result from the migration of dialysis fluid under pressure from the peritoneal cavity into the pleural space.[1,2] Increased intra-abdominal pressure arises either transiently with coughing or straining or permanently from a large volume of PD solution. The mechanism by which peritoneal dialysate transverses the diaphragm is thought to be due to a pleuroperitoneal communication. Trauma frequently causes PD fluid to appear in the thorax. A sudden increase in intra-abdominal pressure opens a communication between the abdomen and the thorax, allowing PD fluid to leak into the thorax.[3] Hydrothorax frequently presents as respiratory distress, particularly dyspnea or shortness of breath. The lung collapses under extreme conditions. Approximately 25% of patients remain asymptomatic. A high glucose level in the pleural effusion is an important clue because no other form of hydrothorax has elevated glucose levels.[4] PD solution in the thoracic cavity presents a unique situation that occurs only in patients receiving PD.

As described in the literature, in most cases, the peritoneopleural fistula is diagnosed by use of scintigraphy. However, scintigraphy is not able to localize a defect in the diaphragm. In the present case, the high glucose concentration in the drained pleural fluid suggested a transdiaphragmatic leakage. We used computed tomography to localize the leakage. MRI has also been attempted to show transdiaphragmatic leakage in a peritoneoflural fistula.[5] Different therapeutic approaches have been reported. Temporary discontinuation of PD, tetracycline instillation into the pleural space, and surgical patch grafting of the diaphragmatic leak have all been described. A novel method may be video-assisted talc pleurodesis.[6] This patient received hemodialysis via a permanent catheter after quitting PD.

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