

## A “Sweet” Pleural Effusion

Clara Pintossi, Mariateresa Castellini, Alice Comaglio, Massimo Salvetti, Maria Lorenza Muiesan\*

Postgraduate School of Emergency Medicine, Clinical and Experimental Sciences Department, University of Brescia and 2° Medicina Generale, Internal Medicine Department, Spedali Civili, Brescia, Italy

\*Corresponding author: Maria Lorenza Muiesan, Postgraduate School of Emergency Medicine, Clinical and Experimental Sciences Department, University of Brescia and 2° Medicina Generale, Internal Medicine Department, Spedali Civili, Brescia, Italy, Tel: +390303998721; E-mail: [marialorenza.muiesan@unibs.it](mailto:marialorenza.muiesan@unibs.it)

Received date: April 02, 2016; Accepted date: May 04, 2016; Published date: May 11, 2016

Copyright: © 2016 Pintossi C, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### Abstract

Pleuroperitoneal leak should be considered in the differential diagnosis of a pleural effusion, especially in patients on peritoneal dialysis. The existence of a pleuro-peritoneal leak is demonstrated by pleural fluid analysis: a transudate with high glucose content similar to the dialysate, together with a normal concomitant blood glucose concentration. Treatments for dialysate leaks include a variety of approaches, depending on the severity of symptoms and signs. We report the case of a 77 year old woman treated with automated peritoneal dialysis since 10 years due to chronic renal failure in polycystic kidney, presenting to the hospital with progressively worsening dyspnea, due to a non-conventional pleural effusion.

**Keywords:** Emergency room; Computed tomography; Dyspnea; Acute heart failure syndrome

### Abbreviations

ADPKD: Autosomal Dominant Polycystic Kidney Disease; ER: Emergency Room; CT: Computed Tomography

### Case Presentation

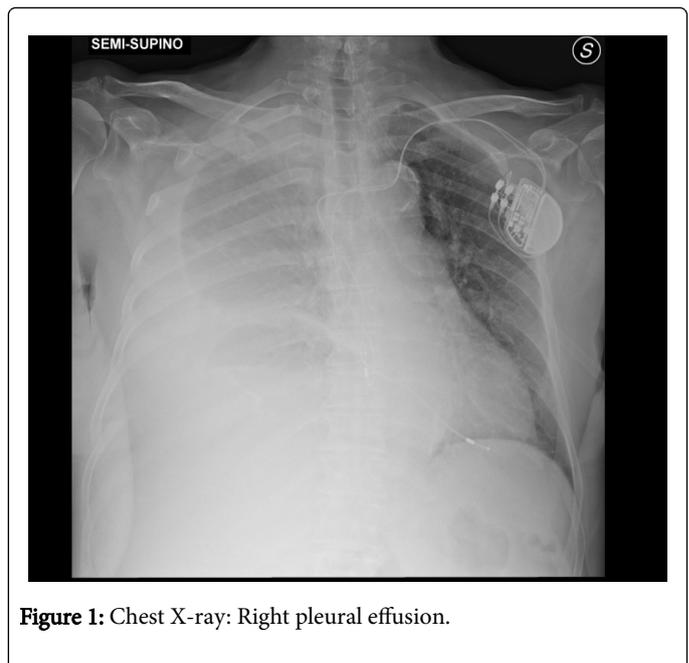
T.T. is a 77 year old woman presenting to the ER with progressively worsening dyspnea and abdominal pain. She had renal failure, due to ADPKD, and she was in treatment with automated peritoneal dialysis since 10 years.

At physical examination there were no signs of heart failure, no peripheral edema, no fever or cough, but decreased/absent breath sounds on the right side. The examination of the abdomen showed a generalized abdominal distention, without tenderness and /or signs of peritoneal catheter exit site infection.

Routine blood tests showed mild leukocytosis. The chest X-ray confirmed the presence of a right sided pleural effusion with a shift of the mediastinum to the contralateral side (Figure 1).

She is admitted to the internal medicine department with the diagnosis of “Right pleural effusion and abdominal pain”.

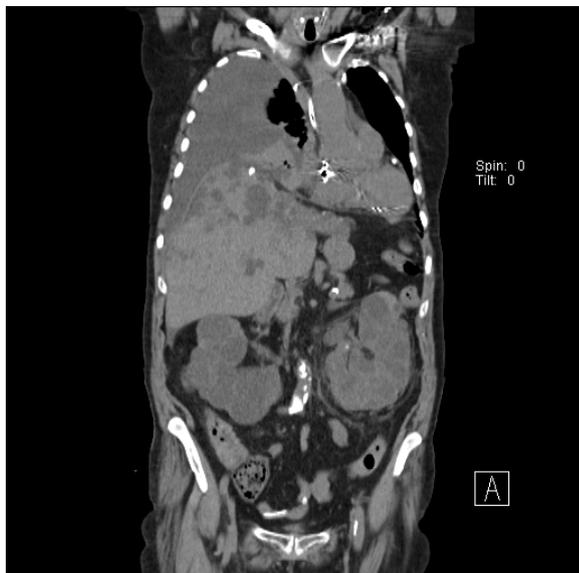
Twenty-four hours after admission she still complained of abdominal pain and developed hematuria. A chest-abdomen computed tomography (CT) scan was prescribed in order to exclude peritoneal dialysis-related peritonitis, to investigate the cause of hematuria and to better define the degree of pleural effusion severity (Figure 2).



**Figure 1:** Chest X-ray: Right pleural effusion.

The CT scan confirmed the massive pleural effusion but showed no peritoneal fluid or bowel distention.

A thoracentesis was performed to investigate the characteristics of the pleural fluid and rule out the major causes of hydrothorax such as inflammatory diseases and/or malignancy. The pleural fluid had a high glucose concentration, despite of a normal blood glucose level, suggesting that the dialysis fluid was leaking from the peritoneum into the pleura.



**Figure 2:** CT scan: Right massive pleural effusion.

## Peritoneal Dialysis Complications

Some of the noninfectious complications that occur in patients on peritoneal dialysis are due to increased intra-abdominal pressure resulting from instillation of dialysate into the peritoneal cavity. These include leaks (hydrothorax or pleuro-peritoneal leaks).

Massive hydrothorax is a rare complication of peritoneal dialysis. The incidence varies from 1.6 to 10 percent [1]. This may occur at any time after the beginning of peritoneal dialysis and in all age groups. Females are more frequently affected and in 66% of cases the effusion is on the right side, likely due to the fact that the left hemi-diaphragm is usually thicker and more muscular. In autopsy studies, discontinuities in the tendinous portions have been reported especially in the right hemidiaphragm, supporting the presence of congenital right-sided diaphragmatic defects.

Patients with polycystic kidney disease are predisposed to develop pleuro-peritoneal leaks [2]. The commonest symptom at the time of diagnosis is progressive dyspnea. The pathophysiologic mechanisms involved are either a congenital or an acquired anatomical defect in the diaphragm. The presence of dialysis fluid in the abdominal cavity during peritoneal dialysis increases intra-abdominal pressure and may lead to the dialysis fluid leaking from acquired or congenital defects in the abdominal and thoracic wall [3].

As observed in this patient, an hydrothorax, which appears after several months on peritoneal dialysis, should raise the suspicion of an acquired diaphragmatic defect secondary to increased intra-abdominal pressure, leading to collagenous fibers disruption, and rupture of the pleural layers.

## Diagnosis

Any investigations should be safe, reliable, reproducible and cost effective. Successful treatment depends on the demonstration of a trans-diaphragmatic leak through an anatomical defect.

In a ADPKD patient with hydrothorax the existence of a pleuro-peritoneal leak is demonstrated by pleural fluid analysis: a transudate with a high glucose content similar to the dialysate, together with a normal concomitant blood glucose concentration [2].

## Management

Treatments for dialysate leaks include surgical or pleuroscopic repair, temporary transfer to hemodialysis, lower dialysate volumes, peritoneal dialysis with a cyclor. Recent recommendation proposes a standard approach to the treatment of early and late dialysate leaks: 1-2 weeks of rest from peritoneal dialysis and surgery if recurrence occurs. Chemical pleurodesis may be offered to the patient with recurrent pleural effusion, unresponsive to conservative measures, who needs and/or desires to continue with peritoneal dialysis. A paucity of literature exists concerning the effectiveness of such therapy.

Surgical correction of an identified diaphragmatic defect can also be performed but requires thoracotomy; this has led some investigators to suggest that thoracoscopy should precede surgery to ensure that a visible and repairable communication is identified.

Surgical repair has been strongly suggested only for leakage causing genital swelling, but not for that causing pleural effusion [4].

Despite the various treatment options, management of hydrothorax depends on the severity of symptoms and signs. We can conclude that small effusions need no specific treatment and in patients with respiratory failure the treatment of choice is immediate cessation of peritoneal dialysis followed by thoracentesis and institution of hemodialysis.

Peritoneal dialysis may also be continued if the estimated duration of dialysis is short, such as the patient who will soon undergo a living, related transplant. Some pleuro-peritoneal leaks spontaneously resolve (often after temporary transfer to hemodialysis), but most patients with ultimately require permanent transfer to hemodialysis [5].

## Discussion

Pleuroperitoneal leak should be considered in the differential diagnosis of a pleural effusion, such as congestive cardiac failure, hypoalbuminemia, or fluid overload, particularly when a right sided effusion develops in a patient on peritoneal dialysis.

Although there is no agreement concerning the optimal treatment, intermittent peritoneal dialysis may be continued at lower fill volume, in patients who are at risk with either hemodialysis, surgical treatment or pleurodesis.

In this case the patient was switched to hemodialysis treatment. No other diagnostic procedures were performed in order to identify the cause of the peritoneal leak.

## References

1. Nomoto Y, Suga T, Nakajima K, Sakai H, Osawa G, et al. (1989) Acute hydrothorax in continuous ambulatory peritoneal dialysis--a collaborative study of 161 centers. *Am J Nephrol* 9: 363-367.
2. Lew SQ (2010) Hydrothorax: pleural effusion associated with peritoneal dialysis. *Perit Dial Int* 30: 13-18.
3. Szeto CC, Chow KM (2004) Pathogenesis and management of hydrothorax complicating peritoneal dialysis. *Curr Opin Pulm Med* 10: 315-319.

4. Abraham G, Shokker A, Blake P, Oreopoulos DG (1988) Massive hydrothorax in patients on peritoneal dialysis: A literature review. *Adv Perit Dial* 4: 121.
5. Simmons LE, Mir AR (1989) A reviews of management of pleuroperitoneal communication in five CAPD patients. *Adv Perit Dial* 5: 81-83.