Sweet Hydropneumothorax: Pleural Effusion complicated by Peritoneal Dialysis

Priyanka Upadrasta MD, Hiba Ambreen MD

AtlantiCare Regional Medical Center, Atlantic City, N.J., U.S.A.

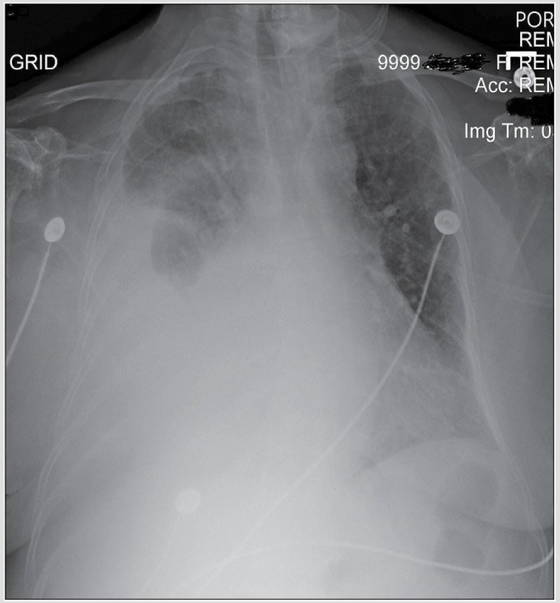
Introduction

Sweet hydrothorax is a rare but potentially life-threatening complication of Peritoneal Dialysis (PD). Hence it is extremely important for the clinicians to be aware of this complication when managing the patients on PD.

Case presentation

58 year-old female with past medical history of HTN, membranous glomerulonephritis complicated by ESRD on PD presented with fever, cough, dyspnea for 2 weeks. On admission, she was tested positive for for COVID-19 pneumonia with increasing oxygen requirements. A Chest X-ray was showed patchy bilateral airspace opacities predominately on the left side along with moderate right pleural effusion and right apical pneumothorax. She was medically managed for COVID 19 symptoms with antibiotics and steroids while saturating at low 90s on non-rebreather.

She was subsequently transferred to ICU for worsening acute hypoxic respiratory failure. Repeat Chest X-ray showed a large right sided pleural effusion with mediastinal shift. Right sided chest tube yielded 1.9L serous fluid. Chest tube placement improved clinical status. Biochemical analysis of pleural fluid was transudative in nature. It has low protein and LDH levels but has elevated glucose content: pleural fluid glucose concentration was 377mg/dL compared with a simultaneous serum glucose concentration of 227mg/dL. Immediately, PD was stopped, and she was started on HD which resulted in improvement in her overall clinical picture.



Discussion

The prevalence of hydrothorax secondary to PD is estimated to be 2%. It manifests as a unilateral effusion and tends to occur on the right side in majority of the cases. This right sided predominance is described under a spectrum of disorders that fall under an umbrella phrase - porous diaphragm syndrome. It could be attributed to congenital diaphragmatic defects, coverage of left side with anatomical structures in the mediastinum and other non congenital reasons include those that cause high intra abdominal pressures . These causes to form an abnormal pleuroperitoneal fistula causing the peritoneal fluid to leak back into the pleural space. The dialysate that is used in PD is composed of dextrose transmigrates against the gravity from the peritoneum through the diaphragm into the pleura causing an effusion.

Diagnostic thoracocentesis and pleural fluid analysis is the simplest way to make the diagnosis. Biochemical studies of Pleural fluid revealing an elevated glucose levels in pleural fluid compared to that serum glucose levels is highly indicative of PD associated hydrothorax. A glucose gradient of more than 50 mg/dL (2.7 mmol/l) has 100% specificity and sensitivity. However recent studies have shown that this approach has variable sensitivity and instead of utilizing the PF-Gradient, using PF-S glucose ratio is much more beneficial in few cases of PD related hydrothorax that has low PF-S glucose gradient. PF-F ratio >1 has higher sensitivity and argues in favor of pleuroperitoneal fistula as the cause of PD associated effusion .

Confirmatory tests for definitive diagnosis to demonstrate pleuroperitoneal communication is radiological assessment. Peritoneal scintigraphy, CT peritoneography with intraperitoneal contrast and methylene blue or Tc-99m sulfur colloid infusion studies have been used to diagnose and locate the fistula. However, all these tests confer low sensitivity .

PD related hydrothorax can be managed both conservatively and invasively depending on the size of the defect and effusion. Conservative management of includes temporary discontinuation of PD and conversion to HD for about 2-6 weeks. In cases, if conservation therapy fails, there are multiple invasive procedures like chemical pleurodesis using agents like talc insufflation technique have been shown to be effective in some cases. Invasive surgical correction using either open surgery or video-assisted thoracoscopic surgery have a high success rate with 90% of cases experiencing no PD associated hydrothorax recurrence

Conclusion

Our case demonstrates an uncommon but serious complication of PD. Early diagnosis and management is the key in such cases. Hence it needs consideration and awareness. A high degree of suspicion is necessary when managing PD patients who develop new onset unilateral pleural effusion.