Sweet Hydropneumothorax: pleural effusion complicated by peritoneal dialysis

Abstract

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

Here, we present the case of a 58-year-old female patient with past medical history of ESRD on PD, who was admitted for management of COVID-19 pneumonia symptoms. Her condition deteriorated and transferred to ICU for acute hypoxic respiratory failure. X-ray has shown a massive right-sided pleural effusion with mediastinal shift. Pleurocentesis with pleural fluid studies helped to diagnose her with hydrothorax that has high glucose levels. Immediate cessation Of PD and transition to HD helped patient recover and was later discharged from the hospital.

Case presentation

58 year-old female with past medical history of HTN, membranous glomerulonephritis complicated by ESRD on peritoneal dialysis presented to the hospital with fever, cough, dyspena since 2 weeks before admission. She was subsequently tested positive for COVID-19 pneumonia with increasing oxygen requirements. A Chest X-ray was performed which 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 requiring HFNC at 100% FiO2 saturating at 93%. On auscultation, patient had diminished breath sounds bilaterally. Repeat Chest X-ray was performed which showed a large right sided pleural effusion with mediastinal shift. Right sided chest tube yielded 1.9L serous fluid from the pleural space. Over the course of her hospital stay, she went through chest tube drainage twice, which improved her clinical status. The drained fluid is straw colored sent for biochemical analysis. Laboratory findings characterized the fluid to be a transudative in nature. It has low protein and LDH levels but has elevated glucose content; no organisms were cultured and no neoplastic cells were visualized. The pleural fluid glucose concentration was 377mg/dL compared with a simultaneous serum glucose concentration of 227mg/dL. Immediately, PD was halted and she was started on HD which resulted in improvement in her overall clinical picture.

Discussion

PD is one of most commonly used dialysis procedures nowadays due to its easier technique and better lifestyle. But it has its own complications and one of such rare and life threatening

complications is PD associated hydrothorax. Majority of these cases occur within 30 days of initiating PD.

The prevalence of hydrothorax secondary to PD is estimated to be 2% with a higher female predominance. 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 make way 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 analysis of Pleural fluid is usually 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.4 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 pleuroperitonial 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 depeding 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 our patient presented in this care report, conservation management helped the patient recover. In cases, if conservation therapy fails, there are multiple invasive procedures that can be done. 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.