HOSPITAL PHYSICIAN®

NEPHROLOGY BOARD REVIEW MANUAL

Complications of Peritoneal Dialysis

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Complications of Peritoneal Dialysis

INTRODUCTION

Peritoneal dialysis (PD) is a form of renal replacement therapy that is primarily limited to patients with end-stage renal disease (ESRD) who have had previous minimal abdominal surgery. Multiple abdominal surgeries can produce adhesions that reduce the surface area of the peritoneal membrane, which is an important determinant of the clearance of solutes from the blood. PD takes advantage of the permeability characteristics of the peritoneal membrane, particularly its ability to hinder the movement of glucose from the peritoneal space into the circulation. The osmotic gradient created by the instillation of hypertonic solutions (which are principally dextrose-based) is responsible for the removal of urea and creatinine from the blood (solute clearance) and translocation of fluid (ultrafiltration).

After a PD catheter has been surgically placed into a patient's lower abdomen, dialysate exchanges ideally are not initiated for 2 to 3 weeks to allow for adequate healing of the incision and to prevent leakage of dialysate fluid. A typical continuous ambulatory PD (CAPD) prescription consists of 4 exchanges of a dextrose solution per day, with each dwell containing 2 L of fluid. Generally, a final daily exchange is performed, and the solution is allowed to dwell overnight.

Continuous cycling PD (CCPD) is an automated exchange system that allows patients to connect their PD catheter to a computerized cycler during the night while they are sleeping. The cycler regulates the frequency and volume of the exchanges. A typical CCPD regimen consists of 3 to 5 infusions overnight, with a final infusion of fluid that may dwell for 12 hours during the daytime.

Initially, patients' lifestyles and preferences are used to determine whether CAPD or CCPD is the most appropriate treatment modality. However, complications of PD may require modification of the modality and regimen of exchanges employed.

This review describes 3 complications that are commonly associated with peritoneal dialysis: PD-related peritonitis, ultrafiltration failure (UFF), and decreased effective solute clearance.

CASE PATIENT 1: PERITONITIS

INITIAL PRESENTATION

A 45-year-old man who is on CCPD presents to the emergency department (ED) with diffuse morning abdominal pain and cramping as well as a cloudy dialysate effluent.

History

The patient was started on CCPD 1 month ago after developing ESRD secondary to polycystic kidney disease. His treatment regimen consists of 5 2-L exchanges of 2.5% dextrose solution. After the last exchange for the day, the patient infuses 2 L of 1.5% dextrose solution to dwell for 6 hours. After some questioning, the patient reveals that he dropped the bag connector on the floor and connected it to the catheter without first sterilizing it.

Physical Examination

In the ED, the patient has an oral temperature of 38°C and a standing blood pressure of 142/82 mm Hg. Abdominal examination reveals diffuse tenderness and rebound pain. No expressible drainage is observed from the patient's PD catheter site.

Initial Laboratory Testing

Laboratory studies reveal a peripheral leukocyte count of 15,000/mm^3, 92% of which are neutrophils. The effluent contains 22,300 leukocytes, 90% of which are neutrophils. A Gram stain of the effluent reveals only neutrophils; no organisms are found. Liver function

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