

Management of Peritonitis



A. Clinical Presentation and Diagnosis of Peritonitis¹

Peritonitis is diagnosed when at least two of the following three criteria are present:

1. Clinical features like abdominal pain and/or cloudy dialysis effluent.
2. White cell count $>100/\mu\text{L}$ or $>0.1 \times 10^9/\text{L}$ in the dialysis effluent (after a dwell time of at least 2 hours) with $>50\%$ polymorphonuclear cells.
3. Positive dialysis effluent culture.
 - Peritoneal dialysis effluent should be tested for cell count, differential leukocyte count, Gram stain, and culture whenever peritonitis is suspected.
 - Peritoneal dialysis patients should be presumed to have peritonitis when cloudy effluent is presented, until proven otherwise.

B. Differential Diagnosis of Cloudy Effluent¹

Cellular causes

PMN leukocytes

- Culture-positive infectious peritonitis
- Infectious peritonitis with sterile cultures
- Chemical peritonitis

Eosinophils

- Dialysate eosinophilia
- Chemical peritonitis

Monocyte/macrophages

- Specimen taken from 'dry' abdomen (after prolonged peritoneal rest)

Red blood cells

- Hemoperitoneum

Malignant cells

- Lymphoma
- Peritoneal metastasis

Non-cellular causes

Fibrin

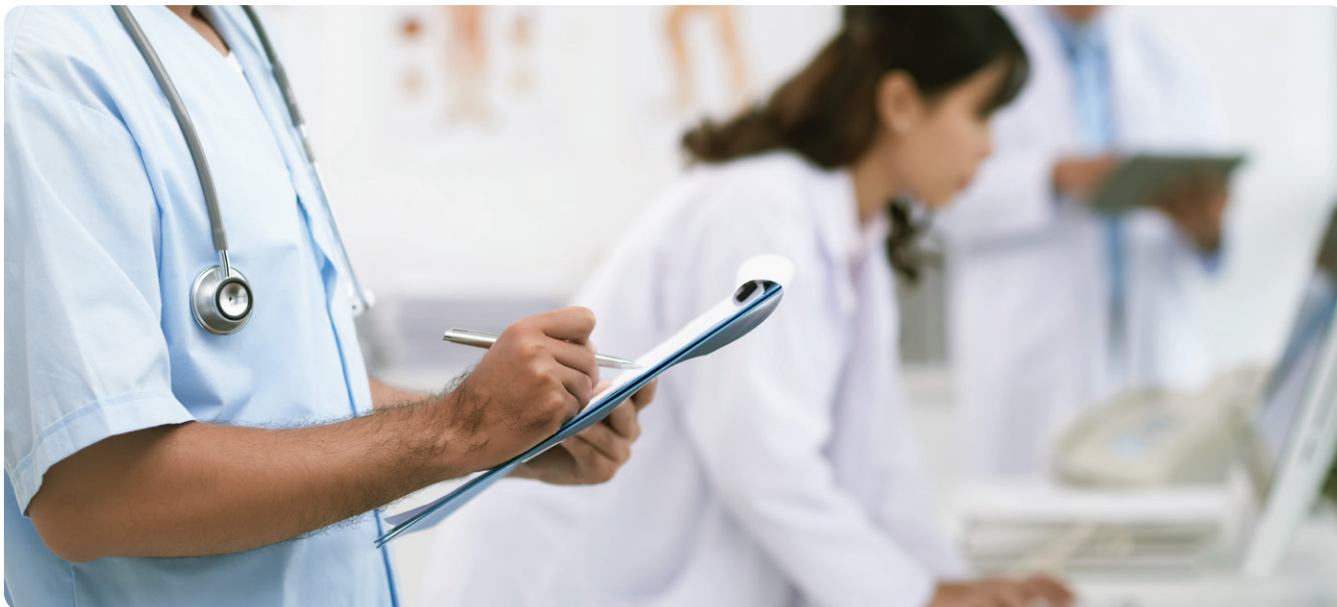
Triglycerides

(milky white appearance of effluent)

- Calcium channel blockers
- Lymphatic obstruction
- Acute pancreatitis



Key Activities



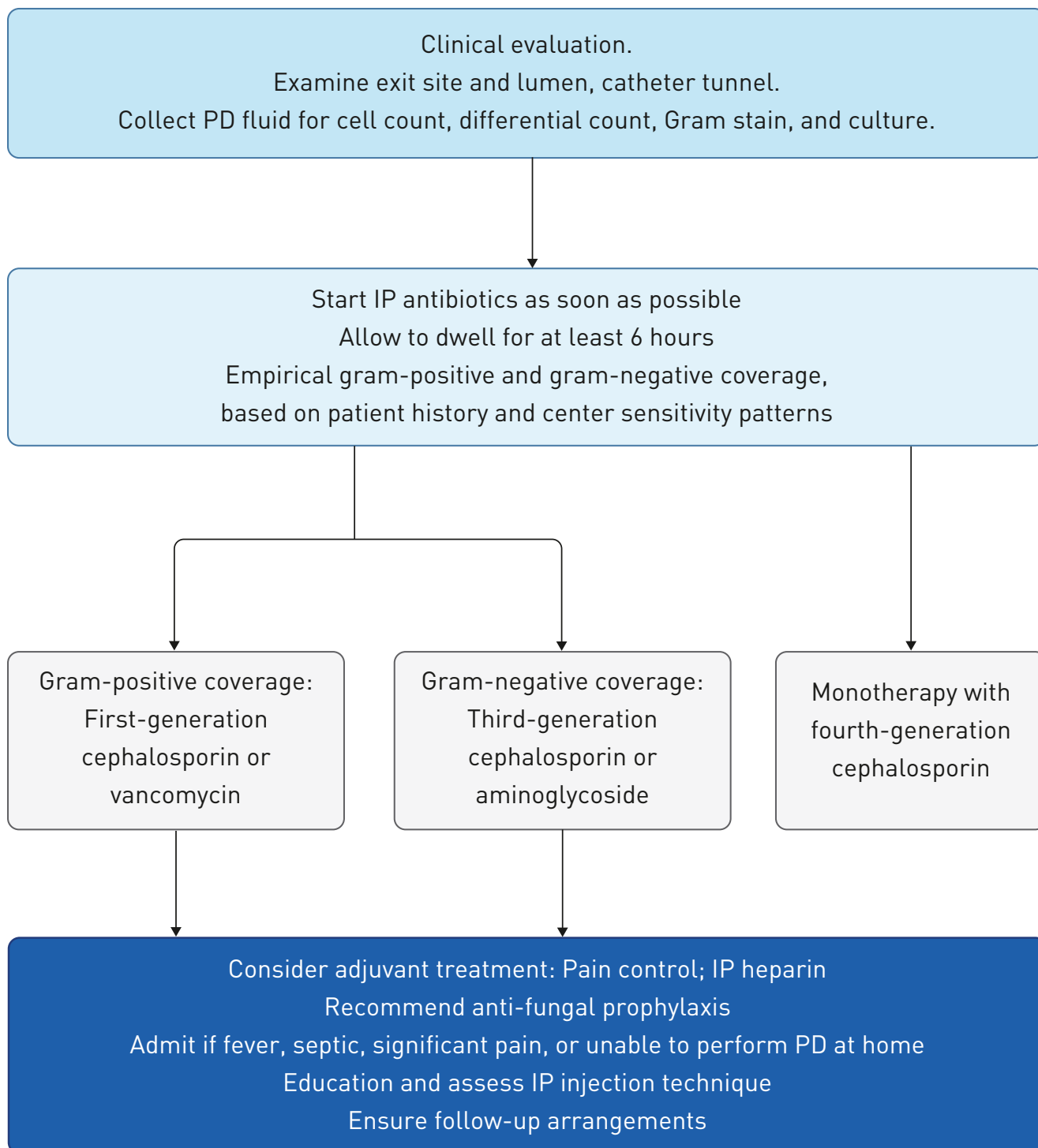
1. Perform physical exam, including abdominal palpation, degree and location of pain, exit-site, and tunnel assessment.
2. Disconnect the drained bag and send the *sample to the laboratory for cell count in addition to differential, Gram staining, and culture. Dwell time should be at least 2 hours.¹
3. Inoculate two blood culture bottles (aerobic and anaerobic) with 5–10 mL of effluent.¹
4. After specimen collection, initiate empiric IP antibiotics as soon as possible, even if only cloudy effluent is present.¹
5. In the presence of cloudy effluent, add heparin 500 U/L to a new bag to prevent occlusion of the catheter by fibrin.¹
6. Initiate adequate pain management intervention such as analgesics.¹
7. Assess the need for hospitalization.
8. Review the following with the patient:
 - Possibility of a break-in technique, compliance to hand hygiene, and mask use.
 - Recent procedures, constipation, diarrhea, and antibiotic use.
 - Peritonitis and exit-site infection history and treatment.
 - Use of exit-site prophylaxis.
9. Schedule for follow up and retraining where applicable.

*First cloudy bag or an aliquot thereof.

IP: Intraperitoneal.



Initial Peritonitis Management



Subsequent management of peritonitis include continued assessment and modification of therapy based on culture and sensitivity results; refer to subsequent sections for specific organisms cultured.¹ Exchange that contains antibiotics must be a minimum 6-hour dwell.¹

For more information on the use of antibiotics and subsequent management of peritonitis, refer to the 2022 ISPD guidelines.¹

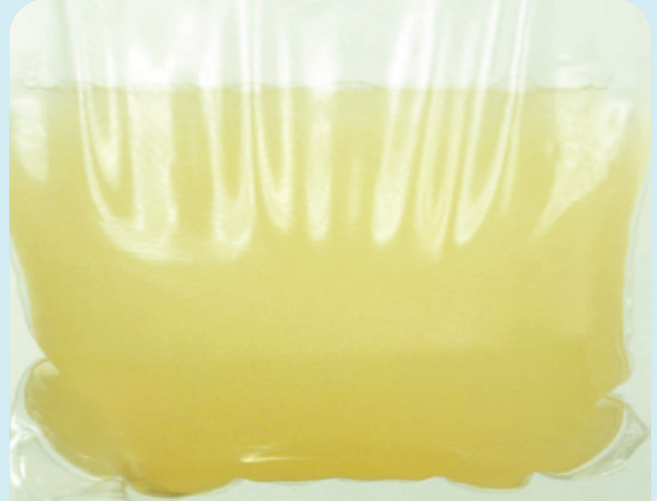
PD: Peritoneal Dialysis; ISPD: International Society for Peritoneal Dialysis.



Patient Education



Abdominal pain



Cloudy effluent

- Instruct the patient to report immediately to the PD unit if there is cloudy effluent, abdominal pain, and fever.
 - Instruct the patient to collect drained cloudy dialysate and bring it to the clinic.
 - Make sure to obtain specimens before the initiation of antibiotics.
 - Stress on 100% antibiotic compliance by patients.
 - Instruct the patient to report persistent cloudiness to the PD unit.



- Teach aseptic technique with emphasis on hand hygiene.³
- Emphasize on routine exit-site care as per hospital protocol to prevent exit-site infection.⁴
- Teach contamination recognition and proper response with focus on:³
 - Breaks in PD system
 - Touch contamination.
- Teach patients to report constipation and diarrhea immediately.⁵
- Teach patients to report pending dental work, colonoscopies, or other invasive procedures to implement antibiotic prophylaxis.⁶



Indications for Peritoneal Catheter Removal

*Refractory peritonitis

Failure of the PD effluent to clear after 5 days of appropriate antibiotics or earlier if patients' clinical condition is deteriorating.

**Relapsing, recurrent and repeat peritonitis.

Fungal peritonitis.

Peritonitis with concomitant exit site and tunnel infection,
e.g.: *Staphylococcus aureus*, *Pseudomonas*.

Adapted from: Li PK *et al.* 2022.

*Observation for antibiotic effect longer than 5 days is appropriate if PD effluent white cell count is decreasing towards normal, instead of mandatory PD catheter removal if effluent does not clear up by day 5.

**Simultaneous PD catheter removal and re-insertion be considered after culture of the PD effluent has become negative and the PD effluent white cell count is below 100/mL, in the absence of concomitant exit site or tunnel infection.¹

For more information on indications of catheter removal, refer to the 2022 ISPD guidelines.¹



Measuring, Monitoring and Reporting Peritonitis



- PD-related and organism-specific peritonitis rates
- Antimicrobial susceptibilities of the infecting organisms
- Culture-negative peritonitis (should be <15% of all peritonitis episodes)
- Peritonitis outcomes
- Mean time to first peritonitis episode
- Percentage of patients free of peritonitis per unit time
- Pre-PD peritonitis

Adapted from: Li PK *et al.* 2022

ISPD guidelines suggest a rate of not more than 0.4 peritonitis episodes per year at risk.¹

Every program should monitor, at least on a yearly basis, the incidence and outcomes of peritonitis.¹

References

1. Li PK, Chow KM, Cho Y, *et al.* ISPD peritonitis guideline recommendations: 2022 update on prevention and treatment. *Perit Dial Int.* 2022;42(2):110–153. 2. Li PK, Szeto CC, Piraino B, *et al.* Peritoneal dialysis-related infections recommendations: 2010 update. *Perit Dial Int.* 2010;30(4):393–423. 3. Bernardini J, Price V, Figueiredo A. ISPD Guidelines/Recommendations: Peritoneal dialysis patient training 2006. *Perit Dial Int.* 2006;26(6):625–632. 4. Szeto CC, Li PK, Johnson DW, *et al.* ISPD Catheter-Related Infection Recommendations: 2017 Update. *Perit Dial Int.* 2017;37(2):141 – 154. 5. Szeto CC, Li PK. Peritoneal dialysis-associated peritonitis. *Clin J Am Soc Nephrol.* 2019;14(7):1100–1105. 6. Piraino B, Bernardini J, Brown E, *et al.* ISPD position statement on reducing the risks of peritoneal dialysis-related infections. *Perit Dial Int.* 2011;31(6):614–630.