

Peritoneal Dialysis-related Peritonitis Clinical Outcomes: A systematic review

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ABSTRACT

Peritoneal dialysis (PD)-related peritonitis is one of the most common complications and may lead to mechanical failure and death. This may cause by gram-positive, gram-negative, fungal, and sometimes the culture was sterile. This study aims to review the outcomes of PD-related peritonitis. Online searching was performed on PubMed, ScienceDirect, Cochrane, and Google Scholar following PRISMA guidelines. We used the search term peritoneal dialysis, peritonitis, continuous ambulatory peritoneal dialysis, continuous cyclic peritoneal dialysis, and exit-site infection. After a full-text assessment for eligibility, eight articles were included in this review. We found death outcomes were in the range of 1.4 to 9%. Approximately 7.2% to 19.3% were transferred to HD according to four articles. Catheter removal within the range of 5.1% to 25%. Relapse cases varied widely from 1.5% to 12%. Recovery rates were predominant over all of the clinical outcomes from 65% to 82.4%. Although recovery rates of PD-associated peritonitis were high, peritonitis still remained the most common cause of conversion to HD, PD catheter removal, and mortality. Prevention should be the priority to avoid complications and increase mortality rate by daily exit site care and antibiotic prophylactic prior to catheter placement was recommended.

Keywords: Peritoneal Dialysis, Peritonitis, Outcomes, Recovery, Death

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INTRODUCTION

Peritoneal dialysis was first introduced by Georg Ganter in 1923 and was developed throughout the 20th century as one of therapy for end-stage renal disease besides hemodialysis (HD) and renal transplantation. During Peritoneal Dialysis (PD), solutes and water are exchanged through peritoneal capillaries and dialysate peritoneal fluid through a catheter which then the solution of dialysis is packaged in plastic bags. This portable method certainly increased patients' quality of life and productivity without any interruption of the need to go to the hospital or dialysis center. Not only does it provide more patients freedom, but it is also better at maintaining residual renal function. (Al-Natour & Thompson, 2016; Andreoli & Totoli, 2020)

Certainly, it doesn't mean that it comes without limitations. Peritoneal dialysis still has complications including pericatheter leak, dysfunction of the catheter, hernia due to elevated intra-abdominal pressure, hydrothorax, edema and ultrafiltration failure, weight gain, hypertriglyceridemia, hyperglycemia, encapsulating peritoneal sclerosis, and infection. The most serious complication of PD is peritonitis which may lead to technical failure and death. The cause of such cases could vary from gram-positive bacteria, gram-negative bacteria, or fungal, and sometimes the culture was sterile. (Andreoli & Totoli, 2020)

Peritonitis often recurs within a month of the previous episode with the same organism in the culture. If within the fifth day of treatment peritonitis has not shown a response, it is considered refractory peritonitis and catheter removal should be done prior to transferring to HD. (Al-Natour & Thompson, 2016; Andreoli & Totoli, 2020) There are several types of clinical outcomes of PD-related peritonitis including recovery, recurrent, refractory, and death. The aim of this study is to systematically review the outcomes of peritoneal dialysis-related peritonitis.

RESEARCH METHOD

Eligibility criteria

Studies were included if they met the following criteria:

- a. Published in English and full-text was available
- b. Published between 2016 and 2021
- c. Participants who were diagnosed with peritoneal dialysis-related peritonitis
- d. Clinical outcomes of peritoneal dialysis-related peritonitis include recovery, relapse, PD catheter removal, transfer to HD, and death.

Exclusion criteria for the studies as follows:

- a. Non-english articles
- b. Case report, case series, and literature review articles
- c. Articles without full-text

Guidelines

Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) was used in reporting this study. The flow diagram can be found in Fig. 1.

Search strategy

Literature search was performed on PubMed, ScienceDirect, Cochrane and Google Scholar following PRISMA guidelines. The search was conducted on December 23th, 2021 using the search term peritoneal dialysis, peritonitis, PD, continuous ambulatory peritoneal dialysis, continuous cyclic peritoneal dialysis, and catheter infections.

Data extraction

One reviewer selected literature and extracted the data into an Excel database. The titles and abstracts were screened to determine the eligible articles by two reviewers. Then, we did a full-text review to obtain detailed information. Data were extracted by two reviewers independently. Information on the author, study design, publication year, sample size, and peritonitis outcomes were extracted to MS Excel. Any discrepancies among the observers were discussed until a consensus is reached.

RESULTS AND DISCUSSION

Study Selection

Systematic online searching from databases resulted in 311 articles. We checked for duplicates leaving 229 articles. A total of 23 articles were found to be eligible for this study. Six review studies, eight articles that focused on another topic of interest, and one non-English article were excluded. Eight articles were included in this review after a full-text assessment for eligibility.

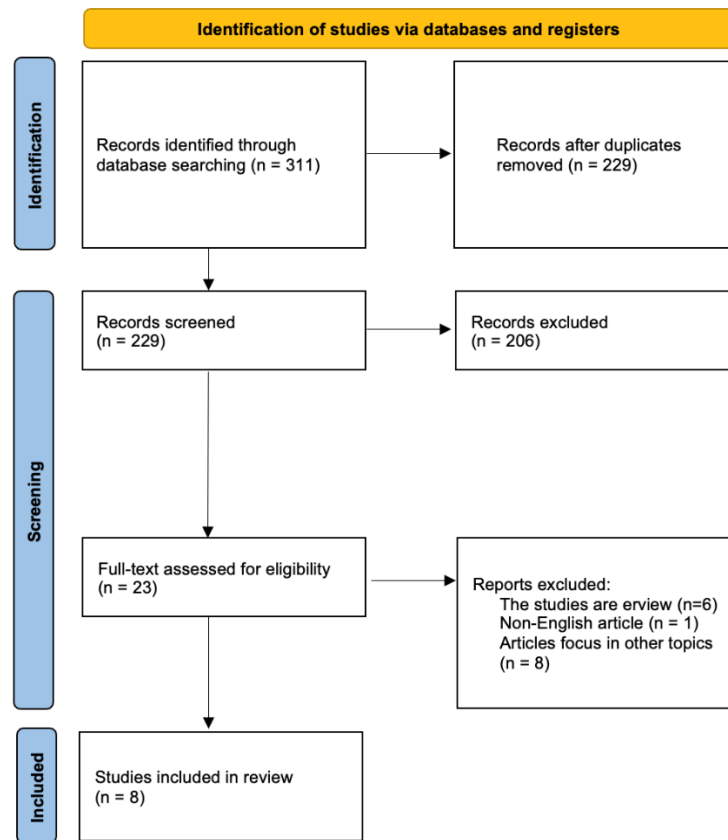


Figure 1 PRISMA flow diagram of study selection

Study Characteristics and Key Findings

Each of reviewed article’s characteristics are listed in Table 1. A total of 11,124 participants who were diagnosed with peritoneal dialysis-related peritonitis with data on clinical outcomes were recruited in this study.

Al-Sahlawi et al.(Al Sahlawi et al., 2021) used both continuous ambulatory PD and automated PD conducted in the 7 countries of Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS). Wu et al.(Wu et al., 2020), Hu et al.(Hu et al., 2018), and Pindi et al(Pindi et al., 2020). uses CAPD as their PD modality. Meanwhile AlZabli et al⁹. and Pina et al¹⁰. utilized APD in their studies. Abraham et al.(Abraham et al., 2017), and Htay et al.(Htay et al., 2018) used both CAPD and APD but no data on the percentage availability of each modality. Duration of dialysis are presented in Table 1.

Al Sahlawi et al.(Al Sahlawi et al., 2021) using continuous ambulatory (CAPD) and automated peritoneal dialysis (APD) showed cure rates were achieved in 65% of episodes, relapsing/recurrent peritonitis occurred in 9% of episodes, PD catheter removal in 21%, HD transfer in 16%, and death within 50 days occurred in 6%. The relapse/recurrent event was not in itself considered a separate and independent peritonitis event in the analysis. A study by Wu et al.(Wu et al., 2020) revealed outcomes of recovery rate at 79.3%, 7.2% of transfer to HD, 6.3% developed relapse or recurrent peritonitis, and 7.2% of peritonitis-associated death.

A study from Saudi Arabia by Al Zabli et al.(AlZabli et al., 2021) showed that 73.6% of its population recovered from PD-associated peritonitis, 25% had the outcome of PD catheter removal, and 1.4% resulted in death. A studt from Spain by Pina et al revealed outcomes of recovert rate at 77.8%, 9.6% relapse or recurrent peritonitis, 10.8% transfer to HD, and 1.8% resulted in death. Hu et al.(Hu et al., 2018) showed 82.4% of cure rates, 1.5% of relapse, 5.1% of recurrence, 2.9% of repeat peritonitis, 5.1% of PD catheter-removal, and 2.9% PD peritonitis-associated death. ¹⁰ Pindi et al.(Pindi et al., 2020) reported 77% recovery, 9% of relapse, 4% recurrent, 4% refractory, 2% repeat, 15% PD catheter removal, and 2.6% of death. Abraham et al. conducted a multicenter nationwide study in India denoted the complete cure rate was 70% and the death rate was 5.7%.(Abraham et al., 2017) An Australian national registry analysis establish that cure of 69%, relapse of 12%, catheter removal of 19%, conversion to HD of 18%, and mortality was 9%.(Htay et al., 2018)

Table 1. Study Characteristics

Author	Country	Year of Publication	Study Design	Total participants	PD modality	Dialysis Duration
Al Sahlawi et al.(Al Sahlawi et al., 2021)	Australia, New Zealand, Canada, Japan, Thailand, the United Kingdom, the United States	2021	Observational prospective cohort study	1.190	Continuous ambulatory PD (CAPD) and Automated PD (APD)	N/A
Wu et al. (Wu et al., 2020)	China	2020	Retrospective clinical study	1.953	CAPD	<6-48 months
AlZabli et al.(AlZabli et al., 2021)	Saudi Arabia	2020	Retrospective clinical study	131	APD	N/A
Pina et al.(de la Espada Piña et al., 2021)	Spain	2020	Observational prospective cohort study	2.904	APD	38.3 ± 13.3 months
Hu et al.(Hu et al., 2018)	China	2018	Observational prospective cohort study	278	CAPD	6–92 months
Pindi et al.(Pindi et al., 2020)	India	2020	Prospective, observational, cross-sectional study	75	CAPD	N/A
Abraham et al.(Abraham et al., 2017)	India	2020	Prospective cohort study	244	CAPD and APD	0.4–187.3 months
Htay et al.(Htay et al., 2018)	Australia	2017	Retrospective cohort study	4,428	CAPD and APD	N/A

Table 2. PD-related Peritonitis Outcomes

No	Reference	Peritonitis outcomes					
		Recovery	Relapse/Recurrence	PD Catheter removal	Transfer to Hemodialysis	Renal transplantation	Death
1	Al Sahlawi et al. (Al Sahlawi et al., 2021)	65%	9%	21%	16%	-	6%
2	Wu et al. (Wu et al., 2020)	79.3%	6.3%	-	7.2%	-	7.2%
3	AlZabli et al. (AlZabli et al., 2021)	73.6%	-	25%	-	-	1.4%
4	Pina et al. (de la Espada Piña et al., 2021)	77.8%	9.6%	10.8%	-	-	1.8%
5	Hu et al. (Hu et al., 2018)	82.4%	Relapse 1.5% Recurrent 5.1% Repeat 2.9%	5.1%	-	-	2.9%
6	Pindi et al. (Pindi et al., 2020)	77%	Relapse 9% Recurrent 4% Refractory 4% Repeat 2%	15%	-	-	2.6%
7	Abraham et al. (Abraham et al., 2017)	70%	-	-	19.3% (HD or transplant)	-	5.7%
8	Htay et al. (Htay et al., 2018)	69%	12%	19%	18%	-	9%

Table 3. Causative Organisms

Reference	Causative microorganism			
	Gram-positive organisms (%)	Gram-negative organisms (%)	Others (%)	Culture-negative (%)
Wu et al. (Wu et al., 2020)	36.9	20.7	6.3 (fungi)	21.6
AlZabli et al. (AlZabli et al., 2021)	50.1	26	3.4 (fungi)	20.5
Pina et al. (de la Espada Piña et al., 2021)	55.9	13.2	2.3 (fungi)	9.6
Hu et al. (Hu et al., 2018)	52.8	17.4	2.8 (fungi)	25.7
Pindi et al. (Pindi et al., 2020)	31.1	62.3	6.4	0
Abraham et al. (Abraham et al., 2017)	33	43	13.3 (fungi), 2.2 (M. Tuberculosis)	64.7

Peritoneal dialysis (PD)-related peritonitis is a major cause of permanent conversion to HD. It is known to be associated with death and hospitalization, high treatment costs, and chronic adverse sequelae to the anatomy and physiology of the peritoneal membrane.(Perl et al., 2020) It is a main compound of quality control for any given PD program and a core measurement for monitoring the superiority of programmatic across health assessment.(Marshall et al., 2017)

Peritonitis rates may differ widely between centers, even in the same country or location.(Pindi et al., 2020) The peritonitis rate was 1.6% episodes per patient/year in Saudi Arabia, 0.40 in Thailand, 0.38 in the United Kingdom, 0.35 in Australia/New Zealand, 0.29 in Canada, 0.27 in Japan, and 0.26 in the United States.(Perl et al., 2020) Recommendations by International Society Peritoneal Dialysis (ISPD) state that peritonitis rates should be less than 0.5 episodes per patient/year.(Szeto & Li, 2019)

One of the most important risk factors of PD-related peritonitis is exit-site and catheter infection as a consequence of tunnel infection, tube use, poor compliance, and contamination by hand.(Ponce et al., 2018) Other risk factors were old age, smoking, diabetes, obesity, hypoalbuminemia, hypokalemia, low vitamin D intake, and poor exercise.(Wang et al., 2019) Current understanding on the clinical and demographic predictors of peritonitis episodes are still generally unknown.(Ponce et al., 2018)

Chronic kidney disease (CKD) is associated with age-related renal function decline in hypertension, diabetes, obesity and primary renal disorders. As kidney damage progresses the remaining nephrons compensate by increasing the single nephron filtration rate, and this hyperfiltration promotes further injury.(Hill et al., 2016) The most common cause of ESRD reported in the United States population is diabetes, accounting for nearly 45% of all new cases of ESRD starting renal replacement therapy between 1996 and 2000.(McClellan, 2005) Meanwhile hypertension is the most common cause of ESRD in the United States, accounting for 23% of incident ESRD patients between 1996 and 2000.(McClellan, 2005)

The vast majority of causative microorganism of PD-related peritonitis are aerobic bacteria including coagulase-negative staphylococci, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. Peritonitis with sterile culture also found in approximately 30% of cases. Other etiologies for peritonitis are fungi and mycobacteria.(Song et al., 2012) In the present study we constantly find the most common cause of PD-related peritonitis is gram positive except for Pindi et al.(Pindi et al., 2020) which found gram-negative accounts for 62.3% cases and had no sterile culture results.

Diagnosis of PD-related peritonitis criteria consisted of two of the following aspects: (1) clinical manifestation represents consistent with peritonitis, i.e, abdominal pain or cloudy effluent; (2) dialysis effluent white cell count >100/ μ l (after a dwell time of at least 2 hours), with >50% neutrophils; and (3) positive dialysis effluent culture.(Li et al., 2016) The appropriate and early diagnosis is core to initiating antibiotics.(Szeto & Li, 2019) Across six studies we reviewed, all were defined as PD-related peritonitis by the ISPD 2016 criteria.

Outcome-specific definitions of peritonitis were medical cure (defined as complete resolution of peritonitis), refractory peritonitis (defined as peritonitis episode with persistently cloudy bags or persistent dialysis leukocyte count >100 x10⁹/L after 5 days of antibiotic therapy), recurrent peritonitis (an episode that occurs within 4 weeks of completion of therapy with a different organism), relapse peritonitis (an episode that occurs within 4 weeks of completion of therapy with the same organism or negative culture episode), repeat peritonitis (an episode that occurs more than 4 weeks after completion of therapy of a prior episode with the same organism), PD-associated catheter removal (removal of PD catheter as part of the treatment of an active peritonitis episode), PD-associated HD transfer (transfer from PD to HD for any period of time as part of the treatment for a peritonitis episode), and peritonitis-associated death (death occurring within 30 days of peritonitis onset or death during hospitalization due to peritonitis).4,19 Generally the studies we reviewed has the similar definition for those term.

According to PDOPPS, the modality of PD also mention to be related with risk of peritonitis, the study found that CAPD observed to be upper risk than APD.(Al Sahlawi et al., 2021; Perl et al., 2020) It is also associated with cure rate which showed higher in APD modality rather than CAPD.(Al Sahlawi et al., 2021) We found that three studies using APD, while other utilized CAPD modality.

Treatment and prevention of PD-associated peritonitis were usually based on ISPD guidelines. Antibiotics as prophylactic were suggested prior to the insertion of the catheter. Exit site care through daily topical antibiotic cream or ointment such as mupirocin or gentamicin was recommended. PD-associated peritonitis was treated by antibiotics based on the culture results. Vancomycin or first-generation cephalosporin recommend for gram-positive culture while aminoglycoside or third-generation cephalosporin were directed towards gram-negative results. For secondary prevention, it proposes for anti-fungal administration during antibiotic courses to prevent fungal peritonitis.(Li et al., 2016).

In the present study, we found mortality rates were between 1.4% to 9%. Important risk factors for the first event of peritonitis in the elderly were advanced age, assistance-assisted PD, high BMI, and hypoalbuminemia. Approximately 7.2% to 19.3% were transferred to HD according to three articles.(Al Sahlawi et al., 2021; AlZabli et al., 2021; Wu et al., 2020) Catheter removal was within the range of 5.1% to 25%. Relapse cases varied from 1.5% to 12%. Recovery rates were predominant over all of the clinical outcomes from 65% to 82.4%.

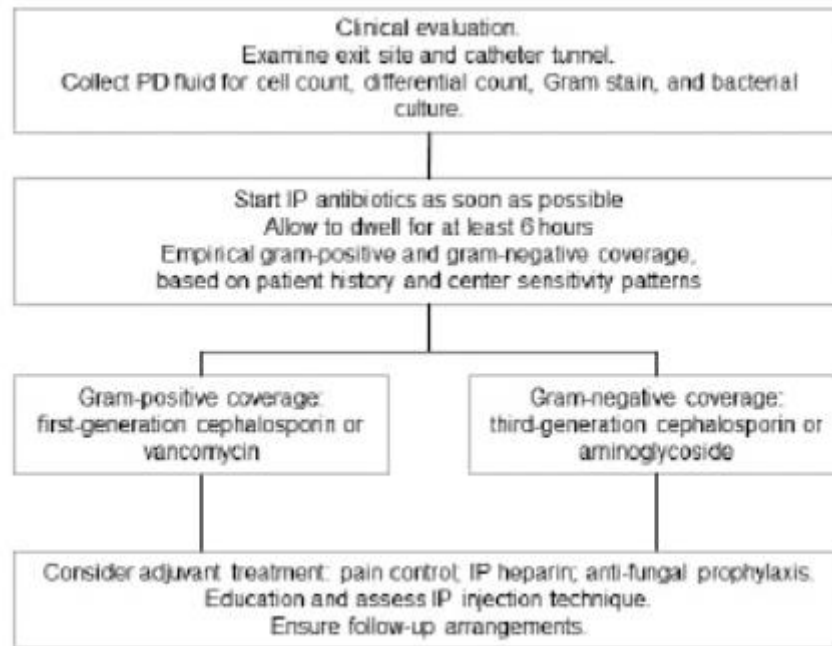


Figure 2. Initial management for PD-associated peritonitis

CONCLUSIONS AND SUGGESTIONS

Although recovery rates of PD-associated peritonitis were high, peritonitis still remained the most common cause of conversion to HD, PD catheter removal, and mortality. Relapse and recurrent were not uncommon in this case. Prevention should be the priority to avoid complications and increase mortality rate by daily exit site care and antibiotic prophylactic prior to catheter placement were recommended.

REFERENCES

- Abraham, G., Gupta, A., Prasad, K. N., Rohit, A., Bhalla, A. K., Billa, V., Chakravati, R., Das, T., Dhinakaran, T., Dutta, A. R., Giri, P., Gokulnath, Jeloka, T., Kumar, S., Marwaha, A., Raghavan, R. V., Ravichandran, R., Rohit, R., Sarkar, C. N., & Singh, N. S. K. (2017). Microbiology, Clinical Spectrum and Outcome of Peritonitis in Patients Undergoing Peritoneal Dialysis in India: Results from a Multicentric, Observational Study. *Indian Journal of Medical Microbiology*, 35(4), 491–498. https://doi.org/https://doi.org/10.4103/ijmm.IJMM_17_392
- Al Sahlawi, M., Zhao, J., McCullough, K., Fuller, D. S., Boudville, N., Ito, Y., Kanjanabuch, T., Nessim, S. J., Piraino, B. M., Pisoni, R. L., Teitelbaum, I., Woodrow, G., Kawanishi, H., Johnson, D. W., & Perl, J. (2021). Variation in Peritoneal Dialysis–Related Peritonitis Outcomes in the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS). *American Journal of Kidney Diseases*, 79(1), 45–55.e1. <https://doi.org/10.1053/j.ajkd.2021.03.022>
- Al-Natour, M., & Thompson, D. (2016). Peritoneal Dialysis Address for correspondence. *Semin Intervent Radiol*, 33, 3–5.
- AlZabli, S. M., Alsuhaibani, M. A., BinThunian, M. A., Alshahrani, D. A., Al anazi, A., Varghese, S., Rose, V., & Rahim, K. A. (2021). Peritonitis in children on peritoneal dialysis: 12 years of tertiary center experience. *International Journal of Pediatrics and Adolescent Medicine*, 8(4), 229–235. <https://doi.org/10.1016/j.ijpam.2020.09.001>
- Andreoli, M., & Totoli, C. (2020). Peritoneal Dialysis. *Rev Assoc Med Bras*, 66(1), 37044.
- de la Espada Piña, V., Ganga, P. L. Q., Junquero, J. M. G., Fosalba, N. A., Girón, F. F., Huete, M. J. E., Ortega, M. P., Barrero, G. V., Salazar, A. M., Martínez, F. M., Guerrero, M. J. M., de Mota, E. E., Cabrero, S. S., & Rodríguez, C. R. (2021). Two decades of analysis of peritonitis in peritoneal dialysis in Andalusia: Epidemiological, clinical, microbiological and progression aspects. *Nefrologia*, 41(4), 417–425. <https://doi.org/10.1016/j.nefro.2021.10.004>
- Hill, N. R., Fatoba, S. T., Oke, J. L., Hirst, J. A., O’Callaghan, C. A., Lasserson, D. S., & Hobbs, F. D. R. (2016). Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis. *PLOS ONE*, 11(7), e0158765. <https://doi.org/10.1371/JOURNAL.PONE.0158765>
- Htay, H., Cho, Y., Pascoe, E. M., Darssan, D., Nadeau-Fredette, A.-C., Hawley, C., Clayton, P. A., Borlace, M., Badve, S. V., Sud, K., Boudville, N., McDonald, S. P., & Johnson, D. W. (2018). Center Effects and Peritoneal Dialysis

- Peritonitis Outcomes: Analysis of a National Registry. *American Journal of Kidney Diseases*, 71(6), 814–821. <https://doi.org/https://doi.org/10.1053/j.ajkd.2017.10.017>
- Hu, S., Ming, P., Qureshi, A. R., Lindholm, B., Bo, Y., & Yang, H. (2018). Peritonitis: Episode sequence, microbiological variation, risk factors and clinical outcomes in a North China peritoneal dialysis center. *Kidney and Blood Pressure Research*, 43(6), 1943. <https://doi.org/10.1159/000495958>
- Li, P. K. T., Szeto, C. C., Piraino, B., de Arteaga, J., Fan, S., Figueiredo, A. E., Fish, D. N., Goffin, E., Kim, Y. L., Salzer, W., Struijk, D. G., Teitelbaum, I., & Johnson, D. W. (2016). ISPD peritonitis recommendations: 2016 update on prevention and treatment. *Peritoneal Dialysis International*, 36(5), 481–508. <https://doi.org/10.3747/pdi.2016.00078>
- Marshall, J. C., Bosco, L., Adhikari, N. K., Connolly, B., Diaz, J. V., Dorman, T., Fowler, R. A., Meyfroidt, G., Nakagawa, S., Pelosi, P., Vincent, J. L., Vollman, K., & Zimmerman, J. (2017). What is an intensive care unit? A report of the task force of the World Federation of Societies of Intensive and Critical Care Medicine. *Journal of Critical Care*, 37, 270–276. <https://doi.org/10.1016/j.jcrc.2016.07.015>
- McClellan, W. M. (2005). Epidemiology and Risk Factors for Chronic Kidney Disease. *Medical Clinics of North America*, 89(3), 419–445. <https://doi.org/10.1016/J.MCNA.2004.11.006>
- Perl, J., Fuller, D. S., Bieber, B. A., Boudville, N., Kanjanabuch, T., Ito, Y., Nessim, S. J., Piraino, B. M., Pisoni, R. L., Robinson, B. M., Schaubel, D. E., Schreiber, M. J., Teitelbaum, I., Woodrow, G., Zhao, J., & Johnson, D. W. (2020). Peritoneal Dialysis–Related Infection Rates and Outcomes: Results From the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS). *American Journal of Kidney Diseases*, 76(1), 42–53. <https://doi.org/10.1053/j.ajkd.2019.09.016>
- Pindi, G., Kawle, V., Sunkara, R., Darbha, M., & Garikaparthi, S. (2020). Continuous ambulatory peritoneal dialysis peritonitis: Microbiology and outcomes. *Indian Journal of Medical Microbiology*, 38(1), 72–77. https://doi.org/10.4103/ijmm.IJMM_20_251
- Ponce, D., De Moraes, T. P., Pecoits-Filho, R., Figueiredo, A. E., & Barretti, P. (2018). Peritonitis in Children on Chronic Peritoneal Dialysis: The Experience of a Large National Pediatric Cohort. *Blood Purification*, 45(1–3), 118–125. <https://doi.org/10.1159/000484344>
- Song, Y., Wu, J., Yan, H., & Chen, J. (2012). Peritoneal dialysis-associated nontuberculous mycobacterium peritonitis: A systematic review of reported cases. *Nephrology Dialysis Transplantation*, 27(4), 1639–1644. <https://doi.org/10.1093/ndt/gfr504>
- Szeto, C. C., & Li, P. K. T. (2019). Peritoneal dialysis–associated peritonitis. *Clinical Journal of the American Society of Nephrology*, 14(7), 1100–1105. <https://doi.org/10.2215/CJN.14631218>
- Wang, H. H., Huang, C. H., Kuo, M. C., Lin, S. Y., Hsu, C. H., Lee, C. Y., Chiu, Y. W., Chen, Y. H., & Lu, P. L. (2019). Microbiology of peritoneal dialysis-related infection and factors of refractory peritoneal dialysis related peritonitis: A ten-year single-center study in Taiwan. *Journal of Microbiology, Immunology and Infection*, 52(5), 752–759. <https://doi.org/10.1016/j.jmii.2018.10.013>
- Wu, H., Ye, H., Huang, R., Yi, C., Wu, J., Yu, X., & Yang, X. (2020). Incidence and risk factors of peritoneal dialysis-related peritonitis in elderly patients: A retrospective clinical study. *Peritoneal Dialysis International*, 40(1), 26–33. <https://doi.org/10.1177/0896860819879868>

