Review Article

Automated Peritoneal Dialysis Versus Continuous Ambulatory Peritoneal Dialysis for People with Kidney Failure: A Review

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ABSTRACT

Background: Peritoneal dialysis is a well-established renal replacement therapy for patients with end-stage kidney disease, offering two primary modalities: Automated Peritoneal Dialysis (APD) and Continuous Ambulatory Peritoneal Dialysis (CAPD). Both methods provide effective solute and fluid removal, cost-effectiveness, accessibility, and impact on patient lifestyle that vary significantly, particularly in resource-limited settings such as Indonesia.
Objective: This review compares APD and CAPD in terms of efficacy, convenience, cost-effectiveness, and accessibility, with a focus on their implications for patient care in Indonesia.
Methods: A systematic review of relevant literature was conducted to evaluate the benefits and limitations of both dialysis modalities. Factors such as treatment outcomes, cost, infection risk, insurance coverage, and availability were analyzed to determine the most suitable option for different patient populations.
Results: APD offers greater convenience, improved quality of life, and a lower risk of peritonitis due to fewer disconnections. However, its higher cost, dependency on electricity, and limited insurance coverage reduce its accessibility. Conversely, CAPD is more cost-effective, widely available, and covered by BPJS Kesehatan, making it the preferred option for many patients. Despite its affordability, CAPD requires greater patient commitment, increases peritonitis risk, and may interfere with daily activities.
Conclusions: Both APD and CAPD are effective dialysis options, but CAPD remains the more accessible and cost-effective choice in Indonesia. APD may benefit select populations if economic and infrastructural challenges are addressed. Expanding insurance coverage, reducing equipment costs, and improving infrastructure are crucial to increasing APD accessibility and optimizing dialysis care in Indonesia.
Keywords: Peritoneal Dialysis, Automated Peritoneal Dialysis, Continuous Ambulatory Peritoneal Dialysis, Chronic Kidney Disease Stage V, Quality of Life.

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Introduction

Those with stage V or terminal chronic kidney disease—defined by a glomerular filtration rate less than 15 mL/min/1.73 m^2—need therapeutic intervention to replace renal function. Either kidney transplantation or one of the current dialysis modalities—hemodialysis (HD) or peritoneal dialysis (PD)—may be part of this treatment.[1] By eliminating solutes and water, both modalities of dialysis help to restore electrolyte balance and correct acidosis, therefore facilitating renal replacement. Whereas HD depends on blood flow via an extracorporeal circuit through vascular access, PD uses the peritoneal membrane as the dialysis interface to allow the exchange of water and solutes between the peritoneal capillaries' blood and the dialysate that is injected into the peritoneal cavity via a catheter. The patient or carer is trained by qualified nursing staff to use hygienic methods to attach the transparent, flexible plastic bags containing the dialysis solution to the catheter at home or in another appropriate location (like their place of employment).[2] Compared to HD, PD has the major benefit of portability because the patient or carer administers the therapy, allowing for more freedom to travel and greater autonomy from nursing and medical staff.[3]

Globally, Automated peritoneal dialysis (APD) acceptance varies depending on a number of factors, including patient preferences, health-care infrastructure, and economic considerations. The use of APD has grown in industrialized nations as a result of technological developments and a move toward home-based therapy.[4] However, APD adoption is still low in many poor countries, including Indonesia. Widespread healthcare is hampered by issues including exorbitant prices, a shortage of qualified healthcare workers, and restricted equipment availability. PD use in Indonesia has decreased, falling from 6.6% in 2014 to 1.6% in 2018.[5] To date, there has been little progress in the government's and the Indonesian Nephrologist Organization's (PERNEFRI) efforts to promote Parkinson's disease. APD is a viable choice for PD optimization in Indonesia due to its ease of use and possible advantages. However, a number of obstacles prevent its widespread use.[5]

The many forms of APD include tidal PD (TPD), nocturnal intermittent PD (NIPD), intermittent PD (IPD), and continuous cyclical PD (CCPD). A minimum of three to five exchanges must be made each day by the patient or caregiver in CAPD.[6,7] A renewed interest in APD has been sparked by the many problems with CAPD, such as decreased patient motivation over long periods of time, procedural errors, and recurrent peritonitis.[8,9] For all patients judged suitable for PD, APD has been proposed as a substitute for CAPD. APD is recommended by the Renal Association (UK) and the European Best Practice Guidelines for peritoneal dialysis for patients with high peritoneal transporter status, especially those who need to avoid excessive volumes.[10] Research suggests that CAPD may be less expensive than HD.

Due to a number of issues, such as exorbitant prices, a small market, and a lack of knowledge, APD is currently not widely accessible in Indonesia. Numerous actions could be taken to increase accessibility. To increase availability, medical device manufacturers must be encouraged to enter the Indonesian market with APD equipment and supplies.[11] In addition, lowering the financial burden on patients through the implementation of subsidies or the expansion of insurance coverage would make APD a more attractive alternative. In order to ensure appropriate implementation and patient support, it is also crucial to establish training programs for healthcare workers to expand their expertise with APD. Additionally, patients and their families can better comprehend APD as a treatment option by increasing public awareness through educational programs. Finally, to make it easier to distribute APD equipment throughout Indonesia's various and geographically difficult regions, infra-structure and logistics must be improved.[8] Patients in Indonesia may find APD to be a more affordable and accessible renal replacement treatment if these important concerns are addressed. The effectiveness of Continuous Ambulatory Peritoneal Dialysis (CAPD) and

Automated Peritoneal Dialysis (APD) was evaluated in this review.

Methods

The databases chosen for this study were PubMed and Google Scholar, utilizing the terms peritoneal dialysis, automated peritoneal dialysis, and continuous ambulatory peritoneal dialysis, chronic kidney disease stage V, quality of life. The criteria for inclusion were: (a) evaluate the effectiveness of Continuous Ambulatory Peritoneal Dialysis (CAPD) and Automated Peritoneal Dialysis (APD) in patients with stage V CKD; (b) publish between 2018 and 2024; (c) have papers written in English or Bahasa Indonesia; and (d) be human studies. (a) discussing various types of dialysis methods; (b) texts that were not published in English or Bahasa Indonesia; and (c) animal studies were the exclusion criteria. The search strategy will use a combination of MeSH terms and keywords, such as ("automated peritoneal dialysis" OR "APD") AND ("continuous ambulatory peritoneal dialysis" OR "CAPD") AND ("kidney failure" OR "end-stage renal disease" OR "ESRD") AND ("outcomes" OR "mortality" OR "survival" OR "peritonitis" OR "quality of life" OR "cost-effectiveness"). Authors selected a collection of papers and analyzed databases. After duplicate papers were eliminated, a preliminary screening was carried out by looking at the publications' titles and abstracts. The materials were filtered based on the preset inclusion and exclusion criteria after a comprehensive screening that involved reading the entire text. The author was consulted for adjudication when the writers' opinions were inconsistent throughout the screening process.

Result and Discussion

Ninety-two records advanced to full-text evaluation after 87 records were eliminated at the initial screening stage due to title and abstract screening. Of these, 22 studies were left for additional assessment after 70 records were eliminated for lacking sufficient data. Five papers that satisfied all inclusion criteria were included in the systematic review after 17 studies that merely included study protocols were eliminated during the final screening stage.

Risk of Bias Assessment

The risk of bias assessment for the five included cohort studies, evaluated using the Newcastle-Ottawa Scale (NOS), showed generally low to moderate risk across domains. In the selection domain, three studies scored three out of a maximum of four stars, two studies have a maximum score indicating stronger methodological rigor in selecting study participants. For comparability, all studies consistently received two stars, reflecting adequate control for potential confounders. The Exposure domain revealed more variation: two studies scored two out of three stars, while three studies obtained maximum stars, suggesting stronger methodological rigor in exposure ascertainment. Overall, the NOS results indicate that all studies were of reasonable quality.

Table 1. Risk of bias across the studies

Author, year	Selection	Comparability	Exposure	Overall
Yang *et al.*, 2018 (9)	***	**	***	
Wang *et al.*, 2020 (6)	***	**	**	
Lin *et al.*, 2020 (12)	****	**	***	
Li *et al.*, 2018 (13)	****	**	***	
Zhong *et al.*, 2020 (15)	***	**	**	

Adequacy in Peritoneal Dialysis

According to the International Society of Peritoneal Dialysis (ISPD) Guidelines, the effectiveness of peritoneal dialysis should be evaluated not only with numbers but also through a comprehensive clinical assessment. This includes looking at hemoglobin levels, response to erythropoiesis-stimulating agents, calcium and phosphorus metabolism, blood pressure control, nutritional status and appetite, volume status with adequate ultrafiltration to prevent overload, and the patient's overall quality of life.[12]

For patients who still have residual renal function, the National Kidney Foundation–Kidney Disease Outcomes Quality Initiative (NKF KDOQI) recommends that the total Kt/V (from both peritoneal clearance and residual renal clearance) should be at least 1.7 per week, measured at the end of the first month on PD and then every four months thereafter.[10] To preserve remaining kidney function, steps should be taken such as prescribing angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers for hypertensive patients, and avoiding nephrotoxic substances like iodinated contrast media, aminoglycosides, and nonsteroidal anti-inflammatory drugs.[13]

In patients without residual renal function, the minimum recommended PD dose is a weekly peritoneal Kt/V of at least 1.7. This should also be checked at one month and then every four months.[14] For those who fall short of this target, the clearance of small molecules can be improved by increasing exchange frequency and/or infusion volume. In APD, strategies like adding a daytime "wet" dwell or performing an extra daytime exchange can help improve adequacy.[15] Medium molecule clearance, on the other hand, depends more on the length of time the dialysate remains in the peritoneal cavity.

Another important factor influencing solute clearance is the peritoneal transport status, determined through the peritoneal equilibrium test (PET). Traditionally, the PET involves instilling 2 L of 2.5% glucose dialysate (D) into the peritoneal cavity, then collecting dialysate samples at 0, 2, and 4 hours after infusion.[16] A plasma sample (P) is drawn at the 2-hour mark. Based on the creatinine D/P ratio at the second and fourth hours, the glucose D/D_0 ratio, and the total dialysate volume drained after four hours, patients are categorized into four transporter types.[17]

Preparation for PET differs slightly between CAPD and APD patients. For CAPD, the PET is usually performed after the overnight dwell has been drained, ensuring the peritoneal cavity is empty before instilling the 2 L test solution. For APD, the test is best scheduled after

a night of cycling, with the machine disconnected and the abdomen drained prior to the PET fill. In some cases, a short equilibration dwell may be used before the test to simulate CAPD conditions.[16]

Regarding transport characteristics: High transporters quickly reach a dialysis-to-plasma equilibrium for urea and creatinine, but they also absorb glucose rapidly, causing the osmotic gradient to disappear sooner. They tend to benefit from shorter dwell times.[18] Low transporters equilibrate more slowly, retain the osmotic gradient longer, and often require longer dwell times with larger fill volumes to optimize clearance.[19]

Figure 2. Scheme of Continuous Peritoneal Dialysis

Comparison of Clinical Outcomes and Patient Selection Criteria Between APD and CAPD

Critical clinical outcomes, such as mortality, peritonitis risk, switching to alternative dialysis modalities, hernias, PD fluid leaks, PD catheter removal, and hospital admissions, were not significantly different between APD and CAPD, according to the prior study. The two PD techniques' dialysis adequacy metrics were similar.[20]

There is ongoing debate over the relative effects of APD and CAPD on peritonitis rates; some research favor APD, while others support CAPD, and a small number of studies find similar rates of peritonitis in both conditions. There were no notable variations in the number of patients who developed peritonitis during the research period, according to our meta-analysis.[21] An analysis of a large group of patients (> 30,000) who started peritoneal dialysis over a three-year period showed that patients on automated peritoneal dialysis had significantly better dialysis technique and patient outcomes during the first year of dialysis.[6] Even after adjusting for age and diabetes status, there were still significant differences in patient and technique survival, even though patients on APD were younger than those on CAPD. Unlike this study, our evidence—derived from RCTs—did not show that APD and CAPD were superior in terms of patient or technique survival.[22] According to the CANUSA study and other studies, patients with CAPD who have high or rapid peritoneal membrane solute transport characteristics have higher mortality rates. There is currently no proof that APD leads to higher survival rates, even if it may offer these patients better small solute clearances than CAPD.[23] Although APD has the potential to provide better small solute clearances than CAPD, our meta-analysis found no differences in dialysis adequacy. This is not

surprising because previous studies have shown that the differences between the two modalities for creatinine clearances are, at most, negligible in real-world situations.[24]

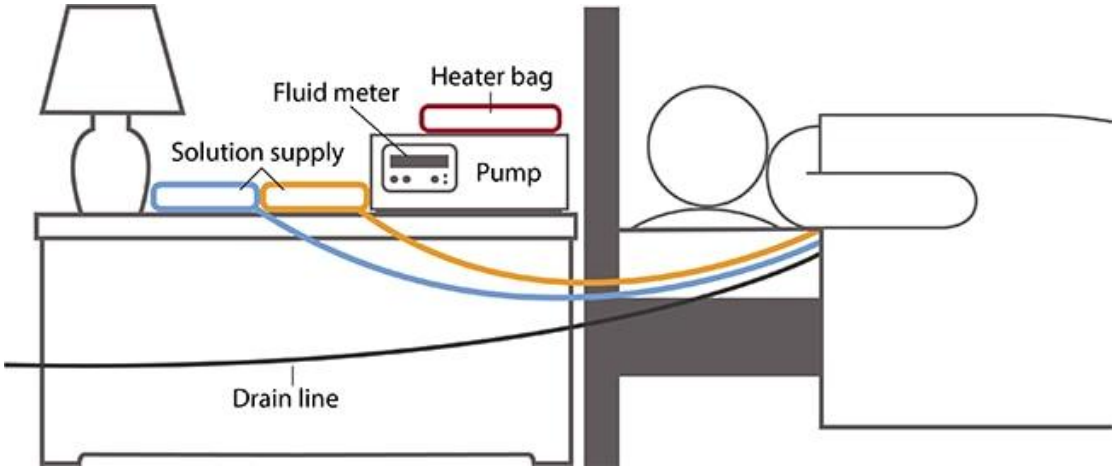

Figure 3. Scheme of Automated Peritoneal Dialysis

The selection between Automated Peritoneal Dialysis (APD) and Continuous Ambulatory Peritoneal Dialysis (CAPD) depends on various factors, including patient characteristics, clinical parameters, and lifestyle considerations.[23] Since APD is done overnight using a cycler, enabling patients to continue their regular activities uninterrupted, it is typically better suited for younger, more energetic people. Because the shorter dwell periods reduce glucose absorption and peritoneal membrane damage, it is especially advantageous for patients with high or high-average peritoneal transport characteristics. Additionally, because APD includes fewer connections throughout the day, which lowers the chance of infection, it may be beneficial for people who are more susceptible to peritonitis.[3] Because APD can be used in conjunction with daytime exchanges to maximize fluid balance, patients with intact residual renal function may also benefit from it. Furthermore, because APD does not require multiple manual exchanges during the day, it is a good choice for people who have trouble moving about or who have trouble sleeping.[4]

On the other hand, because CAPD does not require a machine and may be simpler to administer, it is frequently chosen for older patients or those with cognitive difficulties. Since the extended dwell durations enhance solute clearance, it is especially advantageous for people with low or low-average peritoneal transport characteristics. Because CAPD does not rely on automated technology, it is also more accessible to patients who have limited access to electricity or APD supplies.[1] Additionally, CAPD might be a more sensible choice for patients who would rather use a less complicated, machine-free dialysis technique. Because CAPD requires no additional equipment and fewer specialized consumables than APD, it is frequently more cost-effective in environments with limited resources.

Complications: CAPD vs. APD

1. Pericatheter leak

The break-in time is the amount of time that passes between inserting a catheter and starting peritoneal dialysis (PD). Break-in, a preventive measure used to avoid mechanical and infectious problems, is recommended for patients starting elective peritoneal dialysis for a period of two weeks.[25] It is better to administer the medication while supine and with a lower infusion volume for an unanticipated onset of Parkinson's disease. Peritoneal dialysis may be temporarily stopped or the dialysis schedule changed to intermittent overnight dialysis in the event of pericatheter peritoneal fluid leakage. The catheter needs to be replaced if the leak

continues.[26] CAPD shows a tendency for more frequent leaks. In one study, 25% (18 out of 72) of patients on CAPD experienced pericatheter leaks, while none of the APD-only patients did (though the difference was not statistically significant).[27]

2. Drainage failure (Catheter dysfunction)

There are two types of drainage failure: either the catheter does not infuse or drain, which is caused by folds and intramural blockage, or it infuses without draining, which is usually linked to intestinal constipation, tip migration, or omental sequestration.[28] There's limited direct comparison data between CAPD and APD on catheter dysfunction. One study focusing on unplanned dialysis starts (APD vs. CAPD) found no difference in catheter malposition or similar mechanical complications between groups.[29]

3. Hernias

Because of increased intra-abdominal pressure, 10% to 25% of peritoneal dialysis patients may develop hernias, which usually require surgery. The volume infused, recent surgery, obesity, and polycystic kidney disease are examples of potential risk factors.[30] If the patient has residual renal function, corrective surgery can be performed without stopping treatment. As a result, peritoneal dialysis can be started again with a lower infusion volume one or two days after surgery.[31] CAPD is more prone to hernias than APD, likely due to higher daytime intra-abdominal pressure. A 2022 study reported 0.08 hernias per patient-year in CAPD patients versus just 0.01 in APD-only patients (though not statistically significant).[27] Another cohort noted that 63% of established PD patients on CAPD developed hernias versus 47% on APD.[32]

4. Hydrothorax

A rare side effect of dialysate migrating into the pleural cavity through lymphatic channels or a congenital diaphragmatic abnormality is hydrothorax. Pleural fluid analysis, which shows increased glucose and decreased protein contents, is used to make the diagnosis; technetium scintigraphy and contrast-enhanced CT of the peritoneal cavity may also be used.[33] The course of treatment entails stopping dialysis for two to six weeks and putting intra-abdominal pressure-lowering techniques into practice, such as switching from CAPD to nocturnal APD with a dry peritoneal cavity during the day. Pleurodesis, surgery, and maybe technique transfer may be necessary if there is no improvement.[29] Dialysate leakage into the chest (hydrothorax) is recognized as a mechanical complication in PD that can affect either modality. However, there's no clear data differentiating CAPD and APD rates.

5. Edema and ultrafiltration failure

In dialysis patients, hypervolemia is a risk factor for cardiovascular disease and death on its own. It is associated with inflammation, dietary alterations, and ventricular hypertrophy.[23] Excessive sodium and fluid intake, decreased residual renal function, noncompliance with dialysis protocols, excessive dialysate absorption during prolonged exchanges, inadequate use of hypertonic solutions, mechanical problems (e.g., malfunctioning catheters and leaks), discrepancies between dialysis prescriptions and patient peritoneal equilibration tests, and ultrafiltration failure are among the causes of hypervolemia in peritoneal dialysis.[24] In a single-center study of CAPD patients, ultrafiltration failure (UFF) occurred in 15.5%, with incisional or exit site leaks (such as edema) reported in 4.4% of patients.[34] Comparative APD data on these issues is infrequent.

6. Weight gain, hypertriglyceridemia and hyperglycemia

Dialysate glucose absorption can result in calorie excess, which can cause hyperglycemia, hypertriglyceridemia, and weight gain.[24] To lessen the need for hypertonic bags, the treatment consists of a low-calorie diet, increased physical activity, and restricted water intake. An alternate therapeutic option for hypertriglyceridemia is the administration of dose fibrates that are regulated based on renal function. Insulin and/or oral hypoglycemic medications may need to be modified in response to hyperglycemia. If improvement is not obtained, consider changing the dialysis method. All PD patients—regardless of modality—absorb glucose, increasing the risk for weight gain, elevated triglycerides, and

hyperglycemia. While no directly comparative rate data between CAPD and APD exists, such metabolic concerns are well-recognized complications of chronic PD.[25]

7. Encapsulating peritoneal sclerosis

In patients receiving long-term peritoneal dialysis, encapsulating peritoneal sclerosis is a rare complication that is associated with substantial morbidity and mortality. It usually arises from intestinal blockage and malnourishment.[26] There are no well-defined diagnostic criteria; instead, the diagnosis is based on morphological and functional features, such as intestinal blockage and peritoneal fibrosis encapsulation features. Anemia and hypo-albuminemia are common, as are anorexia, nausea, vomiting, and weight loss. Hemo-peritoneum and recurrent sterile peritonitis are two symptoms of encapsulating peritoneal sclerosis. Encapsulating peritoneal sclerosis is a rare but serious long-term complication of PD affecting around 2.5% of patients. There's no evidence indicating a difference in EPS rates between CAPD and APD.[35]

Although laparotomy is the only way to provide a definitive diagnosis, it is usually avoided due to the high dangers involved. Diverse intestine loop diameters, dilated and adherent loops, septate ascites, calcification, and thickening of the intestinal wall and peritoneal membrane are all visible on computed CT scans. Peritoneal dialysis should be stopped in addition to giving nutritional supplements, which are frequently parenteral. Although immune-suppression, tamoxifen, and corticosteroids have been identified as possible treatments, their effectiveness is yet unknown. Another therapeutic approach that might be considered is surgery.[28]

Cost-Effectiveness

Healthcare infrastructure, insurance coverage, patient accessibility, and financial limitations all affect how cost-effective APD and CAPD are in Indonesia. Because of its cheaper initial costs, less reliance on specialist equipment, and low electricity use, CAPD is typically the more economical choice in Indonesia. Many patients, especially those from lower socio-economic backgrounds, choose CAPD because it is readily accessible and funded by Indonesia's national health insurance program (BPJS Kesehatan). Because CAPD can be done at home instead of requiring frequent hospital trips, transportation and facility-related costs are further decreased.[5]

However, because APD requires an automated cycler, which is costly and not readily available in all parts of Indonesia, its starting expenses are greater. Treatment costs are further increased by the requirement for a steady supply of energy and specialist supplies including APD tubing and particular dialysate compositions. Furthermore, APD is now only partially covered by BPJS Kesehatan, which limits its accessibility for a significant section of the population. Even though APD may have benefits like better treatment adherence, lower risk of peritonitis, and an enhanced quality of life, these must be balanced against the much higher cost, especially for patients in rural areas with less developed healthcare systems.[11]

CAPD patients usually perform three to four exchanges daily, each involving about 2 liters of dialysate, so the total daily volume typically ranges from 6 to 10 liters. The volume per exchange may vary based on patient size, with smaller adults or children often using 1.5 liters per exchange, while regular-sized adults use 2 liters, and in some cases, up to 3 liters if tolerated comfortably.[36] In comparison APD commonly done overnight with a cycler, often involves around five cycles per night, each with approximately 2 liters of dialysate. This adds up to about 9 to 10 liters used during the night. If daytime exchanges are added, total daily volume can go even higher.[36]

A study conducted at Dr. Hasan Sadikin General Hospital between 2014 and 2017 showed that, in comparison to HD, CAPD decreased costs by about IDR 23,227,857 per patient. During this time, the CAPD program generated IDR 1,661,972,000 in total savings. According to these results, CAPD might lessen the financial strain on Indonesia's National Health Insurance

program. Although there is little precise evidence on APD's cost-effectiveness in Indonesia, its advantages—such as the opportunity for remote monitoring and a decrease in manual labor—might make it a good choice in the future.[5]

APD may still be more affordable for some Indonesian populations in spite of the increased expenses, especially for working-age patients who want flexibility to keep their jobs, which would lower indirect economic losses. Additionally, by possibly lowering hospitalization rates and CAPD-related consequences such infections and peritoneal membrane failure, APD may help reduce long-term healthcare expenses. However, governmental changes, increased insurance coverage, subsidies, and domestic manufacturing of dialysis equipment are required to lower prices and increase accessibility in order for APD to become more feasible in Indonesia.[11]

Table 2. Difference between Automated Peritoneal Dialysis (APD) and Continuous Ambulatory Peritoneal Dialysis (CAPD)

Aspect	Automated Peritoneal Dialysis (APD)	Continuous Ambulatory Peritoneal Dialysis (CAPD)
Definition	Uses an automated cycler to perform dialysis at night while the patient sleeps.	Manual dialysis performed during the day without a machine.
Schedule	Performed mostly at night (8–10 hours) with possible daytime exchanges.	Requires 3–5 manual exchanges per day, each lasting about 30–40 minutes.
Indications	Suitable for active individuals, working patients, and those with high peritoneal transport rates.	Preferred for elderly, cognitively impaired patients, or those with low peritoneal transport rates.
Convenience	More convenient for patients with a busy lifestyle; no interruptions during the day.	Requires adherence to a strict schedule, which may interfere with daily activities.
Equipment	Requires an automated cycler, tubing, and electricity.	No machine required; performed manually using gravity-based exchanges.
Risk of Infection	Lower risk due to fewer disconnections per day.	Higher risk due to multiple daily connections, increasing peritonitis risk.
Cost	Higher initial and maintenance costs due to the need for a cycler and specialized supplies.	More cost-effective, with fewer equipment requirements and lower electricity consumption.
Insurance Coverage (Indonesia)	Limited coverage under BPJS Kesehatan, making it less accessible.	Widely covered by BPJS Kesehatan, making it the more affordable option.
Electricity Dependency	Requires a stable electricity supply, which may not be available in all regions.	Does not require electricity, making it more suitable for remote or rural areas.
Impact on Work/Lifestyle	Allows patients to work or attend school without daytime interruptions.	Requires frequent breaks for dialysis exchanges, which may interfere with work or daily activities.
Complications	Lower risk of peritonitis, but possible issues with catheter function and machine dependence.	Higher risk of infections and peritoneal membrane failure due to more frequent exchanges.
Availability in Indonesia	Limited availability due to high costs and lack of widespread insurance support.	More accessible and widely used due to affordability and government support.

Conclusion

End-stage kidney disease can be effectively managed with both Automated Peritoneal Dialysis (APD) and Continuous Ambulatory Peritoneal Dialysis (CAPD), each of which has unique benefits and drawbacks. APD is the best option for people who are active or have high peritoneal transport rates because it provides increased convenience, a better quality of life, and a decreased risk of infection. Accessibility is severely hampered by its greater expenses, reliance on electricity, and restricted insurance coverage in Indonesia. On the other hand, many patients choose CAPD since it is

more affordable, accessible, and fully covered by BPJS Kesehatan, particularly in settings with low resources.

Individual patient needs, peritoneal membrane properties, lifestyle circumstances, and budgetary considerations should all be taken into account when choosing between APD and CAPD. APD offers more flexibility, but in order to make it more affordable and accessible in Indonesia, regulatory changes, increased insurance assistance, and better infrastructure are needed. Ultimately, the best dialysis results and quality of life for people with renal failure depend on a customized, patient-centered approach.

Declarations

Competing interests

The authors declare no conflict of interest.

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None.

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