

Article Type: Mini Review**Received:** 09/01/2022**Published:** 26/01/2022**Open Access Journal of
Biogeneric Science and Research**
ISSN 2692-1081

DOI: 10.46718/JBGSR.2021.10.000251

The Advantages of Peritoneal Dialysis over Hemodialysis

Sami Bahçebaşı**Internal Medicine Specialist, University of Health Sciences Kayseri Training and Research Hospital, Turkey*

***Corresponding author:** Sami Bahçebaşı, Internal Medicine Specialist, University of Health Sciences Kayseri Training and Research Hospital, Turkey

ABSTRACT

Although kidney transplantation is the definitive treatment of kidney failure, for many reasons, most of patients need dialysis treatment. Despite significant advantages of PD over HD, HD commonly used modality all over the world. PD patients have better survival relative to HD patients in the first year of dialysis. A recent study has shown that the risk of all-cause mortality and infection death were higher in the unplanned HD group than in the unplanned PD group during 1-year follow up. Because of prolonged and gentle removal of body fluids and toxins, PD reduces the risk of hemodynamic instability. Therefore, PD may be preferred in the treatment of critically ill patients with acute kidney injury (AKI) or end-stage renal disease (ESRD).

In a study compared PD with continuous renal replacement therapy in critically ill patient with AKI. Patients in the PD group had lower mortality rate at 28 days, less complication of infections and faster recovery of renal function. Therefore, PD can be applied effectively and safely in critically ill patients with AKI and requiring dialysis. PD confers better quality of life (autonomy, flexibility, avoidance of regular hospital visits for the patients and relatives, travel easily, more free time). PD can be done while sleeping, this allowing patient to travel and do daily activities.

PD preserves the residual renal function over HD. PD has freedom of pain in vascular access sites from repeated cannulation for HD and preserves this sites for the future HD. PD has significant economic advantage over HD globally. There is no need for a large number of healthcare workers, dialysis machines, protective equipment and clean water in PD. A meta-analysis has shown that pretransplant PD is associated with post-transplant survival benefit than pretansplant HD. We recommend considering these advantages when choosing a dialysis modality.

Chapter

Chronic kidney disease (CKD) is defined as an estimated glomerular filtration rate less than 60 ml/min/1.73 m² or presence of kidney damage persisting for 3 months or more. In the general population CKD prevalence is around 10 % to 14%. Progressive loss of kidney function to end-stage (GFR less than 15ml/min/1.73 m²) resulting in the need for renal replacement therapy, irrespective of the cause. Renal transplantation is the best treatment option of end-stagerenal disease (ESRD). Because renal transplantation has survival benefit compared to long-term dialysis therapy. When eGFR is less than 20ml/min/1.73 m² the patients must to be listed for renal transplant program [1].

Only 25% of patients with kidney failure undergo renal transplantation and complete their life without dialysis. This is due to many reasons, which include a unexpected

diagnosis of kidney failure, non-availability of a kidney donor, unsuitability for renal transplantation and failed renal transplantation. There are two form of dialysis modality; Hemodialysis (HD) and peritonealdialysis (PD). The choice of dialysis modality is stil controversial. HD commonly used modality all over the world. However, preference for PD is increasing due to the various advantages with PD [2]. PD patients have beter survival in the first year of dialysis compared to HD. In a cohort study, 45165 patients who started unplanned dialysis and planned dialysis were followed for 1 year. The primary outcomes of the study were death from infection and all-cause mortality during 1-year followup. The risks of all-cause mortality and infection death were lower in planned PD group than unplanned PD group. Major cardiac and cerebrovascular events and all-causere admission were lower in planned PD group than unplanned PD group.

This result shows us the importance of timely planning dialysis. The risk of death due to infection and death from all causes was also found to be lower in the unplanned PD group than in the unplanned HD group. Major cardiac and cerebrovascular events and all-cause admission were lower in unplanned PD group than unplanned HD group [3]. These results show that PD is superior to HD in patients undergoing unplanned dialysis. PD reduces the risk of hemodynamic instability, due to prolonged and gentle removal of body fluids and toxins. Therefore, PD is a treatment of choice for critically ill patients with renal failure. In a prospective study compared Continuous Renal Replacement Therapy (CRRT) with PD in critically ill patients with acute kidney injury. 63 CRRT and 62 PD patients were included in the study. Primary outcome was hospital mortality at 28 days, secondary outcomes were infectious complication, recovery of kidney function, median time to resolution of AKI and the median duration of ICU stay of 9 days vs 19 days. Infectious complications significantly less and survival at 28 days significantly better in the patients treated with PD when compared to CRRT. Recovery of kidney function, median time to resolution of AKI and the median duration of ICU stay of 9 days vs 19 days were all in better for PD. Chronic dialysis requirement was found to be the same in both groups [4]. Therefore, PD can be applied effectively and safely in critically ill patients.

PD better preserves residual renal function compared to HD [5]. Several mechanisms play role. The most important one is the less abrupt fluctuations in osmotic load and volume. These leading to more stable hemodynamic status [6]. Pretransplant PD is associated with post-transplant benefit than pretransplant HD. In a cohort study 1209 pretransplant HD and 603 pretransplant PD patients included. Recipients with chronic PD patients has significantly higher infection risks in urinary tract infection and peritonitis during hospitalisation for kidney transplantation. On the other hand, there was no significant difference between groups in hospitalisation duration for kidney transplantation. Compared with patients with PD, new onset ischemic heart disease, tuberculosis and hepatitis C all higher recipients with chronic HD during follow-up period of 90 days after kidney transplantation. There was no significant difference regarding all-cause mortality between the HD and PD groups. However, the graft survival probability was significantly higher in PD than HD group after 10 years of kidney transplantation follow-up period [7].

In a meta-analysis has shown that pretransplant PD is associated with post-transplant survival benefit than pretransplant HD. A total of 16 studies included. 6 studies reported mortality benefit of PD. There was no significant

difference in graft survival between two groups [8]. These studies show that PD may be preferred primary dialysis modality for patients who are considering transplantation. PD confers better quality of life. PD patients have more free time due to autonomy, flexibility, avoidance of regular hospital visits. PD has freedom of pain in vascular access sites from repeated cannulation for HD and preserves this site for the future HD. PD can be done while sleeping. Because of these advantages, PD patients can travel easily and do their daily activities [2].

PD has significant economic advantages over HD. In a study cost-effectiveness of PD and HD compared. 4285 pairs of HD and PD patients were follow-up 14 years. Estimated life expectancy between HD and PD found nearly equal, whereas average lifetime healthcare costs were higher in HD than PD [9]. The reasons for this; there is no need for a dialysis machines, clean water, protective equipment and large number of healthcare workers. The choice of dialysis modality can be affected by many different factors; such as patients selection, approach of the healthcare facility, physician opinion and accessibility to equipment etc. However, we recommend that these advantages of PD, which are described throughout our article, should be taken into account in the selection of dialysis modality.

References:

1. Satyanarayana R Vaidya, Narothama R Aeddula (2021) Chronic Renal Failure. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing.
2. Shrestha Badri Man (2018) Peritoneal Dialysis or Haemodialysis for Kidney Failure?. J Nepal Med Assoc 56(210): 556-557.
3. Tu Yi-Ran, tsung-Yu tsai, Lin Ming-Shyan, tu Kun-Hua, Lee cheng-chia, et al (2020) "Association between initial dialytic modalities and the risks of mortality, infection death, and cardiovascular events: A nationwide population-based cohort study." Sci Rep 10(1): 8066.
4. Al-Hwiesh Abdullah, Abdul-Rahman Ibrahim, Finkelstein Fredric, Divino-Filho Jose, Qutub Hatem, et al. (2018) "Acute Kidney Injury in Critically Ill Patients: A Prospective Randomized Study of Tidal Peritoneal Dialysis Versus Continuous Renal Replacement Therapy." Therapeutic Apheresis and Dialysis 22(4): 371-379.
5. Marro B' n, C Remo' n, M Pe'rez-Fonta'n, P Quiro' s and A Orti' z (2008) "Benefits of preserving residual renal function in peritoneal dialysis." Kidney International 73: S42-S51.
6. Lysaght MJ, Vonesh EF, Gotch F (1991) "The influence of dialysis treatment modality on the decline of remaining renal function." ASAIO Trans 37: 598-604.
7. Lin Huan-Tang, Liu Fu-Chao, Lin Jr-Rung, Pang See-Tong, Yu Huang-Ping (2018) "Impact of the pretransplant dialysis modality on kidney transplantation outcomes: a nationwide cohort study." BMJ Open pp. e020558.
8. Joachim, I Gardezi Ali, Chan Micah R, Shin Jung-Im, Astor Brad C, et al. (2017) "Association of Pre-Transplant Dialysis Modality and Post-Transplant Outcomes: A Meta-Analysis." Perit Dial Int 37(3): 259-265.

-
9. Chang Yu-Tzu, Hwang Jing-Shiang, Hung Shih-Yuan, Tsai Min-Sung, Wu Jia-Ling, et al. (2016) "Cost-effectiveness of hemodialysis and peritoneal dialysis: A national cohort study with 14 years follow-up and matched for comorbidities and propensity score." Scientific Reports.