

## **Peritoneal Dialysis: Trends, Outcomes and Complications**

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**Background:** Renal replacement therapy is needed for end-stage chronic renal failure patients to sustain their lives. Renal replacement therapy could be either hemodialysis or peritoneal dialysis. Peritoneal dialysis provides several advantages to the patient compared to hemodialysis. It requires fewer hospital visits, has greater patient autonomy and could be adjusted to daily personal activities. However, complications such as peritonitis, line blockage, leakage and hernia, may occur.

**Objective:** To evaluate the trends of Peritoneal Dialysis, its outcome and associated complications.

**Design:** A Retrospective, Descriptive Study.

**Setting:** Peritoneal Dialysis Centers, Ministry of Health, Bahrain.

**Method:** One hundred eight patients who underwent peritoneal dialysis line insertion from January 2007 to January 2015 were included in this study.

**Result:** One hundred eight patients had peritoneal dialysis line insertion from January 2007 to January 2015. Forty-eight (44.44%) patients are currently on regular peritoneal dialysis. Sixty (55.55%) stopped peritoneal dialysis due to several reasons: 23 (38.3%) blockage, 11 (18.3%) death, 5 (8.3%) inadequate dialysis, 4 (6.6%) transplant, 4 (6.6%) social and 8 (13.3%) unknown. Complications occurred in 52 (48.1%) patients: peritonitis in 29 (26.8%), and blockage in 23 (21.3%) patients. No other complications were reported.

**Conclusion:** Peritoneal Dialysis remains an effective method of renal replacement therapy and it offers several advantages in comparison to hemodialysis. Our results are consistent with most reported regional and international findings. However, we look forward to improve our practice, particularly reducing the infection and blockage rates.

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End-stage renal disease (ESRD) patients need one form of renal replacement therapy to sustain their lives. Renal replacement therapy could be either hemodialysis (HD) or peritoneal dialysis (PD). In PD, patient's peritoneum is used as a filtering membrane in which the sterile dialysate is washed via the inserted catheter (PD line) then drained into the drainage bag via a closed drainage system.

There are two types of PD: continuous ambulatory PD and automated PD. In continuous ambulatory PD, the dialysate fluid is infused in the peritoneal cavity from a dialysate bag and needs to be done four times per day, whereas in the automated PD, the dialysate fluid is infused by a special machine while the patient is sleeping at night. PD lines are surgically inserted via open or laparoscopic techniques, and can be done under general or local anesthesia<sup>1</sup>.

Choosing a dialysis modality is a difficult yet vital step for patients with ESRD. Patients should be well-educated about all dialysis options with special attention to their associated comorbidities and personal preferences. PD was introduced in 1970s; the technique has greatly developed throughout the years and its use has increased, offering great advantages and outcomes<sup>1-3</sup>. In patients with congestive heart failure complicated by cardiorenal syndrome type 2 (CRT2), initiating PD showed great benefit compared to HD<sup>1</sup>.

The continuous filtration quality of PD offers a better control of body fluid levels, as well as maintaining venous congestion and intra-abdominal pressure. PD has been proven to be more advantageous in patients awaiting transplantation and require a form of renal replacement therapy<sup>3</sup>. Blood borne infections (Hepatitis B and C and to less extent Human Immunodeficiency Virus) which are commonly seen in HD patients poses no threat in PD therapy.

PD also provides significant financial benefit to the healthcare system<sup>1,4</sup>. The simplicity of PD use requires fewer medical staff recruitment, less resources and technical support<sup>4</sup>. In China, the government strongly encourages the usage of PD via increasing awareness and structured PD programs<sup>5</sup>. Therefore, a rapid increase in PD patients was reported from 297 patients in 2005 to more than 1,000 in 2012<sup>5</sup>.

A PD program and set of protocols have been initiated by The Nephrology Unit in Salmaniya Medical Complex in 2007 in collaboration with The Vascular Surgery unit.

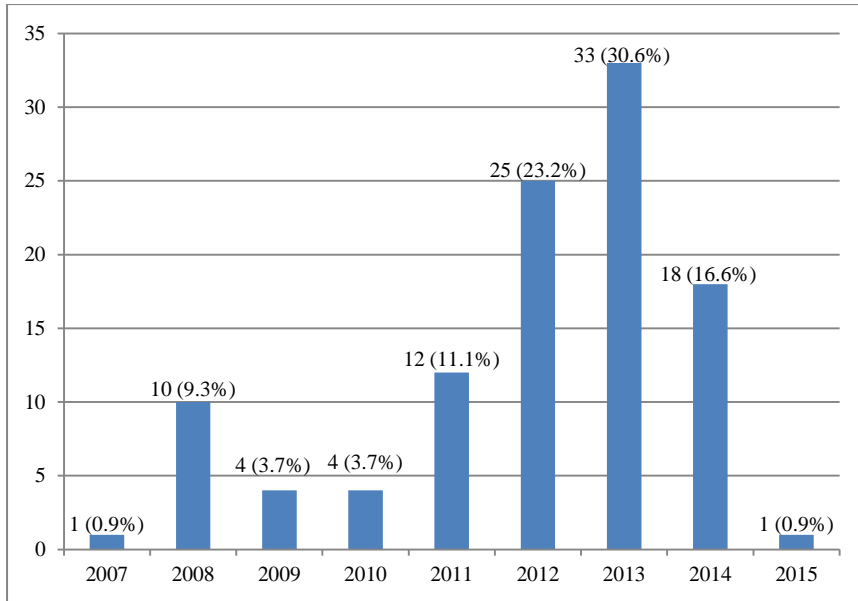
The aim of this study is to evaluate the trends, outcomes and associated complications of Peritoneal Dialysis practice.

## **METHOD**

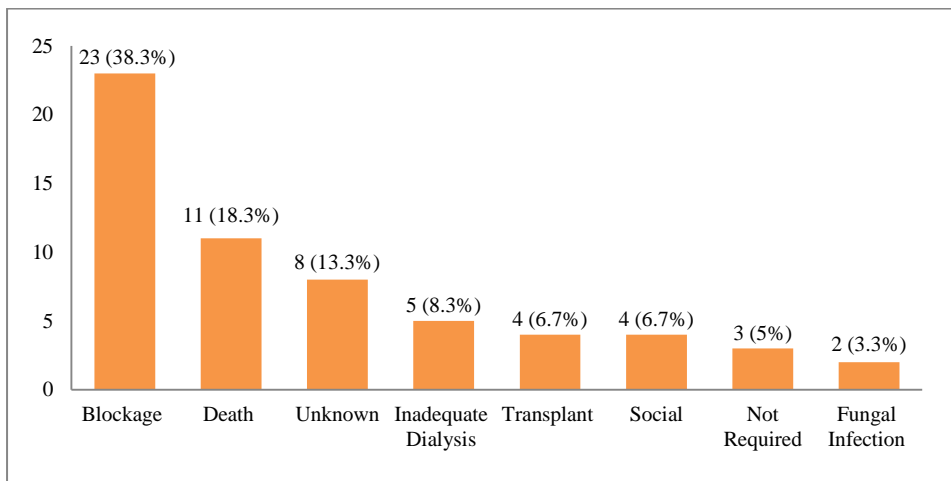
One hundred eight patients who had PD line insertion from January 2007 to January 2015 were included. All necessary data were collected retrospectively from the PD nurse. A database registry is available for all PD patients.

## **RESULT**

One hundred eight patients had PD line insertion from January 2007 to January 2015. The majority of the patients were in 2013, see figure 1. Forty-eight (44.44%) patients are currently on regular peritoneal dialysis. Sixty (55.55%) stopped peritoneal dialysis due to several reasons, blockage 23 (38.3%) patients' death 11 (18.3%), inadequate dialysis 5 (8.3%), transplant 4 (6.6%), social 4 (6.6%) and unknown 8 (13.3%), see figure 2.

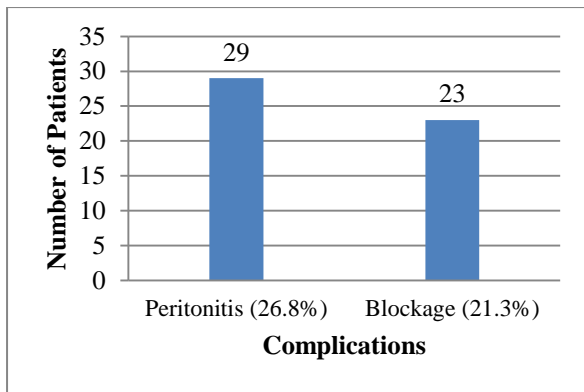


**Figure 1: PD Line Insertion Per Year**

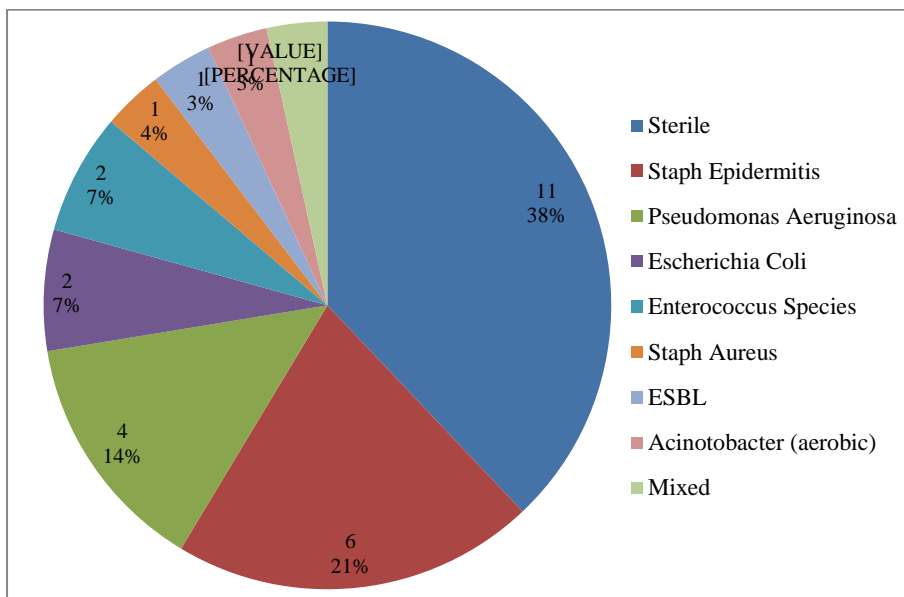


**Figure 2: Reasons for Discontinuing Peritoneal Dialysis**

Complications occurred in 52 (48.2%) patients; 29 (26.8%) peritonitis, and 23 (21.3%) blockage, see figure 3. No other complications were reported, such as exit site infection, leakage or hernia. A culture was performed for the twenty-nine cases of peritonitis. The most common cultured infective organisms in peritonitis are *Staphylococcus Epidermidis* 6 (21%) followed by *Pseudomonas Aeruginosa* in 4 (14%) patients. Eleven (38%) patients had sterile cultures, see figure 4.



**Figure 3: Complications of Peritoneal Dialysis**



**Figure 4: Infective Organisms Causing Peritonitis**

## DISCUSSION

PD remains an effective renal replacement therapy for patients suffering from ESRD. In comparison to HD, PD offers several advantages in terms of a greater patient autonomy, more independency and flexibility with daily activities, less hospital visits, and decreased financial burden on the patient and healthcare system<sup>1-3</sup>. Patients in rural areas where transport is an issue could benefit from this home-based treatment<sup>4,5</sup>. In addition, it provides higher protection of residual kidney functions compared to HD<sup>1-3</sup>. Recent studies continue to prove the compatibility with potentially higher patient survival rate on PD versus HD in the first 1-3 years of commencing renal replacement therapy<sup>1-3</sup>.

PD was first introduced in the Middle East in Turkey in 1968<sup>6</sup>. Since then, the number of patients on PD increased dramatically, with variable differences among regions<sup>6</sup>. In our study, 60 stopped PD for various reasons, mainly being due to blockage, death, inadequate dialysis and transplant. In a similar study, the main reasons for discontinuing PD was due to death, transplant, refractory peritonitis, catheter malfunction and shifting to other dialysis centers<sup>7</sup>.

In this study, 12.1% of Bahraini patients are currently on PD, which is similar to the global statistics of PD worldwide<sup>4</sup>. Hassanien et al concluded that HD remains the main mode of renal replacement therapy<sup>8</sup>. In 2008, PD was 11% of the total dialysis population worldwide<sup>4</sup>. Nearly 79% in Hong Kong, 28.1% in UK, 0.02% in Egypt, 59% were in developing countries, 41% in the developed countries, the largest PD usage being in Mexico, USA, and China<sup>4,9</sup>. In 2009, the percentage of PD patients in the Middle East was 10.2% and 10.3% in Europe<sup>6</sup>.

A study conducted in China revealed that 14.1% of patients on PD, compared to 85.9% on HD, which is similar to our findings<sup>5</sup>. With the increasing prevalence of chronic kidney failure in China, the government strongly encourages the usage of PD via increasing awareness and structured PD programs<sup>5</sup>. A study in Saudi Arabia in 2012 reported 9.4% of patients on PD compared to 90.6% on HD<sup>10</sup>. These figures are similar to our study, with slight increase in our percentage of patients receiving PD. In the Middle East, Qatar was ranked the highest (26.1%), followed by Kuwait (13.2%), Yemen (8.8%) and UAE (8.3%)<sup>4</sup>.

In our study, peritonitis was encountered in 26.8% of patients. Peritonitis remains the most important and common complication of PD use reported internationally<sup>7,9</sup>. The most common cultured infective organisms were Staphylococcus Epidermidis followed by Pseudomonas Aeruginosa. Akoh reported that the most common cultured infective organism was coagulase-negative staphylococcus<sup>9</sup>. In another study in Saudi Arabia the most common organism accounting for the majority of peritonitis cases was Staphylococcus, with Staph Epidermidis representing 20% of the cases, this is similar to our findings<sup>7</sup>.

## CONCLUSION

**PD remains an effective method of renal replacement therapy and it offers several advantages in comparison to HD. Our results are consistent with most reported regional and international findings.**

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**Competing Interest:** None.

**Sponsorship:** None.

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