“The Effects of Location of Peritoneal Dialysis Training, In-Home versus In-Center, on Peritoneal Dialysis Patients ”

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Abstract

Objective:
The objective of this study is to investigate the relationship between peritonitis rates and whether peritoneal dialysis was taught in-center (n_1=104) or in-home (n_2=16) for 120 patients in a single center located in Southern Georgia. Many preceding studies have assessed the linkage between peritonitis rates and demographic factors, such as age, gender, and race among peritoneal dialysis patients. However, there is limited research that examines the effects of peritoneal dialysis training location on a patient’s chance of developing peritonitis.
Results:
Significance between peritonitis rate and location of training (P=0.352) could not be established. Additionally, all models used to analyze each variable resulted in insufficient p-values and binary r-squared values.
Summary:
Considering the use of unbalanced sample sizes and limited data, the results can be deemed misrepresentative of the general peritoneal dialysis patient population, this study finds that location of training, in-home versus in-center, may not be an accurate gauge of peritonitis risk in certain populations.

Introduction

Peritonitis is the leading reason of technique failure in patients undergoing peritoneal dialysis (PD), a renal replacement treatment conducted in a dialysis unit or at the patient’s home.[1] Previous research indicates that risk for peritonitis among PD patients include existence of diabetes mellitus, lower education level, and lower albumin levels.[2,3] Since home-based PD is an option for treatment, PD nurse trainers teach patients or caretakers how to perform their own PD in-home or in-center. Though in-center PD training appears to be a reliable option for patients, home training can be advantageous since PD trainers can assess the patient’s home environment and observe how PD patients will implement learned techniques in a different setting.[4] Previous research shows that peritonitis rate among 84 PD patients decreased by a factor of two after introducing home-based training.[5]

The limited research comparing outcomes of PD patients who were trained in-home versus in-center do not provide significant statistical information as to why improvements in-home or in-center occur. This study aims to examine the relationship between whether a PD patient was trained in-home or in-center and risk of peritonitis and factors associated with peritonitis occurrence and mortality, while accounting for demographic factors to provide detailed information on a patient’s overall health given circumstantial PD cases.

Methods and Materials

This study is a retrospective analysis for data accumulated over a period of seven years. Subjects were categorized into two groups: one group’s dialysis administrator received peritoneal dialysis training in their homes and the other group’s dialysis administrator was trained in-center. In order to eliminate latent factors, patients considered eligible for this study had to have been a patient of the facility for at least one month. The data collected includes gender, age, peritonitis occurrence, presence of family support to patient, and severity of comorbidities.

The initial analysis was conducted through SPSS using a Fischer’s test for qualitative data and Welch’s t-test for quantitative data. Further investigation was done for the primary independent variable, location of training, through a Cox proportional hazards model composed to compare the influence of in-home and in-center training on peritonitis occurrence over time on PD.

Results

The principal variable, peritonitis occurrence, showed little correlation with location of PD training, returning a correlation of just 0.013 (Cox and Snell) in a binary regression model.

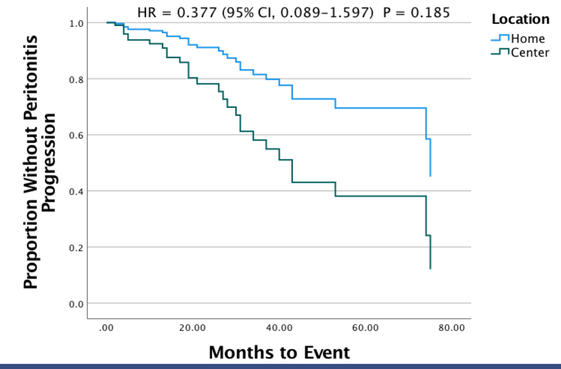
The Kaplan-Meier Plot, shown in figure 1, depicts the probability of peritonitis as a function of how long PD lasted for patients trained in different locations. The hazard ratio, 0.377, in figure 1 is provided to compare the home trained group to the center trained group, respectively, and indicates that at any time during PD, patients who were trained in home had a 62.3% lower risk of peritonitis. The confidence interval includes 1. Therefore, this result is not significant, and this finding is further verified by the log-rank p-value being over 0.05.

The baseline values shown in “Table I” provide a statistical significance value for each factor studied. In the case that location of PD training could be associated with risk of peritonitis, the factors could have been studied individually for each group. However, all factors do not meet the 95% confidence threshold to make any conclusive results against the null hypothesis and can be attributed to chance. Thus, this study does not provide sufficient evidence that location of PD training can be used to predict the likelihood of peritonitis occurrence for a PD patient.

Table 1. Baseline Characteristics for Peritonitis Occurrence Among Groups

Characteristic	All patients (n = 120)	Trained In-home (n = 16)	Trained In-center (n = 104)	P-value (2-sided)
Age (year)	62 ± 15	62 ± 14	61 ± 15	0.996
Sex (male)	66 (55%)	11 (69%)	55 (53%)	0.996
Peritonitis Occurrence, Yes	29 (24%)	2 (13%)	27 (26%)	0.352
Time on Peritoneal Dialysis (months)	19 ± 18	22 ± 22	19 ± 17	0.578
Comorbidity Rating	3 ± 2	3 ± 2	3 ± 1	0.682
Family Support, Yes	59 (49%)	10 (63%)	49 (47%)	0.292
Expired During PD, Yes	51 (42%)	8 (50%)	43 (41%)	0.591

Figure 1. Time to Peritonitis for Home Trained Patients and Center Trained Patients



Discussion

The several statistical analyses done consistently showed that no definite correlation could be found between the independent variable, location of peritoneal dialysis training, and the principal outcome, peritonitis occurrence, during peritoneal dialysis. Since all models returned p-values greater than .05, which is required for a 95% confidence level, statistical significance could not be established. Consequently, the null hypothesis fails to be rejected. Thus, this study concludes that no correlation could be found between risk of peritonitis and location of peritoneal dialysis training in a single dialysis center located in Columbus, Georgia. Furthermore, this study did not find statistically significant correlations between either age and peritonitis risk or sex and peritonitis risk.

Self Analysis

This study, however, does have several flaws. The study only includes data from 2013 to 2020, a period of seven years, while most studies covering peritonitis risk factors utilized data which spanned a decade or longer. Considering the number of subjects in the home trained group (n=16) and the center trained group (n=104), the study’s principal weakness is in its unequal sample sizes, which can lead to problems in comparative analyses and less variability within a specific group.

Conclusions

In conclusion, location of peritoneal dialysis training does not accurately predict the occurrence of peritonitis for peritoneal dialysis patients in Columbus, Georgia. Through meticulous analysis of peritonitis risk rather than mortality, this study allows for more targeted predictions to be made from existing data by allowing healthcare professionals to isolate peritonitis likelihood from risk of death, which can be a result of the patient’s comorbidities and number of comorbidities. Although no correlation between the two primary variables was found, this study did determine that location of peritoneal dialysis training is not likely to predict peritonitis risk to the same extent of predicting death during peritoneal dialysis.

References

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