Early peritonitis and its outcome in incident peritoneal dialysis patients

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INTRODUCTION

Peritonitis is a serious complication of peritoneal dialysis (PD) therapy and remains the primary reason for transfer to haemodialysis.

In addition to a heightened risk of technique failure, early peritonitis has also been associated with mortality, an increased risk of future peritonitis and higher peritonitis rate, and use of a central venous catheter on transfer to HD.

Although observational studies have identified patient- and therapy-related factors that have been associated with an increased risk of peritonitis in prevalent PD patients, it is unclear whether these factors also predict the risk of early peritonitis and its outcome in incident PD patients.

Knowledge of the risk factors for early peritonitis, along with subsequent implementation of tailored preventative strategies, may be helpful in reducing the occurrence of early peritonitis.

Therefore, this study was conducted to identify the factors that predict peritonitis and a poor peritonitis outcome within the first year of PD using data from the Australia and New Zealand Dialysis and Transplant Registry.

METHODS

This was a multicentre study which included all patients who commenced PD in Australia between 1 October 2003 and 31 December 2014.

The primary outcome was early peritonitis, diagnosed according to the International Society for Peritoneal Dialysis (ISPD) guidelines and defined as occurring within the first year of PD therapy.

Secondary outcomes examined the outcome of each peritonitis episode and included medical cure, relapse or recurrence, catheter removal, peritonitis-associated technique failure and peritonitis-associated death.

Medical cure was defined as achieving peritonitis cure with antibiotic therapy alone. ISPD definitions were used for peritonitis relapse or recurrence, peritonitis-associated technique failure and peritonitis-associated death.

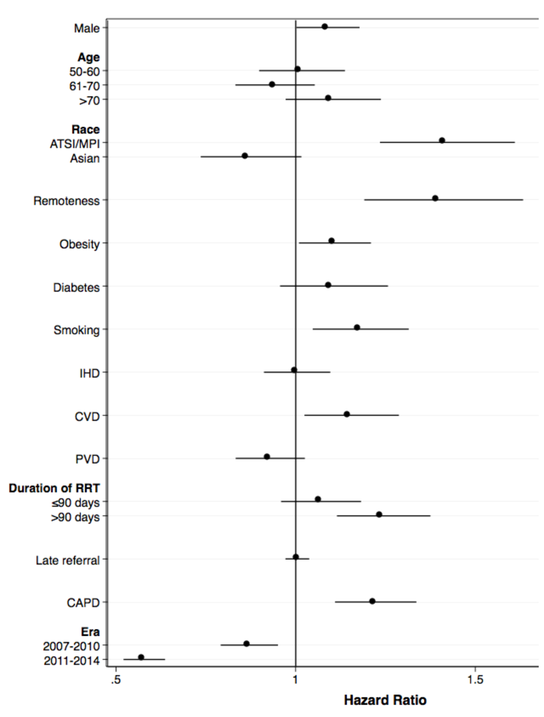
Predictors of early peritonitis were analysed using a multivariable-adjusted Cox proportional hazards model. Peritonitis outcome was examined by multivariable-adjusted logistic regression analyses, clustered by patient.

RESULTS

A total of 9845 patients commenced PD in Australia during the study. Of those, 2615 (27%) patients developed a total of 3827 episodes of peritonitis.

Patients who developed early peritonitis were more likely to be male or obese, to have a history of smoking or cerebrovascular disease (CVD), to have been treated with CAPD compared to APD, or to have previously received >90 days of renal replacement therapy. Remoteness increased the risk of early peritonitis in ATSI/MPI patients.

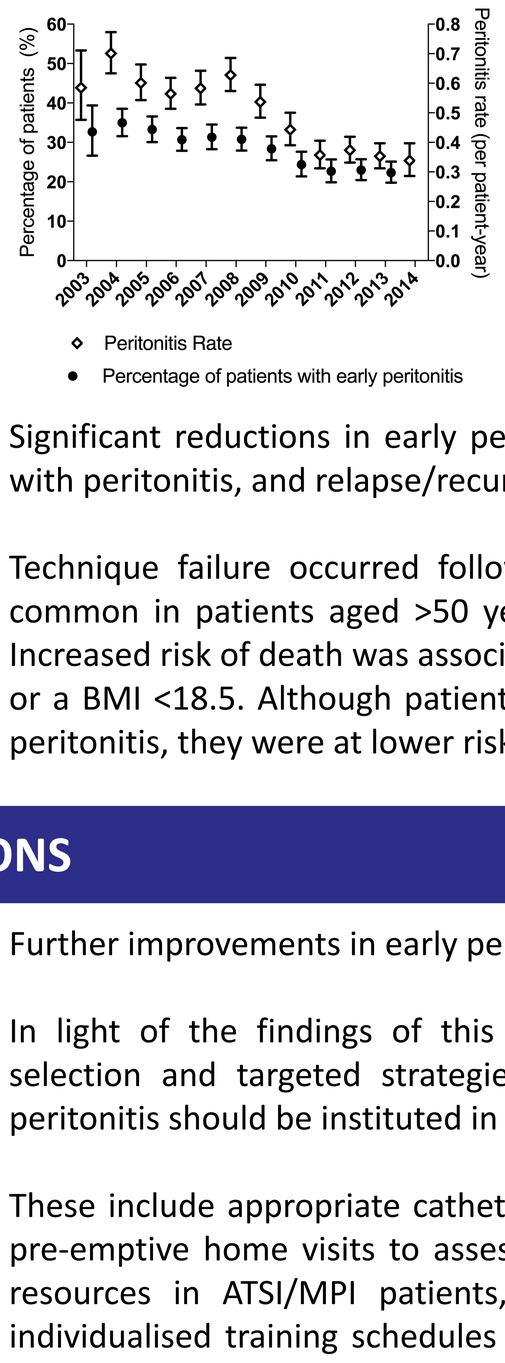
	Peritonitis (n=2615)	No peritonitis (n=7230)
Male	1576 (60)	4252 (59)
Age, years		
- <50	656 (25)	1854 (26)
- 50-70	1170 (45)	3256 (45)
- >70	789 (30)	2120 (29)
BMI, kg/m^2		
-<18.5	92 (3)	269 (4)
-18.5-30	1800 (69)	5193 (72)
>30	723 (28)	1768 (24)
Race		
-Caucasian	1874 (72)	5373 (74)
-ATSI/MPI	400 (15)	616 (9)
-Asian	170 (7)	618 (9)
Remoteness	247 (9)	353 (5)
Diabetes	1229 (47)	2976 (41)
Cerebrovascular disease	394 (15)	927 (13)
Duration of prior RRT		
- Nil	1603 (62)	4805 (66)
- ≤ 90 days	505 (19)	1275 (18)
- > 90 days	507 (19)	1150 (16)
CAPD	2016 (77)	5280 (73)
PD era		
- 2003-2006	886 (34)	1821 (25)
- 2007-2010	987 (38)	2424 (34)
- 2011-2014	742 (28)	2985 (41)

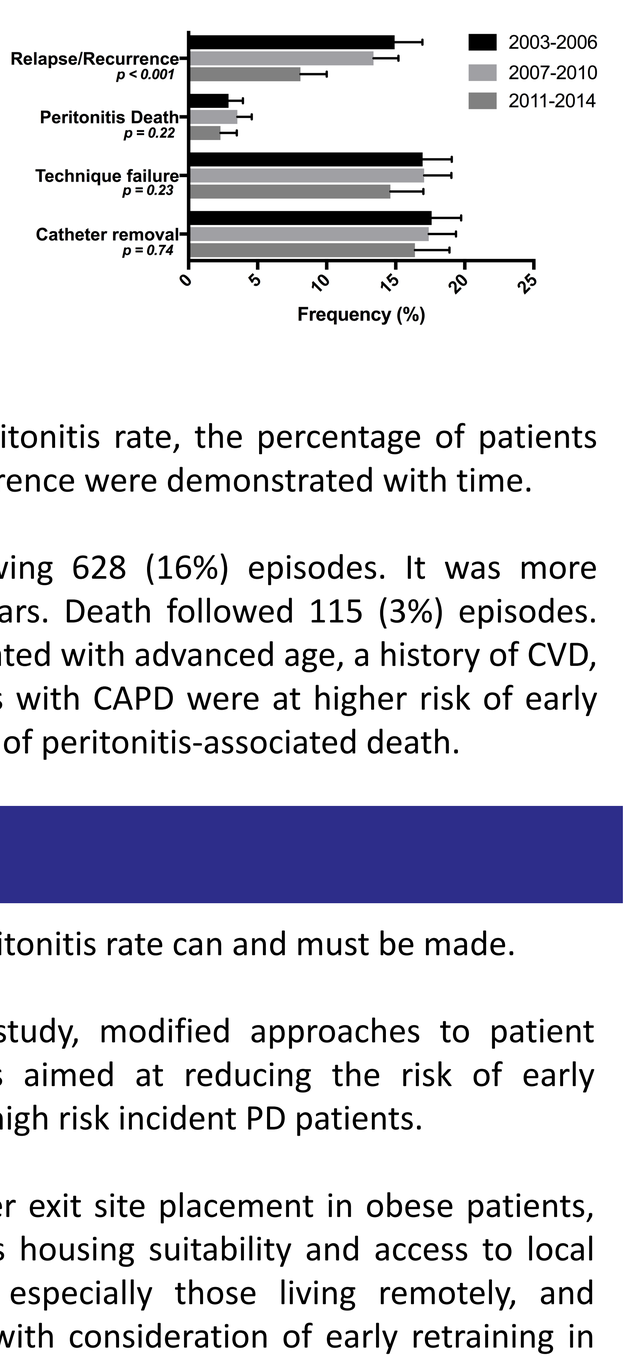


The most frequent cause of early peritonitis was coagulase negative staphylococcus (21%), followed by culture-negative peritonitis (20%), and non-*Pseudomonas* Gram negative organisms (16%).

Medical cure was achieved following 2558 (67%) episodes of early peritonitis. Cure was more likely in obese patients and in those who started PD between 2011-2014. Cure was less likely in patients aged >50 years.

Catheter removal was required after 659 (17%) episodes; it was more likely in patients aged > 50 years and those with prior RRT exposure (either ≤90 days or >90 days). Patients who were male, obese, or of ATSI/MPI race were at lower risk. A total of 320 (8%) episodes were followed by a relapse or recurrence. Patients with a history of CVD were at reduced risk.





Significant reductions in early peritonitis rate, the percentage of patients with peritonitis, and relapse/recurrence were demonstrated with time.

Technique failure occurred following 628 (16%) episodes. It was more common in patients aged >50 years. Death followed 115 (3%) episodes. Increased risk of death was associated with advanced age, a history of CVD, or a BMI <18.5. Although patients with CAPD were at higher risk of early peritonitis, they were at lower risk of peritonitis-associated death.

CONCLUSIONS

In this large cohort of PD patients from Australia, early peritonitis was associated with male sex, obesity, smoking, CVD, CAPD, and previous RRT. Living remotely increased the risk of early peritonitis in patients of ATSI/MPI race.

Although obesity was associated with an increased risk of early peritonitis, it was also associated with an increased likelihood of medical cure.

A key finding of this study was the substantial improvement in early peritonitis rate and increase in early peritonitis cure across time. This likely reflects continuous quality improvement initiatives instituted across Australia in 2009.

Further improvements in early peritonitis rate can and must be made.

In light of the findings of this study, modified approaches to patient selection and targeted strategies aimed at reducing the risk of early peritonitis should be instituted in high risk incident PD patients.

These include appropriate catheter exit site placement in obese patients, pre-emptive home visits to assess housing suitability and access to local resources in ATSI/MPI patients, especially those living remotely, and individualised training schedules with consideration of early retraining in high risk patients.

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Peritoneal dialysis I
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