National rates of admission, mortality and post-peritonitis technique survival according to day of the week in English peritoneal dialysis patients

James Fotheringham[1,2], Mike Campbell[2], Martin Wilkie[1]

1. Sheffield Kidney Institute, 2. School of Health and Related Research, University of Sheffield

Introduction

Admissions and deaths have been shown to vary according to day of the week in patients receiving haemodialysis [(1)].

Patients with a range of chronic diseases are more likely to be admitted to hospital on a Monday, and have higher hospital associated mortality at the weekend [(2,3,4)].

We set out to explore associations between day of the week, event rates and outcomes in patients receiving peritoneal dialysis (PD) in England.

Methods

Patients and Data Sources

Information on patients receiving PD from a cohort of patients starting renal replacement therapy in England between 2002 and 2006 with follow-up until 2009 collected by the UK Renal Registry was linked to hospitalisation data in the form of the Hospital Episode Statistics database (HES).

Acute admission rates, admission for PD Peritonitis and mortality rates (in hospital and out of hospital) by day of the week whilst receiving PD were determined.

An admission for peritonitis was defined as an acute admission with primary ICD10 diagnosis code of:

- *Inf inflamm react due oth int prosth devs implants & grafts (T857)*
- *Peritonitis, unspecified (K659)*
- *Acute peritonitis (K650)*
- *Acute reaction to foreign subst accident left during a procedure (T816)*
- *Infect inflamm reac due oth card vasc devs implant and graft (T827)*
- *Other peritonitis (K658)*
- *Other disorders of the peritoneum in infections diseases EC (K678)*

A death out of hospital as defined as a UKRR reported death without an associated HES coded in hospital death.

Statistical Methods

Confidence limits on estimated rates and differences between rates were determined using the Poisson distribution. 90 day technique survival following admission for PD peritonitis according to day of the week was analysed using cox regression with a random effects term for renal centre to factor the varying threshold different centres have for admitting patients with PD peritonitis. Technique survival for each day was compared to Wednesday when services should be optimal.

All statistical analyses were performed using R (R Foundation for Statistical Computing, Vienna, Austria).

References

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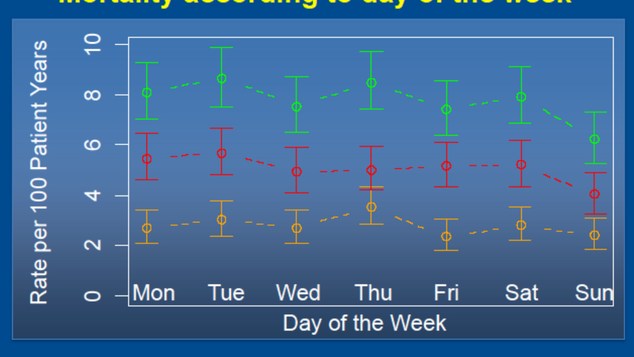
Results

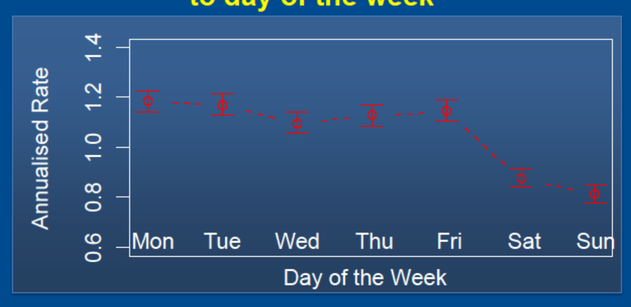
27,649 admissions in 6363 patients over 17,620 patient years were available for analysis. Rates of events according to day of the week are as follows:

Mortality according to day of the week



Mortality rate for all locations was 7.8 per 100 patient years and was stable across the week for both in hospital and out of hospital locations (5.0 and 2.8 per 100 patient years respectively). 65% of deaths occurred in hospital, similar to that reported for haemodialysis patients. CDC/NCHS data shows a similar flat rate for mortality according to day of the week in the general population[(5)].

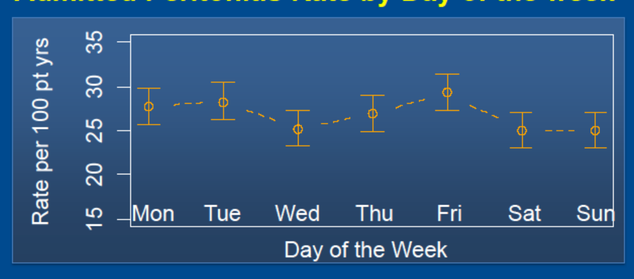
Emergency admission rate according to day of the week



Acute admission rate was 1.15/year for Monday to Friday and 0.85/year for the weekend (P<0.001), a reduction of 26%.

General population acute admission rates have been shown to be 25% lower over the weekend [(4)].

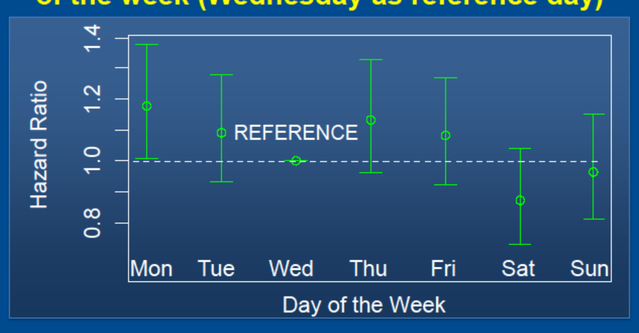
Admitted Peritonitis Rate by Day of the week



Admitted peritonitis rate was slightly lower at the weekend (25.0 vs 26.5 per 100 patient years, P=0.004).

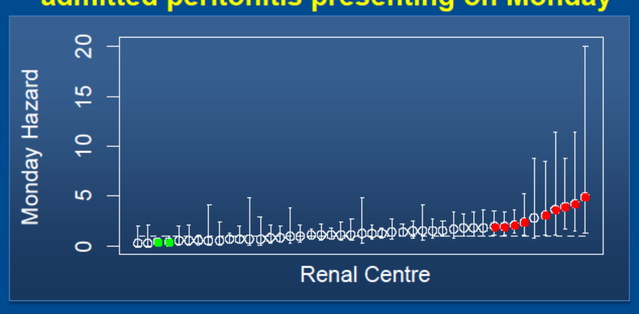
Given the absence of outpatient facilities to treat peritonitis over the weekend, one might expect the admitted peritonitis rate to be higher over this period.

Hazard for technique failure according to day of the week (Wednesday as reference day)



Compared with admission with peritonitis on a Wednesday, Monday was associated with an increased risk of technique failure (hazard ratio 1.18, 95% CI 1.01 - 1.38, P=0.04) an association that persisted adjusting for age, comorbidity, ethnicity and including death as a technique failure event (hazard ratio 1.20, 95% CI 1.02 - 1.40 P=0.027).

Centre-specific hazard for technique failure for admitted peritonitis presenting on Monday



When comparing the hazard for technique failure at 90 days in patients being admitted with PD peritonitis on Monday to those admitted on a Wednesday, centre specific rates varied significantly.

Conclusions

- Unlike haemodialysis patients, PD patients do not demonstrate day of the week variation in mortality rates but are less likely to be admitted at the weekends.
- The lower hospitalisation rate for peritonitis at weekends may represent either patient reluctance to report ill health at weekends, or greater difficulty in accessing medical care.
- The increase in technique failure on Monday may represent a proportion of patients developing PD peritonitis over the weekend who delay their presentation with adverse consequences.
- Practice patterns, service availability and patient perceptions need to be explored to understand factors influencing presentation and treatment of PD peritonitis over the weekend.

Please contact james.fotheringham@nhs.net for more information.

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James Fotheringham

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