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Vancomycin dosing for peritoneal dialysis-related peritonitis: a single centre experience

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Background
Peritoneal dialysis (PD) related peritonitis is one of the serious complications of PD and needs prompt early treatment with appropriate antibiotics. Vancomycin is a commonly used antibiotic for this condition as it can be safely instilled intraperitoneally and has longer duration of action due to reduced clearance secondary to renal impairment. Plasma vancomycin level could be affected by various factors including the level of residual renal function which could be significant in PD patients. There is no recommended national or international consensus on the frequency of vancomycin dosing in PD patients due to lack of pharmacokinetic data.

Methodology
In our centre, we changed practice from vancomycin dosing once a week for PD peritonitis to more frequent dosing till 10th day from the start of antibiotic course. Vancomycin was administered on days 1, 3, 5 and 10 of an infection episode. Plasma vancomycin level was checked prior to every dose and dose adjustment was made based on the level on the same day. Residual renal function was measured as renal urea clearance (Kru) through 24-hour urine collection. Data was collected prospectively for a period of 1 year following change in the administration protocol.

Results
A total of 9 PD peritonitis episodes in 4 patients were treated using vancomycin over a period of 12 months. The mean age of the participants was 64.6 (± 14.8) years and the mean weight was 75 (± 7.1) kg. All patients received 30mg/kg of vancomycin on day 1. The mean plasma vancomycin levels were 18.8 (± 1.9), 26.9 (± 4.4) and 22 (± 3.2) mg/L on days 3, 5 and 10 respectively. Except in 1 patient episode, the levels were above the therapeutic range on day 5 for all other episodes. Plasma vancomycin levels were within the therapeutic range on days 3 and 10 in all patient episodes. In 2 episodes, drug levels tested on day 6 or 7 showed the levels to be in therapeutic range. There was a poor correlation between vancomycin level and Kru for both day 3 ($r = 0.04$) and day 5 ($r = 0.19$).

Discussion
Whilst dosing vancomycin once a week may be sub-therapeutic in PD peritonitis, more frequent dosing run the risk of causing vancomycin toxicity. Our study findings indicate accumulation of the drug does happen in PD patients as evidenced by plasma drug level above the therapeutic range on day 5 and return to therapeutic level on day 10 following a longer dosing interval. Our data also suggests there should be a minimum of 3 days interval between consecutive vancomycin doses. The effect of residual renal function on vancomycin level may not be significant at low levels of eGFR and hence, should not necessitate more frequent dosing. We intend to change our dosing protocol based on these results to reduce the risk of vancomycin toxicity through accumulation secondary to frequent dosing.