Prediction of Treatment Failure Using Dialysate White Blood Cell Changing Pattern in Peritoneal Dialysis-related Peritonitis

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Background: Peritoneal dialysate white blood cells (WBC) count is an important prognostic factor for treatment failure of peritoneal dialysis (PD)-related peritonitis. Few studies have reported the patterns of change in dialysate WBC; however, they are not able to show a strong association between these patterns and outcome measures.

Objective: This study aimed to validate our published criteria of WBC changing pattern after initial antibiotic treatment for the prediction of treatment failure.

Methods: A retrospective cohort study was conducted in Banphaeo Hospital. All PD-related peritonitis episodes from January 2016 to December 2016 were reviewed. The dialysate WBC reduction rate was based on data from our previous study. They were categorized into three groups, based on rate reduction of dialysate WBC at day 3: early response (WBC <3% of baseline), delayed response (WBC 3-33% of baseline), and failure patterns (WBC >33% of baseline). Treatment failure was defined as either peritonitis-associated death or transferring to hemodialysis. We calculated the predictive value for each pattern and demonstrated predictive ability to treatment failure. The receiving-operating characteristics (ROC) curve was compared to the traditional criteria of dialysate WBC at day 5 >100 cell/mm³.

Results: There were 196 adult patients with 258 episodes of PD-related peritonitis for analysis: 112 (43.4%) early response, 76 (29.5%) delayed response, and 70 (27.1%) failure pattern. The initial antibiotic regimen was intraperitoneal cefazolin (87.6%) and ceftazidime (89.2%). Overall treatment failure rate was 23.3%. The predictive value of treatment failure was 8%, 11%, and 61% in early response, delayed response, and failure pattern, respectively. Using the traditional criteria, the predictive value of failure rate was 52%. Both criteria had a similar value describing the area under ROC curve (WBC pattern criteria 79.0, 95%CI: 0.72-0.86; traditional criteria 81.7, 95%CI: 75.6-87.7; p = 0.377).

Conclusion: Dialysate WBC changing pattern during the first three days of peritonitis treatment yields a good prediction of treatment failure in PD-related peritonitis. This pattern can be suggested as alternative criteria to predict outcome of treatment.

Keywords: PD-related peritonitis, Prediction, Treatment failure