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Risk Factors of Peritoneal Dialysis Associated Peritonitis Caused by Gram-Negative Bacteria: A Single-Center Retrospective Study Over 16 Years

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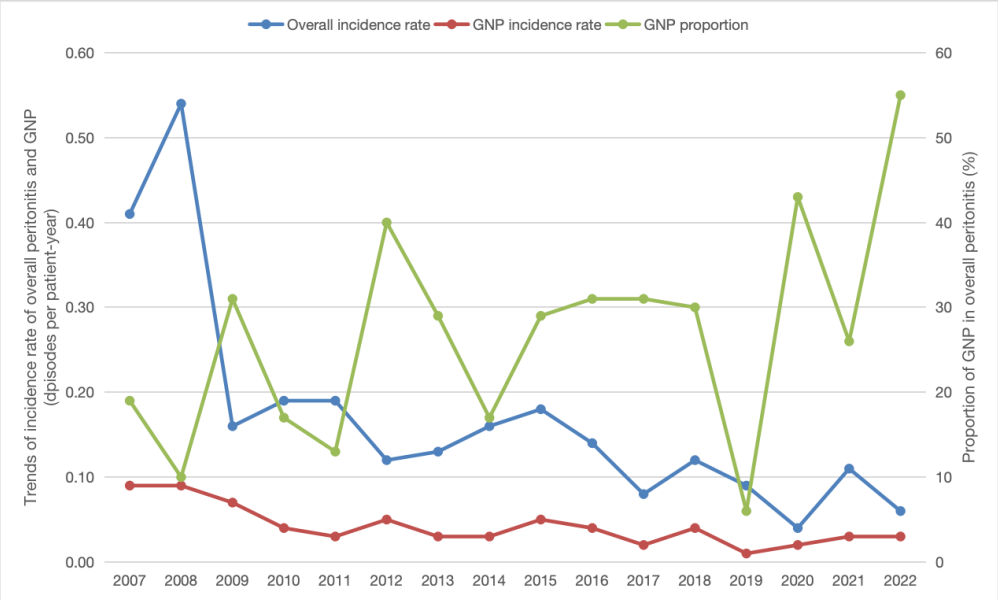
Objectives : To analyze the clinical characteristics, pathogen distribution, and treatment outcomes of peritoneal dialysis associated peritonitis (PDAP) caused by gram-negative bacteria, and explore the risk factors for the occurrence and treatment failure of gram-negative bacterial peritonitis.
Methods : We performed a single-center retrospective study included 544 PD patients who underwent regular follow-up between January 1, 2007, and December 31, 2022. After excluding culture-negative peritonitis, fungal peritonitis, and tuberculous peritonitis, based on the pathogens, all episodes were divided into the gram-negative peritonitis group (GNP) and the non-gram-negative peritonitis group (non-GNP). Demographic characteristics, laboratory examinations, pathogenic bacteria, and treatment outcomes were collected and compared between the two groups of peritonitis.
Results : Over the course of 16 years, 297 episodes of peritonitis occurred in 179 patients. Although the overall incidence of peritonitis is showing a year-on-year downward trend, the incidence of GNP has not changed significantly. However, the percentage of GNP cases among all peritonitis cases is on the rise. Among 226 cases of peritonitis included in the study, Escherichia coli was the main pathogen responsible for gram-negative bacterial peritonitis in our center (37/80, 46.3%), followed by Klebsiella pneumoniae (9/80, 11.3%). In terms of treatment outcomes, the GNP group had significantly higher rates of developing refractory peritonitis, treatment failure, and peritonitis-associated death compared to the non-GNP group ($p<0.001$ for all). Multivariate logistic regression analysis revealed that enteric infection was an independent risk factor for GNP occurrence (OR=6.315, 95% CI3.364-11.854, $p<0.001$). White blood cell counts on day 3 of peritoneal effluent (OR=2.666, 95%CI 1.099-6.469, $p=0.030$) and post-PDAP blood white blood cell counts (OR=1.389, 95%CI 1.060-1.820, $p=0.017$) were independent risk factors for treatment failure in GNP.
Conclusions : GNP cases are prone to have a poorer prognosis compared to non-GNP cases. Therefore, it is important to strengthen preventive measures for PD patients and reduce the risk of enteric infection.

GNP 发生率和百分比.png


Overall incidence rate
GNP incidence rate
GNP proportion
Trends of incidence rate of overall peritonitis and GNP (dpisodes per patient-year)
Proportion of GNP in overall peritonitis (%)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
60
50
40
30
20
10
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022