

LETTER TO THE EDITOR

Adjusting for Underestimated Percentage in Prognostic Factor Analysis of Bacterial DNA Translocation in Cirrhotic Patients

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PCR testing is critical in clinical medicine, especially for identifying bacteria in patients with diseases like spontaneous bacterial peritonitis (SBP) and cirrhosis. Mani et al. discovered that bacterial DNA (bactDNA) detected via PCR testing was a predictor for mortality in patients who recovered from SBP. PCR testing has a sensitivity of 29.1% for identifying bacteria in SBP patients and an 84.6% concordance with blood culture methods [1]. Thanapirom et al. found that bactDNA translocation was related with overt hepatic encephalopathy (HE) and increased mortality rates in cirrhotic patients [2]. In this investigation, PCR testing identified bactDNA in 36.1% of individuals, with larger amounts observed in patients with overt HE than in those without HE [2]. In this investigation, PCR testing showed bactDNA in 36.1% of patients, with higher amounts seen in patients with overt HE compared to those without [2]. According to Thanapirom et al., the findings of the multivariate Cox regression analysis revealed that the following variables were independent of six-month mortality: “age (HR = 1.05, 95% CI: 1.000 - 1.002), baseline IL-6 (HR = 1.001, 95% CI: 1.000 - 1.002), MELD score (HR = 1.12, 95% CI: 1.09 - 1.16), and bactDNA translocation (HR = 2.49, 95% CI: 1.22 - 5.11) [2].”

It is probable that the true frequency of bacterial DNA translocation in cirrhotic individuals is understated due to the PCR test's sensitivity problem. This may affect the validity of the correlation found in these patients be-

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tween bactDNA translocation and death. Thus, to validate the predictive significance of bacterial DNA translocation in cirrhotic patients, additional research utilizing more sensitive bacterial detection techniques is required. In this case, we can calculate the underestimated percentage for the sensitivity of the PCR test in identifying bacterial DNA in cirrhotic patients.

Using the formula provided:

”Underestimated Percentage = ((Actual Outcome - Predicted Outcome)/Actual Outcome) x 100”

Given the information that the sensitivity of the PCR test was 29.1% and the concordance with blood culture was 84.6%, we can calculate the underestimated percentage as follows:

Predicted Outcome = 29.1%, Actual Outcome = 84.6% and Underestimated Percentage = $((84.6 - 29.1)/84.6) \times 100 = 65.6\%$

As a result, 65.6% is the understated proportion for the PCR test's sensitivity in detecting bacterial DNA in cirrhotic individuals.

By applying the underestimated percentage to the initial anticipated outcome, the new prognostic factor analysis for the association between bacterial DNA translocation and death in cirrhotic patients can be adjusted after accounting for this underestimation rate. This adjustment may increase the analysis's precision and yield more trustworthy outcomes.

With the updated sensitivity of 65.6%, the new findings for the original data can be computed as follows:

For bactDNA translocation, the HR of 2.49 would be adjusted to $2.49/0.656 = 3.80$

For MELD score, the HR of 1.12 would be adjusted to $1.12/0.656 = 1.71$

For age, the HR of 1.05 would be adjusted to $1.05/0.656 = 1.60$

For baseline IL-6, the HR of 1.001 would be adjusted to $1.001/0.656 = 1.53$

Therefore, with the adjusted sensitivity of 65.6%, the new results for the factors associated with six-month mortality would be: bactDNA translocation (HR = 3.80, 95% CI: 1.22 - 5.11), MELD score (HR = 1.71, 95% CI: 1.09 - 1.16), age (HR = 1.60, 95% CI: 1.000 - 1.002), and baseline IL-6 (HR = 1.53, 95% CI: 1.000 - 1.002).

In conclusion, it is critical for more precise clinical decision-making to recalculate hazard ratios for prognostic markers like bactDNA translocation in cirrhotic patients after taking into consideration the PCR testing's underestimated sensitivity. Healthcare professionals can enhance the accuracy of prognostic factor evaluations and gain a deeper comprehension of how bactDNA translocation affects patient outcomes by modifying the understated percentage.

Declaration of Interest:

None.

References:

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