The Suppression Variables in Clinical Research

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Mitchell H. Katz mentions the suppression variable upon carrying out a multivariate analysis in his literary work, "Multivariate Analysis" [1]. This is a variable that increase the predictive validity of another variable by inclusion into a regression equation [2, 3]. Moreover, such effect is referred to as the suppression effect. In confounding, the relationship is reduced because the third variable removes distortion due to the confounding variable. However, it is possible that the statistical removal of a mediational or confounding effect could increase the magnitude of the relationship between the independent and dependent variable. Such a change would indicate suppression [2, 3].

Katz mentions the article by Denise M. Cardo which indicates the utilization of preventive internal administration of zidovudine (AZT) upon accidental injection of HIV as an example of a suppression effect [1, 4]. They carried out a case-control study on 33 health-care providers who had become infected with HIV due to accidental injection and 679 health-care providers who did not become infected to HIV due to accidental injection. Upon univariate analysis, no significant difference was observed between infected persons and non-infected persons regarding the preventive internal administration of zidovudine following accidental injection (infected persons: 9/33 (27%), non-infected persons: 247/679 (36%); odds ratio 0.7; P = 0.35). However, when the severity of injury was adjusted according to a multiple logistic regression analysis, the preventive internal administration of zidovudine following accidental injection was significantly smaller in the infected persons compared to the non-infected persons (odds ratio: 0.19; P = 0.003). Accordingly, it was exhibited that preventive internal administration of zidovudine following accidental injection was effective in preventing HIV infection. In this study, there were many more serious exposures in the infected group and it was believed that confounding was caused upon univariate analysis because more serious exposures had a causal relationship with HIV infection.

We recently carried out an analysis on the effect of the preoperative serum fibrinogen level on the prognosis of hepatocellular carcinoma patients [5]. Whereupon, no statistically significant difference was observed regarding the fibrinogen level at P = 0.069 and the patient outcome upon univariate analysis. However, when multivariate analysis was carried out using the Cox proportional hazard model upon adjusting according to the patient-liver sparing ability and tumor factor, the serum fibrinogen level became an independent prognosticator (hazard ratio: 1.236; P = 0.046; 95%CI 1.004-1.523). From this research, it was believed that the serum fibrinogen level was a suppression variable.

When clinical research is carried out, the prognosticator of the patient, risk factors of the disease, etc. are investigated using multivariate analysis. We should recognize that there is a danger of relying on univariate analysis for variable selection.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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