Comments on "The Correlation of Epidural Fibrosis with Epiduroscopic and Radiologic Imaging for Chronic Pain after Back Surgery"

To the Editor:

With great interest, we read the article entitled "The Correlation of Epidural Fibrosis with Epiduroscopic and Radiologic Imaging for Chronic Pain after Back Surgery" by Guner et al. (1) recently published in the December 2021 issue. We congratulate the authors for validating the effectiveness of epiduroscopic imaging in detecting epidural fibrosis (EF) from a series of patients (n = 61) after back surgery. They concluded that epiduroscopy might be more sensitive than magnetic resonance imaging (MRI), particularly when it comes to the early identification of low-grade EF as a potential source of pain in patients with failed back surgery syndrome (2-4). However, we would like to present several concerns regarding the statistical analyses which might be not rigorously performed and thus undermine their findings.

First, there existed certain inconsistency and ambiguity when they reported the interval from back surgery to epiduroscopic imaging or MRI. As stated in the Method paragraph, continuous variables with non-normally distribution were described as median (minimum-maximum) and between-group comparisons were performed with the Mann-Whitney test, while mean ± standard deviation and t-test for Gaussian-distributed variables, which was indeed the common practice. Notably, there were only 2 quantitative variables in the original tables: age (Table 1) and interval (Table 2). Both variables were shown as mean ± standard. Given that the standard deviation was so close to the mean in the original Table 2 (e.g., men 3.30 ± 2.79), the interval was unlikely to conform to a normal distribution, and thus the median (minimum-maximum) should be given instead. The authors continued to explore the correlations between the degree of EF and the elapsed time (the original Table 3), nevertheless, without clearly stating whether Spearman's correlation coefficients (if either variable conforms to a non-normal distribution) or Pearson's correlation coefficients (if both variables were normally distributed) were employed (5,6). The interval after surgery is of great significance since the cumulative incidence and the degree of EF are supposed to gradually increase as the epidural fibrotic tissue grows with time (7). To draw a convincing conclusion, however, I would suggest that the authors should check the variable's conformity to a normal distribution and clearly state the correlation test adopted when examining the relationship between the interval after surgery and the detection of EF by epiduroscopy or MRI.

Secondly, the authors might have mistaken the ordinal variable for the nominal variable when it comes to the fibrosis degree and the surgery type. Nominal variables imply no inherent rank between values, such as the gender in the article, whereas ordinal variables imply an ordered series, such as the degree of fibrosis on a scale of 1 to 4. According to the Methods and Results, nominal variables were compared using Pearson's Chi-square tests extensively in the article. The authors examined the relationship between the surgery type (nonextensive, moderate, to extensive) and the fibrosis degree detected by edipuroscopic imaging (grade 1 to 4) or the fibrosis degree detected by MRI (no, mild, moderate, high, serious) in the original Table 7 and 8, respectively. In the scenario, either for the fibrosis degree or the surgery type, the possible values were apparently ordered. And then, Kruskal-Wallis H test (8,9), a rank-based nonparametric test should be conducted to determine whether the overall difference in the fibrosis degree between different surgical groups reached statistical significance. As a matter of fact, Pearson's Chi-square tests were commonly incorrectly used when researchers failed to discern the ordinal variable from the nominal variable in R×C tables (2 categorical variables with R and C levels). Likewise, the authors might as well double check the statistical methods utilized when exploring the relationship between the fibrosis degree and the symptoms on admission (the original Table 4 and 5) and the consistency of the fibrosis degree detected by epiduroscopy and MRI (the original Table 9).

In the article (1), epiduroscopic imaging seems to be an effective technique to sensitively identify EF in patients with post-surgical back pain. Moreover, only when the data are rigorously analyzed and more pilot studies are performed, should we be able to accu-

mulate high-quality and sufficient evidence to inform clinical diagnosis and intervention.

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