Calculating Likelihood Ratios in Patients With Giant Cell Arteritis

To the Editor: Younge et al\(^1\) provide a landmark study that will allow clinicians to determine accurately the probability of giant cell arteritis in patients before temporal artery biopsy. Nonetheless, Table 3 in their article is confusing because it uses a novel definition of negative likelihood ratio (LR). Likelihood ratios are defined conventionally as the probability of a particular finding in patients with disease divided by the probability of the same finding in patients without disease.\(^2\) An LR is “positive” when it refers to the presence of the finding; it is “negative” when it refers to the absence of the finding. Therefore, a negative LR is the proportion of patients with disease lacking a particular finding divided by the proportion of patients without disease also lacking the same finding. It is calculated as \((1–\text{sensitivity})/\text{specificity} = 1 \text{ – sensitivity} / (1 \text{ - specificity})\), as the authors suggest. The negative LRs presented in Table 3 in their article are the inverse of what most clinicians are used to seeing.

Also in Table 3, the finding of normal erythrocyte sedimentation rates (ESRs) in patients not taking corticosteroids has a sensitivity of 99.6%, which is confusing because it implies that almost all patients with a positive biopsy had normal ESRs. Did the authors intend these numbers to refer to “abnormal ESR” in patients not receiving corticosteroids?

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In reply: We thank Dr McGee for his letter and for his interest in our study on temporal artery biopsies.\(^1\) As he noted, LRs compare the probability of a particular positive or negative test result in patients with a disease to the probability of the test result in those without the disease. As we described in the “Patients and Methods” section of our article, we chose to invert the formula for calculating negative LRs. We believed that this would make comparisons of positive and negative LRs easier, as suggested by Feinstein\(^2\) and Weissler.\(^3\) Ordinarily, calculated according to the “conventional” method, positive LRs become larger as proportions of patients with the disease and negative in increasing proportions of patients without the disease. A direct relationship exists between the ratio and its power to predict disease. However, negative LRs become smaller as a negative test becomes more powerful in predicting the absence of disease—that is, there is an inverse direction of the ratio and its strength to predict the absence of disease. According to the method we used,\(^2,3\) both types of ratios are expressed along a common numerical scale, i.e., both positive and negative ratios become larger as they separate patients with a disease from those without it. In the method we used, positive LRs are calculated as true positives divided by true negatives, and negative LRs are calculated as true negatives divided by false negatives. Importantly, in the “conventional” method, both positive and negative LRs calculate results for the presence of disease, whereas in the method we used, the positive LR calculates for the presence of disease, but the negative LR calculates for the absence of disease.

Regarding Dr McGee’s second question about Table 3, the entry for the ESR in patients not taking corticosteroids at the time of the biopsy should have read “Abnormal ESR” as he suggests, rather than the typographic error “Normal ESR.”

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CORRECTIONS

Incorrect variable: In the article by Younge et al entitled “Initiation of Glucocorticoid Therapy: Before or After Temporal Artery Biopsy?” published in the April 2004 issue of the Mayo Clinic Proceedings (Mayo Clin Proc. 2004;79:483-491), Table 3 on page 486 contained a mislabeled variable. The seventh entry from the bottom of the “Variable” column should read “Abnormal ESR†.”

Incorrect unit: In the article by Silber et al entitled “An Algorithm for the Management of Restless Legs Syndrome,” published in the July 2004 issue of the Mayo Clinic Proceedings (Mayo Clin Proc. 2004;79:916-922), an incorrect unit for serum ferritin was printed in the first, fourth, and 20th lines in the left-hand column on page 918 and in all answer choices for question 1 on page 921. The correct unit for serum ferritin is \(\mu g/L\).