Treacherous statistics

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Each title is necessarily an abbreviation. What I had in mind is the following: the dangers of statistics poorly understood and/or poorly applied. For instance, the generally accepted rule, that any statistically evaluated difference with $P<0.05$ is statistically significant and difference with $P>0.05$ is nonsignificant. This criterion is, of course, arbitrary and relative. In my scientific beginnings, we tried to express this relativity by using expressions such as 'borderline significance' ($P<0.1$), significant ($P<0.01$) and highly significant ($P<0.001$). However, even more dangerous is accepting that differences in the category 'nonsignificant' (ie, $P>0.05$) are nonexistent. Absence of proof is not the same as proof of absence (1).

Another oversimplification in commonly used statistics is an undue reliance on average values without examining their distribution. Incidentally, the presence of normal distribution is a prerequisite of parametric tests. Sometimes, variability of the data may have an equal or larger effect on the final outcome than their average values. For instance, in our theoretical study on the effect of inhomogeneity of the capillary net geometry on cardiac tissue oxygenation (2), we found that an increased variability in intercapillary distance was an independent determinant of cardiac oxygenation.

Computer programs have immensely improved our ability to mathematically evaluate collected data. Nevertheless, we should be aware of the meaning of their printouts.

REFERENCES

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