Propensity Score or Simply Logistic Regression?

To the Director

I have read the article Short and Long-Term Risk of Coronary Artery Bypass Graft Surgery in Acute Coronary Syndrome, by Camporrotondo et al. (1) It has called my attention that the authors used a propensity analysis to adjust for risk score the groups with acute coronary syndrome and chronic stable angina. Why did the researches not use a traditional logistic multivariable analysis to rule out non-ST segment elevation acute coronary syndrome (NSTE-ACS) as a variable associated with higher mortality rate? The simple exclusion of NSTE-ACS from the final multivariate model would have explained that this variable was not associated with higher operative risk. In any case, using a propensity score in this study would have been useful for adjusting and comparing the results of the surgery versus angioplasty for the treatment of NSTE-ACS. (2)

It is worth mentioning Albert Einstein's advice: If you are out to describe the truth, leave elegance to the tailor.

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2. Rubin DB. Estimating causal effects from large data sets using propensity scores. Ann Intern Med 1997;127:757-63. http://doi.org/29d

Authors' Reply

On behalf of the authors, we would like to thank Dr. Borracci for his comments on our study *Short and Long-Term Risk of Coronary Artery Bypass Graft Surgery in Acute Coronary Syndrome. (1)*

Dr. Borracci expresses his concern about the proper use of balancing score methods. He suggests a traditional logistic multivariate analysis to rule out non-ST segment elevation acute coronary syndrome (NSTE-ACS) as a variable associated with higher mortality. We agree to some extent. While it is true that traditional logistic multivariate analysis is a valid method to adjust for risk score, using propensity score carries several advantages over that method. (2) Logistic regression for risk adjustment implies equal distribution of covariates (i.e., similar baseline characteristics) between both groups –which rarely occurs, as mentioned by Blackstone in his publication *Comparing apples and oranges*. (3) In contrast, nothing in the standard output of any regression modeling software will display this critical fact. The reason is that models predict an outcome (such as death) from regressors (such as age and treatment indicators), and standard regression diagnostics do not include careful analysis of the joint distribution of the regressors (such as a comparison of the distributions of age across treatment groups). When the overlap on age is too limited (i.e., differences in baseline characteristics), the database, no matter how large, cannot support any causal conclusions about the differential effects of the treatments. (4) On the contrary, it is possible to obtain comparable populations using balancing scores. These scores constitute a kind of multivariate analysis used to identify subjects with similar likelihood of belonging to either group, allowing the comparison of nonrandomized populations. Thus, the different result between two populations with similar balancing score belonging to a different group provides unbiased estimation of the treatment effect (or adjusted for risk). (5)

For those reasons, when the purpose is to find two comparable populations, we agree with D. B. Rubin, who states –in the same article mentioned by Dr. Borracci– that "*propensity score methods are more reliable tools for addressing such objectives because the assumptions needed to make their answers appropriate are more assessable and transparent to the investigator*". (4)

Once again, we would like to thank Dr. Borracci for his comments on our study and, last of all, reply to Albert Einstein by saying that surgeons, like tailors, must be elegant in the art of suture as a means of showing true surgical outcomes that help take the best decisions for patients.

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