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Who Do You Want Taking Care of Your Parent?

Specialist or generalist? The question of which physicians are best suited to treat patients with a single condition or in a particular care setting has been the subject of study and debate for decades.¹⁻³ Investigators have asked whether cardiologists provide better care for patients with acute myocardial infarction¹ or whether intensivists achieve superior outcomes in critical care settings.² One implication of these studies is that a hospital or health plan armed with this knowledge would be capable of improving outcomes by directing a greater proportion of patients to the superior physician group. In fact, much of the literature reporting on the effect of hospitalists is simply a new variation on this old theme.⁴⁻⁸ Of course, to realize any potential gains, there must be an adequate number of specialists or the ability to increase the supply quickly. Neither option tends to be especially realistic. Further, these studies have a tendency to create false dilemmas because consultation and comanagement are more common than single-handed care.

Because studies comparing the outcomes of physician groups are generally not randomized trials, minimizing the threat of selection bias (ie, patient prognosis influencing treatment assignment) is of paramount importance. For example, one can imagine how patients with a particularly poor prognosis in the setting of acute myocardial infarction (perhaps related to age or the presence of multiple comorbidities) might be preferentially directed toward a general medicine service, especially when remunerative cardiac intervention is unlikely. In such instances, comparing simple mortality rates would erroneously lead to the conclusion that patients cared for by cardiologists had better outcomes.

Multivariable modeling techniques like logistic and liner regression and more recently, propensity-based methods, are the standard approaches used to adjust for differences in patient characteristics stemming from nonrandom assignment. When propensity methods are used, a multivariable model is created to predict the likelihood, or propensity, of a patient receiving treatment. Because it is not necessary to be parsimonious in the development of propensity models, they can include many factors and interaction terms that might be left out of a standard multivariable logistic regression. Then, the outcomes of patients with a similar treatment propensity who did receive the intervention can be compared to the outcomes of those who did not. Some have gone so far as to use the term pseudorandomized trial to describe this approach because it is often capable balancing covariates between the treated and nontreated patients. However, as sophisticated as this form of modeling may be, these techniques at best are only capable of reducing bias related to *measured* confounders. Residual bias from confounders that go unmeasured remains a threat—and is particularly common when relying on administrative data sources.

In this issue of the *Journal of Hospital Medicine*, Gillum and Johnston⁹ apply a version of instrumental variable analysis, a

technique borrowed from econometrics, to address the issue of unmeasured confounding head-on. The approach, called group-treatment analysis, is based on the relatively simple notion that if neurologist care is superior to that provided by generalists, all other things being equal, hospitals that admit a large proportion of their patients to neurologists should have better outcomes than those admitting a smaller proportion. This approach has theoretical advantages over propensity adjustment because it does not attempt to control for differences between treated and untreated patients at the individual hospital level, where, presumably, the problem of selection bias is more potent. Although their standard multivariable models suggested that patients admitted to a neurologist were 40% less likely to die while hospitalized than patients admitted to generalists, Gillum and Johnston found that after adjusting for the institutional rate of neurologist admission, any apparent benefit had disappeared. Similar results were observed in their analyses of length of stay and cost.

In some ways, the findings of this study are more startling for the questions they raise about the presence of residual bias in observational studies using conventional multivariable methods than for the fact that generalist care was found to be as safe as neurologist care and add to a growing body of evidence suggesting that stronger methods are required to deal with residual bias in observational studies.¹⁰

Although the results largely speak for themselves and should be reassuring given that most patients with ischemic stroke in the United States are and will continue to be cared for by generalists, a number of important questions remain unanswered. First, the focus of this study was on short-term outcomes. Because functional status and quality of life probably matter as much or more to stroke patients than in-hospital mortality and certainly length of stay or cost, we can only hope that it is safe to extrapolate from the authors' mortality findings. Second, this study relied on data from the late 1990s, before the widespread availability of hospitalists. How generalizable the findings would be in today's environment is uncertain. On a more practical level, the authors were unable to assess the impact of formal or informal consultation by a neurologist. If this played a significant role (a reasonable assumption, I think), this would have blurred any distinction between the 2 physician groups. For this reason one cannot draw any conclusions about a more pragmatic question—the

necessity or benefit of neurologist consultation in patients with ischemic stroke.

Looking ahead, researchers hoping to improve the outcomes of patients with acute ischemic stroke should focus on developing novel models of collaboration between hospitalists and neurologists, instead of simply trying to prove that a neurologist should take care of a patient suffering from a stroke alone versus a hospitalist without help from a neurologist. We also should recognize that the use of protocols and checklists or leveraging information technology investments may provide clinical decision support that improves care more than just consulting a specialist or having them care for the patient.

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