Regional Variation: Only Moderately Interesting

A Word of Caution

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In most aspects of life in these United States, diversity is viewed as a strength that we champion. It seems that only in the medical field is regional diversity regarded with a suspicious attitude. The underlying assumption appears to be that regional variation in medical care and especially in procedure utilization is due solely or mostly to “substandard” practices. Yet the United States is a markedly diverse and heterogeneous country. This diversity includes a great many things, not the least of which is biological diversity, and ultimately this leads to differences in medical care and medical procedures.

In this issue of Circulation: Cardiovascular Quality and Outcomes, Goodney et al present a study of regional variation in both carotid artery stenting (CAS) and carotid endarterectomy (CEA) in the Medicare population for the years 1998 to 2007. Their data are derived from a 20% random sample of Medicare databases and had to be subjected to a special “coding strategy” because data before 2005 did not adequately capture CAS procedure codes. This highlights the fact that CAS is a “new” procedure. Administrative data sets have not yet accommodated it fully, and a standardized clinical data set has only recently been created. The results of the Goodney study show that the total of all carotid revascularizations for these years declined slightly. The fall-off that occurred in CEA was matched by a corresponding rise in CAS data from New York and Florida for the years 2005 to 2006 indicates that CAS procedures were performed by vascular surgeons in about one third of the cases, by radiologists in about one third, and by cardiologists in about one third. It is entirely possible that if substitution of CAS for CEA was occurring (not yet proven), most of the substitution could have been done by vascular surgeons, many of whom might be pleased to be able to expand their range of practice.

There are 2 preconceived myths imbedded in this article that must be dispelled. The first myth is that any and all regional variation in utilization of a medical procedure is evidence for higher quality of care at the one extreme, and therefore by extension a lower quality of care at the other extreme. The second myth is that CAS and CEA are meant for the same population of patients, that is, are interchangeable, and therefore can be directly compared, or, alternatively, that their utilization can be directly compared.

Myth 1: Variation Is Bad

It is easily observed in this country that there is regional variation in food preferences, dress, and wintertime sports activities. Or, to cite examples from recent news headlines: in personal income, mortgage foreclosures, and unemployment rates. Within the realm of medical care, there is regional variation in hospital admissions for heart failure, in stress testing before elective coronary intervention, in catheterization after acute myocardial infarction, and in red blood cell transfusions in coronary bypass surgery, to name a few examples that have been studied. I take it as undeniably self-evident that regional variation in almost everything that can be named will go on forever.

A recent analysis by Groenwold et al using Medicare data for the years 2003 to 2006, along with the Dartmouth Atlas, offers support for the present study. In Groenwold’s analysis, the total carotid revascularization rates fell very slightly, whereas the proportions of CAS and CEA had significant reciprocal changes, supporting the idea of substitution of CAS for CEA. Interestingly, a comprehensive analysis of CAS data from New York and Florida for the years 2005 to 2006 indicates that CAS procedures were performed by vascular surgeons in about one third of the cases, by radiologists in about one third, and by cardiologists in about one third. It is entirely possible that if substitution of CAS for CEA was occurring (not yet proven), most of the substitution could have been done by vascular surgeons, many of whom might be pleased to be able to expand their range of practice. Nevertheless, we do not know how the increase in CAS procedures was apportioned among the various specialists who perform it. I have no doubt that there is regional variation in this apportionment too, and this will be another interesting research topic to pursue.

In an excellent analysis of Medicare data published recently, Magner et al found that regional variation in CEA was due chiefly to regional variation in the markers of atherosclerotic disease in the population. The 3 markers that explained the bulk of CEA variation were percentage of adult

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

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(Circ Cardiovasc Qual Outcomes. 2010;3:6-7.)

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Circ Cardiovasc Qual Outcomes is available at http://circoutcomes.ahajournals.org

DOI: 10.1161/CIRCOUTCOMES.109.927103
smokers and the numbers of deaths due to heart disease and to stroke. Other measures, such as discretionary nature of the procedure and provider capacity, were not associated with regional variation in CEA utilization. Biological variation was the key determinant. It has also been documented that there is regional variation in the incidence of out-of-hospital cardiac arrest.11 Because the occurrence of cardiac arrest is unlikely to be discretionary or due either to patient, physician, or hospital system preferences or capacities, it must be accepted that biological variation plays a major role in observed regional variation.

Myth 2: CAS and CEA Are Interchangeable
Perhaps as an alternative to using administrative data sets such as Medicare to study regional variation, it would be better to use clinically enriched data sets to study actual indications, outcomes, and performance measures for procedures such as CAS and CEA. For CAS, the only comprehensive criteria for performing the procedure were published recently by a multispecialty society consortium.12 This is the 2007 Clinical Expert Consensus Document (CECD). Reading these criteria helps dispel the second myth: that CAS and CEA are meant for the same population of patients. In fact, at the present time, CAS is only recommended for patients who have 1 or more features that place them at higher risk for undergoing CEA. If substitution is occurring whereby high-risk CEA patients are now receiving CAS instead, then that might be (and probably is) a good thing. On the other hand, if substitution is going in the other direction, and low-risk CEA patients are receiving CAS instead, then that would be undesirable and against recommendations. There has not yet been enough research into these questions on a broad basis to reach any firm conclusions here. Some insight comes from the initial analysis of a national registry for carotid revascularization that was established following CECD recommendations, the CARE registry.2,13 This analysis found that 80% of patients met the CECD criteria for CAS. That is, they had high-risk features for CEA that made it an unattractive option. Furthermore, more than one third of the patients not meeting CECD criteria for other reasons still had high-risk features for CEA. This is why studies that claim to “compare” CAS with CEA are way off the mark.14,15 The 2 procedures are meant for, and performed in, different groups of patients that are not strictly comparable. In the years ahead, the CARE registry will offer important opportunities to investigate many aspects of quality and appropriateness in both CAS and CEA, including regional variation as one topic.

Regional Variation as a Legitimate Subject for Investigation
Regional variation in medical care and procedure use is a worthwhile subject for clinical investigation. However, it is legitimate in just the same way that age, sex, diabetes, obesity, and many other subjects are worthwhile topics. In my opinion, regional variation by itself is only a modestly interesting subject. Careful analysis of regional variation and its clinical correlates may lead to some new insights into a disease state or its treatments. However, the study of regional variation must proceed cautiously and with an attitude of inquisitiveness that avoids prejudicial bias. In the specific case of CAS, much more research is needed to understand where, how, and why it is being done and if it is being done for the proper indications and with appropriate quality. This is all the more important now, at the beginning of CAS expansion. The article by Goodney et al serves to highlight this point. Quality and outcomes metrics for CAS clearly are needed, but these are only just now in the formative stages. Understanding the deeper clinical issues, and not just regional variation in use of CAS per se, should be the proper topics of study.

Disclosures
None.

References

Key Words: Editorials | stents | surgery | carotid arteries
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Circ Cardiovasc Qual Outcomes. 2010;3:6-7
doi: 10.1161/CIRCOUTCOMES.109.927103
Circulation: Cardiovascular Quality and Outcomes is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 1941-7705. Online ISSN: 1941-7713

The online version of this article, along with updated information and services, is located on the World Wide Web at:
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