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Joint Commission Primary Stroke Center Certification Does Not Affect Proband Enrollment: The Siblings With Ischemic Stroke Study

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Abstract

Background—The Joint Commission (JC) certifies primary stroke centers in the United States. Whether certification promotes enrollment of study subjects into stroke research studies is not known. We examined whether enrollment performance of centers was related to JC certification status.

Methods—The 51 US Siblings with Ischemic Stroke Study (SWISS) centers were characterized by JC certification status, year of certification, year initiated into SWISS, center location, and whether the center had a vascular/stroke neurology fellowship program accredited by the Accreditation Council for Graduate Medical Education. Performance measures included days elapsed from initiation to first enrollment, total enrollments within 12 months after initiation, and annual rate of enrollment thereafter.

Results—In all, 36 of 51 SWISS sites (71%) were JC certified. A total of 32 (63%) were initiated into the study from 2000 through 2002, and 19 (37%) were initiated from 2005 through May 2008. Comparison of certified and noncertified sites showed no significant difference in the time to first enrollment (median, 77.5 v 115 days; $P = .90$), total enrollees in the first year (median, 3 v 2 probands; $P = .69$), or annual enrollment rate (median, 1.9 v 1.8 probands; $P = .72$). The rate of enrollment or time to first enrollment was not different between 2000-to-2002 and 2005-to-2008 sites. Early-initiated centers tended to have better year-1 enrollment than later-initiated centers (3 v 2 probands; $P = .056$).

Conclusions—JC certification did not have a significant effect on SWISS center enrollment. The JC should encourage the research mission among certified stroke centers.

Keywords

Brain ischemia; multicenter studies; observational studies; siblings; stroke

There is a pressing need to improve the efficiency of subject recruitment in stroke studies. The sample size of controlled acute stroke trials has increased markedly from the 1950s through the 1990s.¹ Recent stroke prevention studies such as Prevention Regimen for Effectively Avoiding Second Strokes (PROFESS) (N = 20,332 patients)^{2,3} and Stroke Prevention by Aggressive Reduction in Cholesterol Levels (SPARCL) (N = 4731 patients)⁴ involve thousands of patients across dozens of centers. Phase III trials require multiple centers to achieve study aims in a timely fashion. However, increasing the number of centers does not necessarily improve efficiency.

In a meta-analysis of randomized acute stroke treatment trials enrolling at least 300 subjects, recruitment efficiency, defined as the number of subjects enrolled per study per center per month of recruitment, significantly declined with each percentage increase in the total number of study centers.⁵ Center characteristics that determine recruitment efficiency are not well known.

The Joint Commission (JC) is an independent, nonprofit accreditation organization whose mission is to “continuously improve the safety and quality of care provided to the public through the provision of health care accreditation and related services that support performance improvement in health care organizations.”⁶ The JC began certifying stroke centers in 2004, having collaborated with the American Stroke Association of the American Heart Association in the establishment of the performance measures required of a primary stroke center. The certification criteria are largely based on the guidelines delineated in the Brain Attack Coalition’s recommendations for comprehensive stroke centers.⁷ A survey of US neurologists, neurosurgeons, and emergency medicine physicians showed that the majority of respondents support the designation of primary stroke centers.⁸ Establishment of a primary stroke center in a community hospital can result in substantial increases in the proportion of patients with acute ischemic stroke who are treated with intravenous tissue plasminogen activator.⁹ It is not known whether primary stroke centers may have a higher recruitment efficiency than centers without this designation.

The Siblings with Ischemic Stroke Study (SWISS) protocol has been published.¹⁰ Briefly, probands presenting with ischemic stroke either as inpatients or outpatients at one of the study centers were eligible to participate if they had at least one living sibling who had a stroke. Probands were excluded if they had stroke temporally related to a mechanical heart valve, invasive cerebral, or cardiac arterial procedure; endocarditis; or central nervous system vasculitis. The centers typically did not enroll the siblings of the probands. Consent for sibling participation was done through proband-initiated contact.¹¹ Phlebotomy for the DNA sample was done using a nationwide home health agency.

The SWISS has tried to determine whether ischemic stroke has a genetic underpinning by examination of 300 concordant sibling pairs and discordant siblings. Recruitment at more than 50 sites is nearing completion. To enhance recruitment, sites have been added throughout the study. In targeting sites, we chose to solicit sites that were JC certified as primary stroke centers with the thought that these stroke-focused centers would be better recruiters. We hypothesized that JC-certified primary stroke centers would have higher rates of enrollment than noncertified centers.

Methods

Performance in enrolling probands in SWISS was assessed at 51 of 54 participating clinical centers. Three Canadian centers are not eligible for JC certification and were excluded from this analysis. Centers were characterized on the basis of JC primary stroke center certification status, year initiated into SWISS (measure of study-specific research experience), and year

certified as a JC primary stroke center. No new stroke centers were initiated into SWISS in 2003 or 2004. This allowed stroke centers to be divided naturally into sites initiated from 2000 through 2002 and sites initiated from 2005 through May 2008.

Study performance was measured by time interval from SWISS initiation to enrollment of first proband, number of probands enrolled in the first year after center initiation (measure of initial performance), and annual enrollment thereafter (measure of sustained performance). Centers were further characterized by geographic location and accreditation of vascular/stroke neurology fellowship programs by the Accreditation Council for Graduate Medical Education (ACGME). Proband enrollments by centers were considered through May 31, 2008. Probands were considered to be enrolled in the study at the time they consented to participate; at that time, phenotypic data were collected and forwarded to the study's operations center. A center was considered to be initiated in SWISS when the legal contract was finalized and a study initiation call was conducted with the site's principal investigator and study coordinator. JC primary stroke center certification status was assessed by cross-reference against a list of centers with official JC Internet postings.¹² ACGME fellowship accreditation was assessed by cross-reference against official ACGME Internet postings.¹³ Proband demographics were obtained using SWISS enrollment records from the operations center. Regions of the country were identified according to census regions delineated by the US Census Bureau.¹⁴

Because of small subgroup sample sizes and skewed end point distributions, nonparametric methods were preferred for this analysis. Specifically, Wilcoxon rank sum tests¹⁵ were used to compare the annual rate of enrollment and the total number of first-year enrollees between groups with only two levels. The more generalized Kruskal-Wallis test¹⁵ was used to compare the annual rate of enrollment and the total number of first-year enrollees among the 4 geographic regions. Finally, a log rank test was used with Kaplan-Meier estimates¹⁶ for the analysis of time to first enrollment. Software (SAS, Version 9.1, SAS Institute Inc, Cary, NC) was used to conduct the statistical analyses.

Results

During the time period of this analysis (2000–2008), a total of 857 probands were enrolled at 51 US centers. Of these 51 SWISS centers, 36 (71%) had JC certification and 15 (29%) were not certified. A total of 32 centers (63%) were initiated into SWISS during 2000 to 2002, and 19 (37%) were initiated during 2005 to 2008.

Table 1 summarizes location and variability for performance by JC certification, year initiated, ACGME accreditation, and geographic region. For the JC-certified and noncertified sites, there were no significant differences in the median time to first enrollment (77.5 v 115 days; $P = .90$), total number of first-year enrollees (3 v 2 pro-bands; $P = .69$), or median annual rates of enrollment (1.9 v 1.8 probands; $P = .72$). In a comparison of the sites initiated into SWISS from 2000 to 2002 and from 2005 to 2008, there were no significant differences in the median annual rate of enrollment (2.0 v 1.8 probands; $P = .46$) or the median time interval to first enrollment (108 v 70 days; $P = .49$), although the difference in median total number of first-year enrollees was marginally significant (3 v 2 probands; $P = .056$).

Between centers with and without ACGME-accredited vascular/stroke neurology fellowship programs, there was no significant difference in median days to first enrollment (82.5 v 94 days; $P = .48$), median number of enrollees in the first year (3 v 2 probands; $P = .16$), or median annual rate of enrollment thereafter (1.8 v 1.9 probands; $P = .61$). Regions of the country showed no significant differences in the median time to first enrollment, total first-year enrollees, or median rate of enrollment.

Discussion

Our study shows that a center having JC certification as a primary stroke center has not had a significant effect on study subject enrollment in the SWISS on the basis of any outcome measure evaluated. There was no significant difference between certified and noncertified stroke centers in enrollment performance for SWISS, be it in the amount of time required for first enrollment, number of enrollments in the first year, or annual rate of enrollment thereafter. The lack of an appreciable effect of certification on recruitment of probands with ischemic stroke is perhaps not surprising, given the JC's emphasis on compliance with performance measures such as use of antithrombotic medication, consideration and use of tissue plasminogen activator, and consideration and use of rehabilitation services. Nonetheless, monitoring compliance with JC measures requires an ongoing stroke case surveillance program. Presumably, such a program could easily dovetail with a program for screening cases for SWISS and other cerebrovascular research studies.

Our study found no significant difference in any of the 3 performance measures between the enrollment performances of stroke centers with ACGME-accredited fellowships in vascular/stroke neurology and those without. Given the requirement for scholarly activity at fellowship training sites, it is surprising that there was no significant difference.

Center location also showed no significant performance differences. There might be reasons to believe that enrollment of subjects in a family-based ischemic stroke trial might vary depending on region of the country at which probands are screened. Certain regions of the country have higher rates of stroke than others (e.g., the stroke belt, an area of the southeastern United States that has a high rate of strokes and heart disease). Family size, structure, and geographic dispersion of family members or overall interest in participating in a genetics research study may vary by region. Nonetheless, these possible effects on recruitment, challenging as they are to predict, did not play a significant role in the study.

The designation of recruiting centers into pre-2003 and post-2004 initiation groups allowed us to test whether the first group of centers materially differed from centers added as the study progressed. The addition of centers is a common strategy used to accelerate enrollment into a multicenter study when enrollment goals are not meeting original expectations. The only marginally significant difference observed in the analysis was in the number of subjects enrolled in the first year between centers initiated into SWISS during 2000 to 2002 and during 2005 to 2008. Stroke centers initiated from 2000 to 2002 had marginally higher first-year enrollment numbers than centers initiated from 2005 to 2008. This suggests that older SWISS centers may have had a relatively more robust local recruitment process at their inception than that of more recently initiated SWISS centers.

The difference in first-year enrollee number between pre-2003 (original) and post-2004 (expansion) SWISS centers hints at an interesting observation of the recruitment process in general. As has been stated, center expansion is a common method of accelerating recruitment. The results of this analysis indicate that the expansion centers, those initiated into SWISS after 2004, had a less prolific recruitment performance from the outset than the original centers. After the first year, sustained recruitment performance for the original centers and added centers harmonized with the consortium overall, suggesting a learning curve.

Rate of enrollment did not deteriorate in SWISS overall with the addition of new centers. The addition of SWISS centers achieved the goal of increasing the total number of probands in the study, effectively boosting the overall enrollment rate.

Our study has limitations that must be acknowledged. Despite the large numbers of stroke centers involved, SWISS enrollment has been slow and has involved small numbers of

enrollees relative to typical phase III therapeutic trials. Thus, minor differences in recruitment performance between certified and noncertified centers could be missed. Further, SWISS is a unique multicenter family-based observational study. Our results might not generalize to inpatient-based therapeutic trials of acute stroke treatment or outpatient-based therapeutic trials of stroke prevention. Finally, our study focused on a single aspect of center involvement in a multicenter study, namely, study subject enrollment. Even though certification status did not have a substantive bearing on recruitment, involvement of certified centers in a multicenter study, including the process of compliance with JC regulations, leads to greater standardization of poststroke care in accordance with evidence-based guidelines. This reduction in heterogeneity of nonstudy treatments across centers may be of particular importance in acute treatment trials.

In conclusion, JC certification status did not substantively alter recruitment performance of centers in SWISS. Enhancement of recruitment seems best served by adding centers rather than focusing on involving JC-certified stroke centers.

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Table 1
Characteristics of enrollment performance by groups

Characteristic	Time to first enrollment, days [*]	No. of first-year enrollees [†]	Annual rate of recruitment, enrollees, y [†]
JC status			
Certified (n = 36)	77.5 (42–145)	3.0 (4.0)	1.9 (2.8)
Noncertified (n = 15)	115 (37–165)	2.0 (3.0)	1.8 (2.0)
Year initiated			
2000–2002 (n = 32)	108 (57–153)	3.0 (5.0)	2.0 (2.0)
2005–2008 (n = 19)	70 (13–235)	2.0 (3.0)	1.8 (3.1)
ACGME status			
Accredited (n = 16)	82.5 (35–153)	3.0 (2.5)	1.8 (3.9)
Not accredited (n = 35)	94 (42–153)	2.0 (6.0)	1.9 (2.5)
Region			
Midwest (n = 16)	127 (68–210)	2.5 (6.5)	2.4 (2.8)
Northeast (n = 11)	115 (13–153)	3.0 (4.0)	2.6 (1.4)
South (n = 17)	57 (33–291)	2.0 (4.0)	1.8 (5.6)
West (n = 7)	85 (14–596)	3.0 (3.0)	0.9 (1.4)

Abbreviations: ACGME, Accreditation Council of Graduate Medical Education; JC, Joint Commission.

^{*} Values are median (95% confidence interval).

[†] Values are median (interquartile range).