Study Finds Increased Availability of Neurosurgeons Associated with Decreased Risk of Death From Motor Vehicle Accidents

CHARLOTTESVILLE, Va. (July 24, 2012) — Researchers at Dartmouth-Hitchcock Medical Center in Lebanon, NH, have found an association between increasing the distribution of neurosurgeons throughout the United States and decreasing the risk of death from motor vehicle accidents (MVAs). The findings of their study are described in the article “Increased population density of neurosurgeons associated with decreased risk of death from MVAs in the United States. Clinical article,” by Atman Desai, M.D., and colleagues, published today online, ahead of print, in the Journal of Neurosurgery (http://thejns.org/doi/full/10.3171/2012.6.JNS111281).

The researchers reviewed some basics about MVAs, the leading cause of death in the United States among young persons (1 to 34 years of age). The primary cause of death arising from MVAs is traumatic brain injury, whose treatment is generally handled by neurosurgeons. MVAs are more likely to result in fatalities in rural settings, which some attribute to a slow medical response time and reduced access to trauma resources. For the most part, neurosurgeons are clustered in and around cities that house tertiary care hospitals, and thus there is an uneven distribution of this specialty throughout the U.S. Bearing these facts in mind, the authors hypothesized that an increased population density of neurosurgeons would decrease the risk of death from an MVA.

Desai and colleagues performed a retrospective analysis of data from the Area Resource File (2009–2010), a database containing county-level information on health-care facilities and their utilization and expenditures; health-care professionals and their training; and socioeconomic and environmental characteristics. Data from 3,141 U.S. counties were analyzed; 2,051 of these counties were classified as rural. The primary outcome variable was the average number of deaths due to MVAs per million population for each county during the three-year period 2004 through 2006. The primary independent variable was the density of neurosurgeons (number of neurosurgeons per million population) in 2006.

In the 3,141 U.S. counties that were examined, the mean number of MVA-related deaths per million persons was 226. The average number of neurosurgeons per county was six. The greatest number of neurosurgeons in a county was 372; most counties had none. In an unadjusted analysis, the authors found that an increase of one neurosurgeon per million population was associated with 1.9 fewer deaths due to MVAs per million population.

In a multivariate analysis, in which adjustments were made for county urbanicity, socioeconomic conditions and density of general practitioners, an increase of one neurosurgeon was associated with 1.01 fewer deaths from MVAs per million population. This association was present regardless of whether the county was rural or urban. When Desai and colleagues compared the association between deaths from MVAs and the distribution of other medical specialties, the researchers found that an equivalent decrease in MVA-related deaths (one fewer death) would require an addition of 33 primary-care providers; according to another study, an addition of six general surgeons per million population would be needed for the same affect. Rural setting, persistent poverty and low level of education were all associated with significant increases in MVA-related deaths.
Given the association found between the distribution of neurosurgeons and MVA-related deaths, Desai and colleagues conclude that the availability of local neurosurgeons may be important for the overall likelihood of surviving an MVA, and thus neurosurgical education and practice throughout the U.S. should be promoted.


Disclosure: The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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