

## **Surgery at the End of Life Common and Varies According to Region**

*Kwok AC, Semei ME, Lipsitz SR, et al. The intensity and variation of surgical care at the end of life: a retrospective cohort study. Lancet 2011;378:1408-13.*

### **Study Overview**

**Objective.** To examine patterns and regional variations of surgical care among Medicare beneficiaries aged 65 years and older in their last year of life. **Design.** Retrospective cohort study using 2007–2008 claims data for all Medicare fee-for-service enrollee decedents in 2008 and *The Dartmouth Atlas of Health Care* for health care region classification and spending data.

**Setting and participants.** A total of 1,802,029 beneficiaries in the United States aged 65 years and older who died in 2008 were included in the study. **Methods.** Medicare claims data were used to identify beneficiaries who had an inpatient stay with a surgical procedure. A broad definition of surgery was used that included any procedure involving incision, excision, manipulation or suturing of tissue, usually requiring anesthesia or profound sedation to control pain. Five surgeons independently reviewed ICD-9 procedure codes and used a modified-Delphi process to reach a consensus decision on the classification of

surgical procedures. Distributions of age, sex, race, income were examined for 3 decedent groups: those who had an inpatient surgical procedure; those who were admitted to hospital but without any procedures; and those who did not have a hospital admission. The variation of likelihood of undergoing surgery by age was examined. The researchers used hospital referral regions as defined by *The Dartmouth Atlas of Health Care* to examine regional variations in surgical care. A measure of end-of-life surgical intensity was developed for each hospital referral region, defined as the rate of receipt of at least 1 surgical procedure during the last year of life among all decedents, adjusted for age, sex, race, and income. Regions were classified into those with the highest surgical intensity (top 10% of scores), those with middle intensity (middle 80% of scores), and those with low intensity (bottom 10% of scores). The variation in surgical intensity by number of hospital beds in the region and number of surgeons was examined as were the relationships between surgical intensity and mortality and surgical intensity and spending.

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Main outcome measure. Proportion of decedents who had surgical procedures within the 365 days before death.

Main results. Among all Medicare beneficiaries included, 31.9% had an inpatient surgical procedure within a year, 18.3% within 30 days, and 8% within a week before death. Decedents who underwent a surgical procedure were more likely to be younger, male, and non-white. Incomes of patients were not associated with surgical use. The likelihood of having a surgical procedure was 38.4% among those at age 65, which decreased to 35.3% among those 80 years of age, which fell to 23.6% among those 90 years of age. Substantial regional variations were noted, with the highest surgical intensity region (Munster, IN) having a score of 34.4, and the lowest intensity region (Honolulu, HI) having a score of 11.5. The variation in surgical intensity was not associated with number of surgeons in the region but was associated with number of acute-care hospital beds in the region. The high-intensity regions also had higher mortality rate and spending.

Conclusion. A substantial proportion of older adults in the U.S. had surgical procedures at the end of their lives. The rate of surgical procedure varies with decedent age and region.

**Commentary**

In the current debate over unsustainable health care spending, attention is being paid to medical expenditures in the final months of life. Studies have pointed out that end-of-life medical expenditures exceed costs of care during other years [1,2] and have suggested that the high cost may be associated with an inappropriately intense level of care at the end of life [3]. Considering that surgical care is invasive and costly, the current study attempts to examine this important issue by determining the rate of surgical procedures occurring in the last year of life in a Medicare population. They found there was a high rate of surgical procedures at the end of life, that the rate varies with both age and region, and that the variation is associated with regional resource availability.

The finding of more than a third of older adults having a surgical procedure in the last year of life is an alarming one. This raises the question of how often these procedures represent care that is burden-

some and inappropriate given the circumstances at the time the decision of surgery was made. Although one may assume that at least some proportion of these procedures must be inappropriate given the high occurrence rate and the variation in rate by region and resource availability, appropriateness was not assessed by the study. Also, as pointed out by the authors, clinicians are not good at predicting death; examination of intensity of surgical care using a decedent population may be limited because the potential benefits of surgical care among sick patients at risk of dying but survived would not be captured in a decedent population. However, the results from the study do support the notion that we need to further understand how best to care for patients who are seriously ill and with limited life expectancy.

Previous studies have attempted to understand the underlying reasons behind the high costs of care at the end of life, including a study by Kelley et al [4]. They found that although regional variations play a large role in costs of care at the end of life, patient-level determinants in the last 6 months of life, including functional decline, chronic medical conditions, and not having family nearby, were also associated with a greater risk for high cost and high-intensity treatment. Although understanding determinants of such high intensity of care may be useful, what is missing from these data is a clear understanding of what constitutes appropriate care in ill patients with limited life expectancy when taking into account patient goals and preferences. Further understanding of the appropriateness of such care at the time of treatment, rather than through the lens of the outcome of mortality inherent in decedent studies, is necessary to determine how to prevent inappropriate care.

**Applications for Clinical Practice**

This study brings attention to the important issue of what constitutes appropriate care in older adults with limited life expectancies. When planning for invasive surgical procedures, clinicians need to consider patient values and potential benefits in the context of the patient's other comorbid illnesses, which may be life-limiting. While there may be an alarmingly high proportion of decedents who had surgical procedures shortly before their death, one cannot discount that a portion or even a large portion of them were appropriate given the purpose of the procedures and the

patients' goals, such as for palliative purposes. The appropriateness and value of these procedures need to be viewed through not only the health system's perspective of cost and utilization, but also through the eyes of the patients and their families.

*—Review by William Hung, MD, MPH*

### References

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