41310. A Decade of Intracerebral Hemorrhage in the United States: The Impact of Teaching Institutions

Sheetal Hegde*, Taylor Johnson*, Ali Seifi MD, FACP**

*School of Medicine and **Department of Neurosurgery, University of Texas Health Science Center at San Antonio
Disclosure

• The authors have no disclosures.
Introduction

- Intracerebral hemorrhage (ICH) is a leading cause of stroke and mortality. Though ICH is highly prevalent with major complications, current literature has not studied its outcomes in the context of hospital teaching status.

- In a recent study comparing teaching status and mortality among Medicare hospitalizations, Burke et al found lower mortality rates among teaching hospitals in several of the most common medical and surgical conditions, with stroke as one of the two exceptions.¹

- This study aims to examine the impact of hospital teaching status on ICH outcomes. Specifically, this study compares ICH incidence, length of stay, and in-hospital mortality between teaching and non-teaching hospitals in the United States from 2004-2014.
Methods

• Using the Healthcare Cost and Utilization Project (HCUP) database, we performed a retrospective study on ICH patients. ICH patients were identified using the International Classification of Disease- Clinical Modification, 9th revision (ICD-9-CM) code 431.

• Z-tests were calculated to examine differences in the following patient outcomes between teaching and non-teaching hospitals from 2004-2014:
  – ICH incidence (based on number of yearly discharges)
  – Mean length of stay (LOS)
  – In-hospital mortality
Results

- During the study period, HCUP reported 695,447 ICH admissions (61.6% teaching hospitals). ICH incidence was significantly greater in teaching versus non-teaching hospitals ($p<0.001$ every year except 2005) (Figure 1).

- Although the total number of ICH cases did not significantly change from 2004 (64,927) to 2014 (64,790) ($p=0.96$), the incidence in non-teaching hospitals decreased from 28,463 to 11,565 ($p<0.001$) and increased in teaching hospitals from 36,464 to 50,865 ($p<0.001$) (Figure 2).
Results

• LOS across all ICH patients did not change significantly (7.9 to 7.8) \((p = 0.61)\) but was more significant in teaching than non-teaching hospitals \((p<0.001)\) (Figure 3).

• LOS also decreased from 8.8 to 8.2 in teaching hospitals \((p<0.05)\) (Figure 4).
Results

- Overall in-hospital mortality decreased from 19,963 to 15,560 (p<0.001) and was more significant in teaching than non-teaching hospitals (p<0.01 every year except 2005 (p<0.1)) (Figure 5).

- Mortality in non-teaching hospitals decreased from 8,823 to 2,780 (p<0.001) but did not significantly change in teaching hospitals (p = 0.31) (Figure 6).
Discussion

• Compared to non-teaching hospitals, teaching hospitals are more likely to receive patients transferred from another hospital, usually due to severe illness or need for specialized care.\(^2\)

• Yet, previous literature has shown that ICH patients transferred to tertiary care hospitals do not demonstrate increased in-hospital mortality compared to ICH patients directly admitted to the same hospital.\(^3,4\) ICH transfer patients also showed less severe presentation on admission to comprehensive stroke care than directly admitted patients (e.g., higher Glasgow Coma Scale scores, lower National Institutes of Health Stroke Scales scores, smaller ICH volumes, lower ICH scores).\(^5\)

• Though future studies are warranted to clarify, the findings of our current study are compatible with the literature. As referral centers, teaching hospitals may be annually receiving more ICH transfer patients from non-teaching hospitals with less severe disease burden than directly admitted patients. This could explain the decline in incidence and mortality within non-teaching hospitals as well as the increased incidence in teaching hospitals.

• In addition, the lack of change in teaching hospital mortality despite increased incidence suggests a potential relationship between direct admission to teaching hospitals and ICH mortality. Further studies are needed to determine the significance of contributing factors such as severity of illness upon admission, patient transfer status, treatments/procedures, and comorbidities.
Summary Points

• ICH incidence, length of stay, and in-hospital mortality were significantly greater in teaching hospitals compared to non-teaching hospitals from 2004-2014.
• However, mortality within non-teaching hospitals declined while remaining about the same within teaching hospitals.
• Further studies are warranted to clarify these findings and determine contributing factors such as number of procedures performed, patient transfers, and severity of illness upon admission.


