Does Primary Stroke Center Certification Change Emergency Department Utilization and Disposition Patterns of Patients with Acute Stroke?

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Background
Establishment of Primary Stroke Centers (PSCs) has the potential to improve patient care. However, there is little evidence that PSC certification results in measurably improved Emergency Department (ED) care processes or outcomes.

Objective
Within an integrated delivery system (IDS), we examined the impact of PSC certification on utilization, disposition and mortality.

Methods
• 37 IDS medical centers (8 PSC certified)
• Study period: 2005-2008
• N=27,993 patients
• Primary ICD-9 diagnosis of transient ischemic attack (TIA), hemorrhagic (ICH) or ischemic stroke (iCVA)
• 3 PSC certification process stages: before certification process (Pre), preparing for certification (Post) and PSC certified (PSC)
• Logistic and linear regression models adjusted for co-morbidities, patient characteristics, and calendar time to examine major outcomes (hospital admission rates, radiographic imaging utilization and time to imaging), ED throughput time, and patient mortality.

Hypothesis: stroke patients presenting to post-certification medical centers would have higher hospital admission rates and radiographic utilization and faster ED and radiographic throughput times

Results
• There were 14,804 patient visits to pre-certification centers 3,428 to intra-certification centers and 9,761 to post-certification centers (Table 1)
• Study patient characteristics are shown in Table 2 and co-morbidities and risk factors in Table 3
• Our analyses demonstrated significant changes in outcome measures over time, regardless of PSC status (Figures 1 and 2)
• After adjusting for time, there was significantly improved efficiency due to PSC certification process, including:
  1) faster ED throughput time for iCVA patients (48-min improvement, 95%CI 11-85 min), and
  2) decrease in time to radiographic imaging (Table 4)
• Increase in rates of hospital discharge to assisted care facilities for iCVA patients at post-certification facilities (OR 1.26, 95%CI 1.04-1.58)
• We did not find any significant PSC-stage related improvements in mortality (Table 5)

Discussion
Our results show significant changes in ED admission and radiographic utilization patterns for stroke patients over a four-year time period. Some PSC effects, primarily related to throughput measures, were consistent with process changes, such as "ED stroke alerts" and PSC core measures (e.g. the requirement to consider an assisted care facility prior to discharge). Our findings suggest changing practice patterns in stroke care potentially spurred by the evolution of evidence regarding the time-sensitive nature of work-up for stroke and the publicizing of the PSC certification process. Limitations of this study included: retrospective data collection, analysis of a single delivery system, inability to accurately track rates of IV-PA administration.

Table 1: Stroke Center status of Medical Centers and Patient Visits

Table 2: Stroke Patient Characteristics

Table 3: Co-morbidities and Risk Factors

Table 4: Decrease in time to radiographic imaging (in minutes)

Figure 1: Unadjusted Hospital Admission Rates Across all Centers

Figure 2: Brain MRI Utilization Across all Centers

Table 5: Hospital Disposition and Mortality

About CREST Network
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