



Bundled Imaging Protocol Improves Door In Door Out and Door to CTA Times in a Critical Access Hospital

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Background

Cox Barton County Hospital (CBCH) is a 25-bed critical access hospital located in Lamar Missouri and is affiliated with CoxHealth, a large regional health system in southwest Missouri. CBCH is a Level 3 designated stroke center through the state of Missouri who has been participating in the American Heart Association's Get With the Guidelines® Rural Health Outcomes Accelerator since January 2023. CBCH cares for approximately 85 acute stroke patients annually and has submitted 130 records into the GWTG registry. In 2021, CBCH streamlined their transfer agreement with comprehensive stroke center Cox South in Springfield, MO for all thrombectomy and thrombolytic cases from CBCH. Door In Door Out (DIDO) in less than 90 minutes for stroke transfers has been difficult to achieve. An investigation into the reasons for delay included vessel imaging initiation and EMS interfacility transfer processes. It was hypothesized that rapid acquisition of vessel imaging could have a positive downstream influence on door to transfer times.

Objectives

Improve the care of stroke patients by identifying suspected large vessel occlusive (LVO) strokes as early as possible to optimize acute stroke patient selection and transfer DIDO time

Implement a bundled imaging protocol to include Computed Tomography (CT) Head and Computed Tomography angiography (CTA) for all stroke code activations.

Measure the influence of this bundled imaging protocol on door in door out times.

Methods

This was a retrospective before and after study looking at the influence of a bundled imaging protocol on DIDO times from 2022 to 2024. Baseline data captured in 2022, was collected by CBCH stroke data aggregation to track CTA report times as well as door in door out times for all acute stroke patients. All stroke transfers were audited by the stroke process improvement team and stroke medical director to establish a timeline of care for each record identifying contributing factors to transfer delay. Delays in CTA imaging initiation and EMS transport availability were identified as the largest contributors.

Methods (continued)

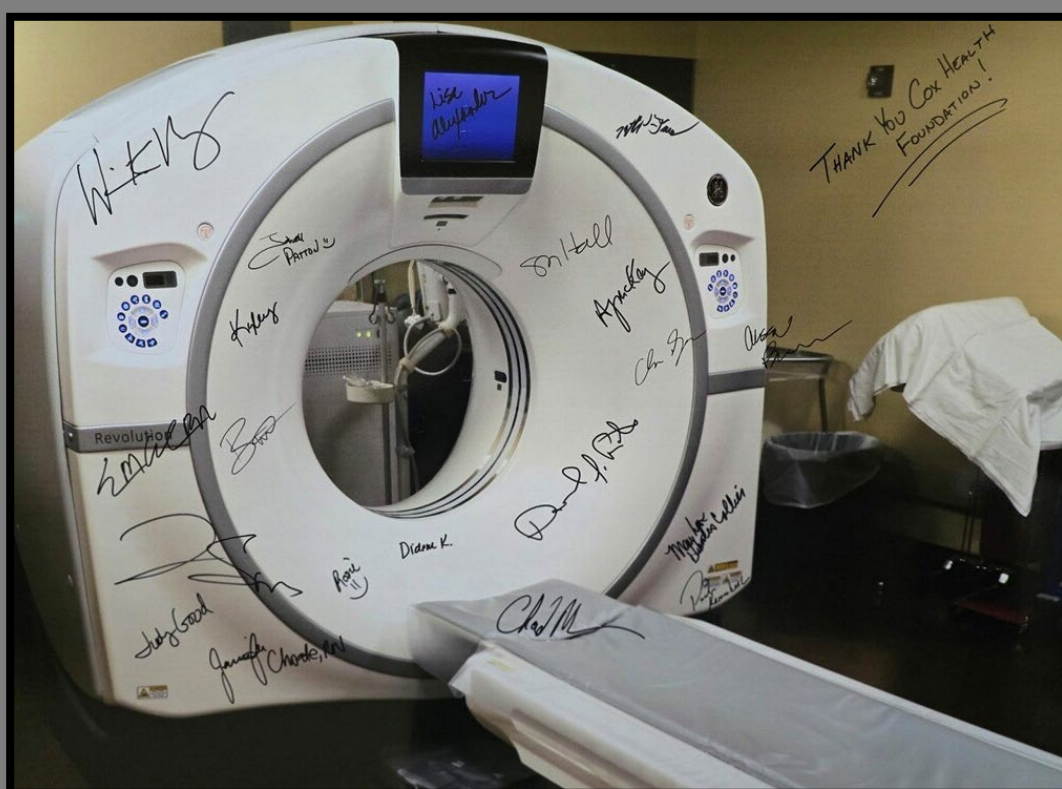
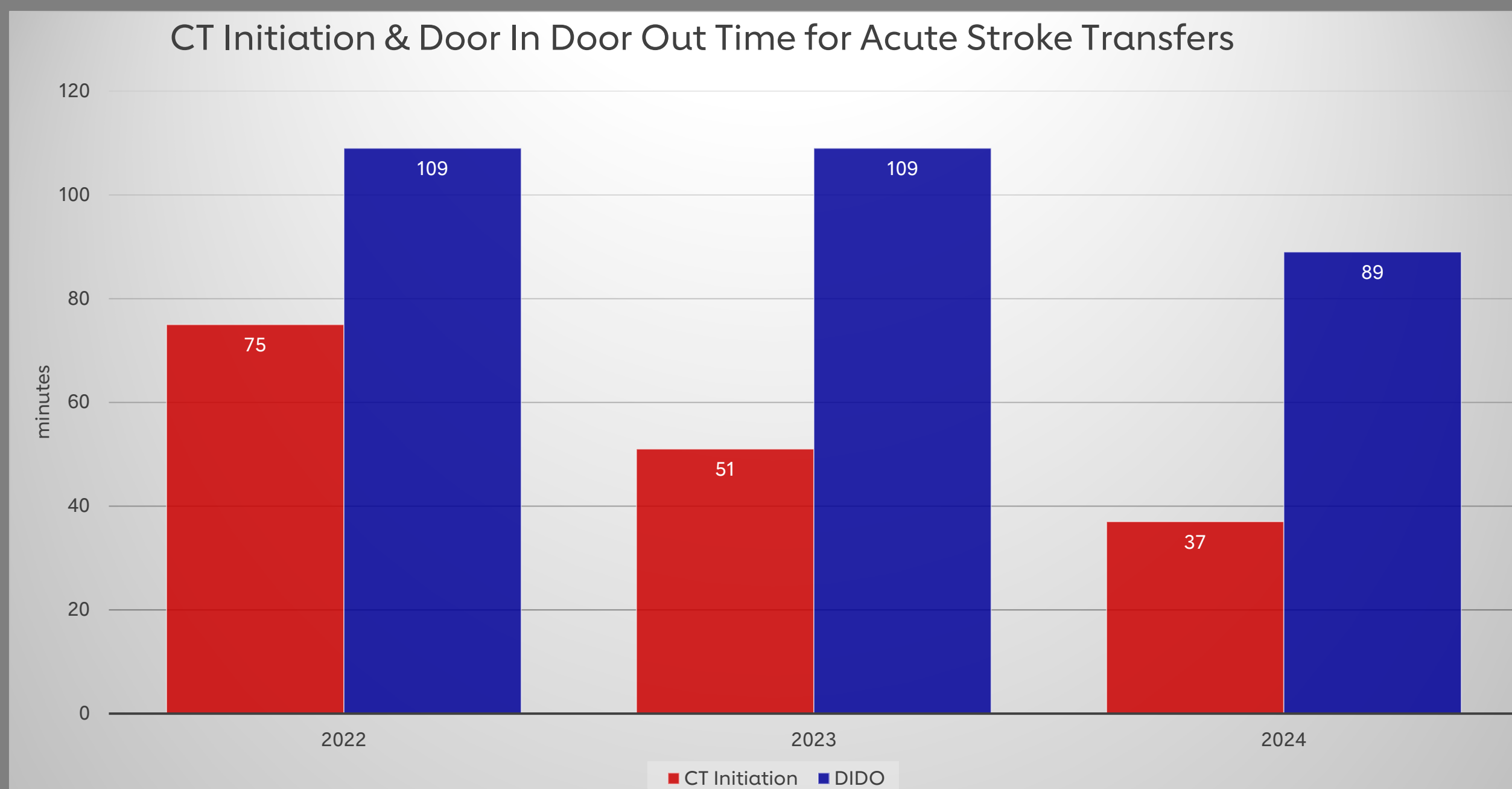
In January 2023, CBCH joined Get With The Guidelines®-Stroke (GWTG-S) registry and Rural Healthcare Outcomes Accelerator program. GWTG-Stroke was used to measure performance from then onward. Mid-year 2023 the stroke activation protocol was changed to incorporate bundled vessel imaging with CTA immediately after CT head without evidence of hemorrhage in all stroke code activations with provider discretion for exclusion. Clinical nursing staff received education on the new protocol in the form of competency training. ED physicians received direct training from the stroke medical director in the morbidity and mortality meetings. Local EMS were educated through monthly meetings with the stroke medical director. The stroke audit materials and tools were amended to track additional aspects of CTA acquisition including door to order, door to scan initiation, and door to report times. An internal goal of 60 minutes from CTA suite door to report was set in 2023 which was achieved and reduced to 45 minutes in 2024. Annual mean times for CTA initiation to report were compared to DIDO times to determine an association.

Results

The CTA initiation to report and DIDO time means in 2022 for 10 acute stroke transfers were 75 minutes and 109 minutes, respectively. After implementation of the bundled imaging protocol, mean CTA initiation to report times decreased to 51 minutes. Mean DIDO times for 14 acute stroke transfers for 2023 remained unchanged at 109 minutes. In 2024 for 13 acute stroke transfers thus far, the mean CTA initiation to report times decreased to 37 minutes and DIDO reduced to 89

Conclusions

Bundled imaging protocols have been shown to not only decrease the time to acquisition of vessel imaging in stroke patients, but also to increase detection of LVOs, and decreased time to mechanical thrombectomy¹. Delays in acquisition of vessel imaging have been shown to be a significant contributor to delays in stroke transfers^{2,3}. Implementation of a bundled imaging protocol (CT/CTA) had a positive association with improved DIDO times at Cox Barton County Hospital. CBCH established an internal goal of 45 minutes from door to report for CTA. There is not yet a nationally recommended goal for this metric. We believe that care team coordination, education, and early bundled vessel imaging for all stroke code activations, combined with a door to report expectation of 45 minutes, contributed to improved DIDO times and allowed CBCH to achieve the AHA GWTC-Stroke DIDO goal of ≤ 90 minutes. Early CTA results within 45 minutes also allow for earlier decisions to be made on mode and priority of EMS interfacility transfer.



References

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