Impact of a Code Stroke Protocol on the Door-To-Needle Time for IV Thrombolysis: A Preliminary Study

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Received: March 14, 2021; Published: March 31, 2021

Abstract

Used in the first hours of a stroke, intravenous tissue plasminogen activator (tPA) proves its effectiveness in the urgent treatment of stroke. The implementation of the stroke code in emergency department (ER), in order to sort out legitimate patient for thrombolysis, remains the only determining factor allowing treatment within the authorized timeframes. This retrospective, observational cohort study conducted in Armed Force Hospital Wadi Al Dawassir, Saudi Arabia, over 12 months concentrates on the impact of implementation of code stroke alert protocol to improve door to needle in ER department. We calculate door to code stroke (DSC), door to CT brain (DCT) for all our population study. Door to needle (DTN) was calculated for legible patients. Our results are promoters in this preliminary study; the implementation of stroke alert protocol appears feasible and can be very helpful to improve the management of ischemic stroke patient.

Keywords: Code Stroke Protocol; Door-To-Needle; Time for IV Thrombolysis

Introduction

Stroke is a relatively common and challenging condition to manage in emergency department. Reducing the time taken to manage cerebrovascular accident (stroke) to increase the rate of thrombolysis and thus reduce disability remains a challenge in SAUDI ARABIA. Better clinical results have been associated with implementation of Stroke code" (SC) in emergency department (ER) which resulted in faster administration of tPA [1,2].

Objective

The objective of our study was to assess the impact of the implementation of the stroke code protocol in emergency departments in reducing the time required to act in front of a patient with a stroke.

Material and Methods

It is a retrospective, observational cohort study was conducted in Armed Force Hospital Wadi Al Dawasir, Saudi Arabia. We include all adult patients coming to ER with stroke-like symptoms.

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The data was collected over a period of 12 months (November 2019-October 2020), after a period of 6 months devoted to the implementation and education of the staff.

We start our intervention with training sessions for emergency staff, including recognition of early signs of stroke: (BE-FAST) of the eyes, face, arm, speech and time and the importance of prompt treatment. This stroke protocol could be activated every day of the week, during day- and night time.

For each patient we calculate door to code activation (DSC), door to imagery time (DCT) and Door to needle (DTN) for the patient applicable to thrombolytic therapy.

Result

Between November 2019 and October 2020, the total number of ischemic strokes was 52. Men represent 59% while women 41%. The mean age was 67.12 years (Figure 1, 2).

Figure 1: Repartition of patients.

Figure 2: Demographic Data (Age).

Ischemic stroke was present in 86% of our study (Figure 3).

![Figure 3: Patient's Diagnosis.](image)

Code stroke was activated in 32 patients of our suspected patients (Figure 4).

![Figure 4: Number of patient/code stroke activated.](image)

In the start of our study the last seen well is not known for the majority of patient.

The total period was divided on four groups; the first group was between November 2019 and January 2020. The total number of ischemic strokes was 9, during this period no stroke code was activated, median door to CT (DCT) time was 51.0 min (range 30 - 70) (Figure 5).

Between February and April 2020, the total number of ischemic strokes was 5. No code stroke was activated also during this period and the median DCT time was 61 min (range 35 - 95).

Between May 2020 and July 2020, the total number of ischemic strokes was 14 with 8 code stroke activated. The median times for door-to-activate stroke code (DSC) time was 13.25 min (range 3-35), Median time from DCT was 35.75 min (19 - 60 min) (Figure 7).

Between August 2020 and October 2020, 24 patients were admitted with diagnosis of ischemic stroke, the median times for DSC time in this last group was 6.25 min (range 3-13), Median time from DCT was 19.57 min (9 - 26 min). Code stroke was activated for all of these patients.

During the period of 12 months code stroke was activated for 52 suspected patients. 6 patients were applicable for thrombolytic therapy, two patients refuse to get the treatment and four (4) of them receive thrombolytic therapy. The median time for door to needle was 58 min (range 50 - 64 min). The median time between door to CT was 23 min (range 20 - 40 min).

**Discussion**

The lack of experience for emergency staffs and the inability to determine which patient is eligible for thrombolysis at triage are the main causes of the delay in the management of patients with stroke [3].

In the first and second quarter, we did not activate any stroke code and no patient received thrombolytic therapy within 1 h of their arrival. Pre-hospital reasons may explain these delays [3]. A delay of 39 hours between the onset of symptoms and admission was reported in a study published in 2019. One quantitative and qualitative survey concluded that the main causes of delay were:

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- The incertitude of patients that they really have a stroke symptoms and waiting was their first action
- Or the symptoms are already recognized by the patients themselves but the problem was that they live alone [4].

The second reason was an in hospital delay in initiating treatment. In our hospital this delay was related to resistant of the staff and their poor knowledge about the stroke but after training of our staff and their encouragement we arrive to reduce the time lag between patient arrival and activation of stroke code with initiation of treatment and this improvement was clear in the third and fourth quarter. Altamirano., et al had the same conclusion in their recently published study [5]. The same applies to Sushma K., et al in their study [6].

Global guidelines for stroke recommend DCT with interpretation time should be <45 min but our goal was to reduce the target to < 25 min and this target was been chosen because we have difficulty to convince the relatives to sign the high consent risk[7].

According to the ASA, the doctor must clearly inform the advantages and disadvantages of the treatment [8]. Others even demand a higher standard of informed consent than that used for routine emergency therapies that are universally accepted as the standard of care [8].

A significant reduction in all our results is obtained after the implementation of the stroke protocol code in ER Similar to Olson., et al we have specified levels of action in order to improve and reduce DTN time [7].

- A stroke protocol was written and made available to the emergency department. A continuous and regular training has been programmed for the staff. This helped us to identify patients with stroke symptoms more effectively.
- An effective communication is ensured between A multidisciplinary team formed by the emergency department, radiology department, laboratory department, medical department / neurologist and the resuscitation department from the activation of stroke code until the patient is thrombolysed [8].
- Performance monitoring and feedback: after SC implementation the stroke audit was conducted monthly.

The main reasons identified for delays in thrombolysis were luck of awareness of public and staff about warning sign of stroke and the possibility to treat.

- At the end of each quarter the successful stroke code participants were assessed in front of all departments.

Simple steps such as: continuous training of staff, encouragement to activate the stroke code at the slightest suspension, prioritization of the patient for imaging as well as continuous availability of treatment in the emergency department; helps to reduce (DTN).

The same steps are implemented by Elyar Sadeghi-Hokmabadi to to shorten DTN time [9].

The limitations of our study were the small number of population studied and that the study was conducted within a single center.

Despite this our findings on the importance and benefits of implementing stroke code protocols in emergency departments are encouraging. Multi-centric studies are necessary nowadays to confirm such results.

Conclusion

Our study show that the implementation of code stroke protocol in emergencies as well as continuous training of staff to identify suspected stroke patient as soon as triage has positive and rapid repercussions on reduction of DTN time and therefore better patient outcome

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Bibliography


Volume 9 Issue 4 April 2021
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