

Original Article

Agreement between Impression of Stroke in the Emergency Department and Diagnosis at the Neurology DepartmentSamad Shams-Vahdati¹, Alireza Ala¹, Eliar Sadeghi-Hokmabad², Neda Parnianfard³, Maedeh Gheybi², Nasim Ahmadi Sepehri²¹*Emergency Medicine Department, Imam Reza Hospital, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran*²*Neurology Department, Neuroscience Research Center, Tabriz University of Medical Sciences, Tabriz, Iran*³*Research Center for Evidence-Based Medicine, Health Management and Safety Promotion Research Institute, Iranian EBM Center: A Joanna Briggs Institute Affiliated Group, Tabriz University of Medical Sciences, Tabriz, Iran***Corresponding Author:** Maedeh Gheybi, E-mail: mghfar21@gmail.com**ARTICLE INFO***Article history*

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Background: Missing to detect an ischemic stroke in the emergency department leads to miss acute interventions and treatment with secondary prevention therapy. Our study examined the diagnosis of stroke in the emergency department (ED) and neurology department of an academic teaching hospital. **Methods and Materials:** A retrospective chart review was performed from March 2017 to March 2018. ED medical document (chart) were reviewed by a stroke neurologist to collect the clinical diagnosis and characteristics of ischemic stroke patients. For determining the cases of misdiagnosed and over diagnosed data, the administrative data codes were compared with the chart adjudicated diagnosis. The adjusted estimate of effect was estimated through testing the significant variables in a multivariable model. The comparisons were done with chi square test. Statistical significance was considered at $P < 0.05$. **Results:** Of 861 patients of the study, 54% were males and 43% were females; and the mean age of them was 66.51 ± 15.70 . We find no statically significant difference between patient's Glasgow Coma Scale (GCS) in the emergency department (12.87 ± 3.25) and patients GCS in the neurology department (11.77 ± 5.15). There were 18 (2.2%) overdiagnosed of ischemic stroke, 8 (0.9%) misdiagnosed of ischemic stroke and 36 (4.1%) misdiagnosed of hemorrhagic strokes in the emergency department. **Conclusion:** There was no significant difference between impression of stroke in the emergency department and diagnosis at the neurology department.

BACKGROUND

A stroke is a serious medical condition that needs emergency care. it can cause lasting brain damage, sever disability, or death (1). Every 40 seconds one person experiences a new or recurrent stroke which accounts for nearly 800,000 people annually, (2). Failing to detect a stroke in the emergency department (ED) prevents the acute interventions and slowdowns the treatment with secondary prevention therapy (3,4). Furthermore, Patients who have lost their stroke may not be adequately examined for the progression of stroke or stroke-related complications. A quick diagnosis is necessary to provide the best treatment and achieve the best results. Despite this, some of strokes go misdiagnosis and some cases go over diagnosis in the ED.

Unfortunately, for the stroke patients whose medical indication was misdiagnosis, the clinical and pre clinics finding were not well determined. Most of this misdiagnosed strokes related to atypical symptoms, such as nausea/vomiting, dizziness, altered mental status, and

falling. Also some stroke patients are misdiagnosed with other medical condition or stroke chameleon such as hypertensive emergency, syncope (5-7).

Our study examined the diagnosis of ischemic and hemorrhagic stroke in the ED and neurology department of an academic teaching hospital. We appraised the confirmed cases of stroke at these 2 departments, to find the Agreement between impression of stroke in the emergency department and diagnosis at the Neurology Department.

METHOD AND MATERIAL

The medical records review was performed on of all ischemic stroke patients who were discharged from the hospital during March 2017 until March 2018 were reviewed retrospectively. Two separate departments (ED and neurology department) were included in the study. Patient who referred to the ED of Imam Reza hospital then admitted to neurology department. This hospital is affiliated with a medical school,

it has a neurological prescription program, it approved as a stroke center, and each year there are more than 1000 stroke cases in ED. Neurology residents are usually the first responder to stroke codes. The ED doctor will initially lead stroke codes as long as a neurologist is available. Then the subjects were enrolled in the study when they were > 18 years old and admitted to the neurology department of the hospital. A neurologist examined all patients. Demographic data and medications were recorded at the beginning of the activity. Initial signs and symptoms of stroke neurology consultation notes were extracted. ED's assessment was applied in the case of notes absence. The residents at the academic center, neurology and ED were writing the notes.

Informed consent was not necessary, whole data were extracted from stroke registry database of neuroscience research center of Tabriz University of medical sciences. The study protocol was approved by the ethic committee of Tabriz University of medical sciences review board. The stroke database of neurology department was reviewed by two reviewers, and 861 charts (patients) to establish a diagnosis of stroke. We include into analysis plan the impression of these patients in the emergency department. IBM SPSS Statistics software package was used to analyze the data. All tests were 2-sided, and a P-value <0.05 was considered significant.

RESULT

Of the 861 patient, 487 were male, 374 were female. The mean age of the patients was 66.51 ± 15.70 years. Initial GCS score ranged from 3 to 16 with a mean of 12.87 ± 3.25 at the ED. At the neurology department, initial GCS score ranged from 2 to 16 with a mean of 11.77 ± 5.15 we found no significant difference among them ($P=0.24$).

Eight ischemic strokes and thirty six hemorrhagic strokes were initially misdiagnosed, which are 1% and 4.1% of the included strokes at the hospital, in exact twenty-one Intracerebral hemorrhage (ICH) and Intracerebral hemorrhage (IVH) patients and 15 Subarachnoid hemorrhage (SAH) patients were missed at the ED. eighteen of patients were over diagnosed at the ED. ($P=0.11$).

All of missed cases was ischemic stroke. An additional 65.5% of strokes were ischemic and 34.5% were hemorrhagic strokes. Impression of stroke in the emergency department compared with the diagnosis at the Neurology Department showed no significant difference ($P<0.001$).

In addition, neurologist in the neurology department detected all missed cases at the ED, but the early diagnosis remained as an important problem.

DISCUSSION

Based on our finding, the main predictors of missed strokes were the symptoms which are frequently associated with posterior circulation strokes (9,10). studies indicated that the community hospitals were the most frequents healthcare facilities where find strokes were missed at, but the also reported fewer missed strokes if the patients were admitted within a clear time frame for intervention (4,5,7,8,10). We found a little missed stroke at the ED of Imam Reza hospital in Ta-

briz. They lost strokes of posterior circulation and stroke that showed atypical symptoms such as headache, gastrointestinal symptoms and dizziness. Misdiagnosed and accurately diagnosed patients did not show a significant deference in discharge disposition. Complications are reduced when stroke is rapidly treated (11,12). A patient with a stroke has limited time for treatment, and then subsequently detected, potentially will miss an opportunity to improve the result. Moreover, a delayed diagnosis may also increase the length of stay at hospital. In this study, patients with stroke had missed who persisted for > 24 hours at ED, although the difference was not statistically significant. Further studies are required to determine the variables that can lead to admission. The diagnosis of stroke ruins indefinable for several reasons, such as the patient's ability to accurately relay his symptoms to medical providers (13,14). In addition, misdiagnosing a stroke as a cerebrovascular event is the main and differential diagnosis of ED. Our results indicated that when a neurologist was involved to ED, the strokes were less likely to be missed. In addition, applying a neuroscientist in ED for improving the diagnosis of acute stroke was examined by other studies. Satisfactory for a neurologist to be advised, it means ED must take a primary stroke diagnosis. For acute neurological syndrome, such as stroke should be advised to the neurologist as a differential diagnosis in ED until a neurologist takes a complete history and comprehensive examination. It may need to realize an immediate patient until the stroke is diagnosed thoroughly.

CONCLUSION

Many stroke indications commonality with those in other complaints and patterned heuristics are often used to create a proficient diagnosis. In this study, we found 2.2% over diagnosis. In our data, there was no documentation of significant difference of GCS score at the neurology and emergency department. There was no significant difference between impression of stroke in the emergency department and diagnosis at the neurology department.

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