Evaluation of Risk Factors affects Length of Hospitalization in Patients with Transient Ischemic Attack or Ischemic Stroke

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Abstract

Introduction: Cerebral artery diseases are the most prevalent neural disorder leading to serious diseases and death. Stroke is the third cause of death in the U.S. and is the most prevalent neurological disabling disease. This study aims to evaluate the influential factors of the duration of hospital stay in transient ischemic attack (TIA) or ischemic stroke patients. Method of study This is a retrospective study. The population of study consists of all patients diagnosed as TIA or ischemic stroke who admitted in the neurology department of Urmia Imam Khomeini hospital from August, 2014 to August 2015. Data was collected from the cases' records and analyzed using SPSS 22.

Results: A total number of 349 TIA and ischemic stroke cases was included in the study of whom, 322 (95.1%) and 17 (4.9%) cases were diagnosed and studied as ischemic stroke and TIA cases, respectively. In 258 cases (73.9%), the involved area was anterior circulation while in 91 cases (26.1%), it was posterior circulation. Considering relevant risk factors, hypertension with 212 cases (60.7%) was the most frequent risk factor followed by past medical history of stroke in 115 cases (33%), congestive heart failure in 113 cases (32.4%), diabetes mellitus in 86 cases (24.4%) and smoking in 72 cases (20.6%), respectively. Conclusion: According to our results, AF rhythm and anterior circulation involvement apparently affects the duration of hospital stay and increases it. This agrees with medicinal literature where AF has been introduced as a risk factor for cerebral embolic diseases and can be considered as a cause of TIA or ischemic stroke.

Keywords: Duration of hospital stay, Ischemic brain stroke, TIA.

Introduction

Stroke is referred to acute neurological functioning disorders caused by the involvement of a cerebral artery [1]. Despite limited treatment advances, cerebral artery events are one of the most important and the most prevalent causes of death across the world due to the limited capacity of the recovery of central nervous system [2, 3].

In Iran, stroke is the second cause of death proceeded only by the heart disease [14]. In the U.S., 800000 new stroke cases are reported every year of which 130000 cases die [5]. Although there is no accurate data, it appears that the prevalence of stroke is higher in Iran than other Western countries and the beginning age of stroke is 45 or even lower [6].

The incidence of stroke has been reduced in the past two decades. However, the total number of stroke cases has been increased due to the aging of the world populaiton [7].

In 2007, cardiovascular diseases imposed 65 billion dollars to the health system of the U.S. The main part of it was consumed to manage and prevent recurrence of strokes [8]. Despite the fact that stroke-induced mortality has been decreased in recent years, about two third of such patients need daily medicinal cares [9]. Stroke patients suffer functional disorders, decreased role in daily life and insufficient social supports. This reduces their quality of life [10, 11]. Stroke are divided into two groups: hemorrhagic stroke and ischemic stroke [12]. The latter
accounts for 80% of strokes. It happens when blood vessels are suddenly blocked due to embolism or thrombosis [13]. In the former one, cerebral arteries are rupture and intercerebral bleedind or subarachnoid bleeding happens [14]. Transient ischemic attack, TIA, is another type of stroke with the same symptoms and motor disorders but they generally last less than one day with no necrosis of brain cells [15]. Transient ischemic attack, TIA, is another type of stroke with the same symptoms and motor disorders but they generally last less than one day with no necrosis of brain cells [15]. However, hemorrhagic strokes are more prevalent in developing countries compared with developed countries with higher rates of mortality [16]. About 30% of such cases die within one month [17]. Prolonged duration of hospital stay, for any reason, imposes huge costs to the health system [18]. Therefore, an efficient health system should shorten this duration in order to improve the quality of services and to reduce imposed costs [19, 20]. On the other hand, prolonged hospitalization imposes serious socio-mental effects on cases [21]. The identification of the influential factors of the duration of hospital stay in stroke patients can both reduce costs and mental effects and increase the efficiency and effectiveness of hospitals [22]. Stroke, as compared to TIA, depression, need for aided-ventilation, stroke intensity, age, associated diseases and eduction are factors affecting the duration of hospital stay in stroke patients [23-26]. Considering the importance of the duration of hospital stay, which was discussed above, this study aims to evaluate the influential factors of the duration of hospital stay in TIA or ischemic stroke patients.

Method of Study

This is a retrospective study where all TIA or ischemic stroke diagnosed patients admitted in the neurology department of Imam Khomeini hospital, Urmia-Iran from August, 20114 to August 2015 were successively included in the study. The cases’ data was collected from their records using researcher-made questionnaire and was analyzed using SPSS 22 and Kaplan-Meier estimator.

Results

The population of this study consists of 349 TIA and ischemic stroke cases admitted in the neurological department of Urmia Imam Khomeini hospital from August 23, 2014 to August 23, 2015, of whom 170 cases (48.7%) were male and 179 cases (51.3%) were female.

The mean (±standard deviation) age of cases was 69.04±14.7. The oldest and youngest cases were 98 and 26 years old, respectively. Of the studied cases, 332 cases (95.1%) were diagnosed as ischemic stroke cases and 17 cases (4.9%) were diagnosed as TIA cases. In 258 cases (73.9%), the involved area was anterior circulation and in 91 cases (26.1%), it was posterior circulation.

Table 1: The frequency of the studied risk factors in the studied cases

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>85</td>
<td>24.4%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>212</td>
<td>60.7%</td>
</tr>
<tr>
<td>Past history of stroke</td>
<td>115</td>
<td>33%</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>113</td>
<td>32.4%</td>
</tr>
<tr>
<td>Lung diseases</td>
<td>26</td>
<td>7.4%</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>17</td>
<td>4.9%</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>10</td>
<td>2.9%</td>
</tr>
<tr>
<td>Hemoglobinopathy</td>
<td>5</td>
<td>1.4%</td>
</tr>
<tr>
<td>Smoking background</td>
<td>72</td>
<td>20.6%</td>
</tr>
<tr>
<td>Consuming alcohol background</td>
<td>3</td>
<td>0.9%</td>
</tr>
<tr>
<td>AF rhythm</td>
<td>31</td>
<td>8.9%</td>
</tr>
<tr>
<td>Homocysteinuria</td>
<td>9</td>
<td>2.6%</td>
</tr>
<tr>
<td>Migraine</td>
<td>4</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

According to table 1, hypertension seen in 212 cases (60.7%) is the most frequent risk factor followed by stroke background seen in 115 cases (33%), congestive heart failure seen in 113 cases (32.4%), diabetes mellitus seen in 86 cases (24.4%) and smoking seen in 72 cases (20.6%).

The mean (±standard deviation) duration of hospital stay was 9.57±1.6 days where 196 and 1 days were the highest and the lowest durations, respectively.

Regarding study outcome, there were 28 in-hospital dead cases (8%) and 321 cases (92%) were discharged.

Table 2: Mean duration of hospital stay separated by sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean± standard deviation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1.6± 9.7</td>
<td>0.0872</td>
</tr>
<tr>
<td>Female</td>
<td>1.6± 9.4</td>
<td></td>
</tr>
</tbody>
</table>

According to the above figures, there is no significant relationship between sex and duration of hospital stay (P-value=0.0872) implying that the variable of sex does not
affect the duration of hospital stay. According to the following table, there is a significant relationship between the involved area and duration of hospital stay (p-value=0.046) implying that the duration of hospital stay increases in cases with anterior circulation as the involved area.

Table 3: Mean duration of hospital stay in the studied cases separated by the involved area

<table>
<thead>
<tr>
<th>Involved area</th>
<th>Mean± standard deviation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior circulation</td>
<td>10.15±1.04</td>
<td>0.046</td>
</tr>
<tr>
<td>Posterior circulation</td>
<td>7.93±5.6</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Mean duration of hospital stay in the studied cases separated by background disease

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean± std deviation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>Yes</td>
<td>9.5±5.6</td>
</tr>
<tr>
<td>Hypertension</td>
<td>No</td>
<td>9.5±1.4</td>
</tr>
<tr>
<td>Past history of stroke</td>
<td>Yes</td>
<td>9.1±1.1</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>No</td>
<td>9.7±1.3</td>
</tr>
<tr>
<td>Lung diseases</td>
<td>Yes</td>
<td>7.8±4.1</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>No</td>
<td>9.7±1.5</td>
</tr>
<tr>
<td>Myocardial infarction background</td>
<td>Yes</td>
<td>9.3±1.8</td>
</tr>
<tr>
<td>Smoking</td>
<td>Yes</td>
<td>10.7±2.7</td>
</tr>
<tr>
<td>AF rhythm</td>
<td>Yes</td>
<td>14.06±2.4</td>
</tr>
</tbody>
</table>

According to table 4, the relationship between diseases and duration of hospital stay is significant only in hyperlipidemia and AF rhythm (p-value<0.001 and p-value=0.049, respectively) so that the duration of hospital stay in AF rhythm and hyperlipidemia patients was higher and lower, respectively.

In addition, table 4 indicates that there is no significant relationship between past history of stroke and duration of hospital stay (p-value=0.650). This implies that this factor does not affect the duration of hospital stay in the studied cases.

Discussion

This study concludes that both involved area and AF background prolong the duration of hospital stay while hyperlipidemia decreases it. In addition, it concludes that sex does not affect the duration of hospital stay.

Cotte FE et al concluded that atrial fibrillation could prolong the duration of hospital stay in stroke patients [27]. Stroke patients who suffer atrial fibrillation at the same time, impose higher costs, compared with normal sinus rhythm cases, due to increased likelihood of congestive heart failure, lung infection, more intensive stroke and longer duration of hospital stay [28]. Lower incomes can decrease stroke-induced duration of hospital stay [29]. The risk of the reoccurrence of stroke and consequent increased duration of hospital stay is higher in TIA and extreme carotid obstruction patients [30]. A retrospective study in the U.S. revealed that the response of stroke to thrombolytic therapy is lower in black people compared with white people. This, in turn, prolongs the duration of hospital stay and increases hospital costs [31]. Gomes F. et al concluded that malnutrition prolongs the duration of hospital stay in stroke cases [32].

Zhao L. et al found that increased neutrophil to lymphocyte ratio, diabetes mellitus, stroke type and the intensity of the primary stroke are among the influential factors of the duration of hospital stay and increase it [33]. In addition, age>65 and the treatment of stroke can affect the duration of hospital stay and relevant costs [34] so that the prescription of the blood clot dissolvers reduces the duration of hospital stay [35]. In addition, falling can increase stroke-induced duration of hospital stay [36]. The prescription of thrombosis dissolvers within 30 minutes significantly reduces the duration of hospital stay as compared to the prescription of the same medicine within 2 hours after hospitalization [37]. A retrospective study found that even the type of insurer organization, i.e. public or private organization, affects the duration of hospital stay [38]. In general, however, non-insured stroke patients suffer intensive strokes, prolonged hospitalization and higher mortality rate compared with insured ones [39]. Edjok RK et al concluded that smoking background reduces mortality rate, the duration of hospital stay and the intensity of stroke compared with non-smoking cases.
However, smoking cases experience stroke at lower ages as compared to other people [40].

Conclusion

Our results showed that as an effective factor, AF rhythm apparently affect the duration of hospital stay and prolongs it.

Suggestions

References


