Association of Various Factors with the Presence of Urinary Tract Infections Among Patients Suffering from Stroke

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ABSTRACT

Objective: To assess the association of various factors with the presence of urinary tract infections among patients suffering from stroke.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: Department of Medicine, Pak Emirates Military Hospital, Rawalpindi Pakistan, from Jun to Sep 2021.

Methodology: A total of 130 patients with ischemic or hemorrhagic stroke diagnosed by the consultant medical specialist or neurologist based on clinical and neuro-radiological findings were included in this study. Urinary tract infection was diagnosed based on urine culture and sensitivity test. Age, gender, type of stroke and severity of stroke was associated with the presence of urinary tract infection among the study participants.

Results: Out of 130 patients with acute stroke included in the study, 81(62.3%) were males, while 49(37.3%) were females. The mean age of the stroke patients included in the study was 56.823±8.737 years. In addition, 33(25.4%) patients had urinary tract infections confirmed on the culture and sensitivity report, while 97(74.6%) had no evidence of urinary tract infection. Statistical analysis revealed that female gender and stroke severity had a statistically significant relationship (p-value <0.05) with the presence of urinary tract infection among patients suffering from acute stroke.

Conclusion: Around one-fourth of our patients presenting with acute stroke had urinary tract infections in our study participants. Female patients and patients with severe stroke symptoms were more at risk of urinary tract infections than male patients and patients with less severe symptoms.

Keywords: Severity, Stroke, Urinary tract infection.


INTRODUCTION

Stroke has been the most commonly encountered neurovascular condition causing a significant impact on the quality of life of patients.1 Previously considered as the disease of the elderly, cerebro-vascular events tend to occur in all age groups across the globe.2 Rehabilitation process after stroke and long-term recovery depends upon several factors, including patients’ general health and the presence of comorbid illnesses. Three multiple health-related conditions have been closely related to stroke and may adversely affect the short-term and long-term outcomes in these patients.3,4

Urinary tract infections occur in the community and are acquired in hospitalized patients. Many factors predispose patients with various illnesses to acquire urinary tract infections.5 Situation gets more complex in the case of nosocomial urinary tract infections. Various neurological disorders have been associated with increased urinary tract infections.6

Stroke patients have been studied for various infections, including urinary tract infections. Wästfelt et al. concluded that UTI was one of the common predictors, especially in female patients.7 Bogason et al. concluded that around 11.7% of their patients had UTI, and most of them had it at the time of admission.8 Li et al. in 2020, revealed that out of 186 subjects, 35 had urinary tract infections. Elevated interleukin-6, higher NIHSS, and decreased haemoglobin predicted urinary tract infection in their study population.9

The management of stroke has always been challenging for treating physicians; a multidisciplinary team usually manages this task. Treatment of these patients may become more complex if other ailments, especially infections, occur along with the course of recovery from stroke. A local study published regarding the quality of life of stroke patients also emphasized that infections, especially urinary tract infection, inversely affects the quality of life and outcome in the patients suffering from a stroke.10

Unfortunately, the presence of UTIs among patients...
with a stroke at admission is less studied in our part of the world. Therefore, we planned this study to assess the association of various factors with urinary tract infections among patients suffering from a stroke.

**METHODOLOGY**

This comparative cross-sectional study was conducted at the Medicine/Neurology Department of Pak Emirates Military Hospital, Rawalpindi Pakistan from June to September 2021. The sample size was calculated using the World Health Organization calculator by using the population prevalence of urinary tract infection in stroke as 5.7%.[11] Ethical approval was obtained via letter A/28/EC/349/2021. Consecutive non-probability technique was used to gather the sample for the study. Ischemic or hemorrhagic stroke was diagnosed by a consultant medical specialist/neurologist based on clinical findings and a plain CT scan brain done at the time of presentation.

**Inclusion criteria:** Patients of either gender, aged between 18 to 70 years presenting with acute ischemic or hemorrhagic stroke were included in the study.

**Exclusion criteria:** Patients with a past or current history of chronic or repeated urinary tract infections, patients with a history of renal or autoimmune disease or a recurrent stroke were excluded from the study. Patients already taking antibiotics before the onset of stroke or those who could not undergo urine culture and sensitivity tests were also not included.

Urinary tract infection was diagnosed with the help of routine urine examination and culture and sensitivity by a consultant microbiologist in the laboratory of our hospital. Midstream voided urine specimen was collected from all the patients who could urinate. The specimen was obtained from the sampling port on the catheter bag or, in the tubing from an a-1 catheter valve. The specimen was collected from all the patients who could urinate. The presence of other neurological illness or other symptoms. Of 130 patients, 104 (80%) had an ischemic stroke, while 26 (20%) had a hemorrhagic stroke. Of most patients, 86 (66.1%) had E. coli as the culprit for urinary tract infections.

All statistical analysis was performed using the Statistical Package for Social Sciences (SPSS-24.0.). Characteristics of participants and the presence of urinary tract infections were described by using descriptive statistics. The relationship between age, gender, severity, and type of stroke with urinary tract infection was determined by applying the Pearson chi-square test keeping the p-values ≤0.05 as significant.

**RESULTS**

Out of 130 patients with acute stroke included in the study, 81 (62.3%) were males, while 49 (37.3%) were females. The mean age of the stroke patients included in the study was 56.82±8.737 years. In addition, 33 (25.4%) patients had urinary tract infections confirmed on the culture and sensitivity report, while 97 (74.6%) had no evidence of urinary tract infection. Table-I summarized the general characteristics of stroke patients included in the study. On the National Institutes of Health Stroke Scale, 71 (54.6%) had mild, 41 (31.5%) had mild to moderately severe, 12 (9.2%) had severe, and 6 (4.6%) had very severe symptoms. Of 130 patients, 104 (80%) had an ischemic stroke, while 26 (20%) had a hemorrhagic stroke. Of most patients, 86 (66.1%) had E. coli as the culprit for urinary tract infections.

Table-I: Characteristics of Stroke Patients (n=130)

<table>
<thead>
<tr>
<th>Study Parameters</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
</tr>
<tr>
<td>Mean±SD</td>
<td>56.82±8.737 years</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>81 (62.3)</td>
</tr>
<tr>
<td>Female</td>
<td>49 (37.7)</td>
</tr>
<tr>
<td><strong>Presence of Urinary Tract Infection</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33 (25.4)</td>
</tr>
<tr>
<td>No</td>
<td>97 (74.6)</td>
</tr>
<tr>
<td><strong>Type of Stroke</strong></td>
<td></td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td>104 (80.0)</td>
</tr>
<tr>
<td>Hemorrhagic stroke</td>
<td>26 (20.0)</td>
</tr>
<tr>
<td><strong>Severity of Stroke</strong></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>71 (54.6)</td>
</tr>
<tr>
<td>Mild to moderately severe</td>
<td>41 (31.5)</td>
</tr>
<tr>
<td>Severe</td>
<td>12 (9.2)</td>
</tr>
<tr>
<td>Very severe</td>
<td>06 (4.6)</td>
</tr>
</tbody>
</table>

Table-II showed the results of the statistical analysis. It was revealed that female gender (p-value <0.001) and stroke severity (p-value<0.001) had a statistically significant relationship (p-value <0.05) with the presence of urinary tract infection among patients suffering from an acute stroke while age (p-value-0.998) and type of stroke (p-value-0.097) had no such relationship in our study participants.
The relationship between these Armed Forces patients and having a UTI. Our study design was slightly different, and we did not study the impact of receiving indwelling urinary catheterization on UTI. However, stroke severity was statistically significantly associated with the presence of UTI in our study participants.

A similar study performed on the Turkish population by Ersoz et al. investigated the frequencies, possible risk factors of urinary tract infections and other relevant parameters in subacute and chronic stroke patients. They came up with the findings around 27.3% of their patients suffered from urinary tract infection. Gender was statistically significantly associated with significant bacteriuria in their data set. Our results supported the results generated by Ersoz et al.

Ifejika-Jones et al. in 2013, found that patients with SUTI had 57% less chance of being discharged home compared with the other levels of care. They also revealed that increased stroke severity on NIHSS was associated with the presence of SUTI in their study participants. We did not follow the patients after diagnosis of acute stroke and screening them for UTI. However, our study results showed that female patients and patients with severe stroke symptoms were more at risk of urinary tract infections than male patients and patients with less severe symptoms.

UTI should not be ignored in patients suffering from a stroke. Special attention should be paid to female patients and patients having a severe form of stroke.

**LIMITATIONS OF STUDY**

There were a few limitations in this study. First, as patients were not screened before the onset of acute stroke, it cannot be concluded that UTI occurred after the stroke, and stroke could be attributed to the presence of UTI in these patients. Future studies with better design can generate better results to ascertain the relationship between these variables.

**CONCLUSION**

Around one-fourth of our patients presenting with acute stroke had urinary tract infections in our study participants. In addition, female patients and patients with severe stroke symptoms were more at risk of urinary tract infections than male patients and patients with less severe symptoms.

Conflict of Interest: None.
Author’s Contribution

Following authors have made substantial contributions to the manuscript as under:

FS: Study design, data analysis, critical review, drafting the manuscript, critical review, approval of the final version to be published.

SN: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

BA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

IA & HK: Critical review, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES


