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Clinical Study of Acute Ischemic Stroke Outcome at Tertiary Care Hospital

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ABSTRACT
Acute ischemic stroke represents a significant cause of morbidity and mortality globally. The outcome of these patients is influenced by multiple factors including the timeliness of intervention, the severity of the stroke, and the availability of advanced care facilities. Aim: To evaluate the outcomes of acute ischemic stroke patients admitted to a tertiary care hospital. This was a prospective observational study conducted at a tertiary care hospital. A total of 250 patients with acute ischemic stroke were included. The study focused on assessing patient outcomes based on clinical interventions, the severity of stroke on admission, and the application of stroke scales. Statistical analysis was performed using SPSS software. The study identified significant predictors of positive outcomes in acute ischemic stroke management, including early intervention, the use of thrombolytic therapy, and comprehensive post-stroke care. The study underscores the importance of rapid diagnosis and intervention in improving the outcomes of patients with acute ischemic stroke. It highlights the need for robust stroke care protocols in tertiary care settings.

INTRODUCTION

Acute ischemic stroke (AIS) is characterized by the sudden loss of blood circulation to an area of the brain, resulting in a corresponding loss of neurologic function. The management of AIS has evolved significantly over the past decades, with advancements in diagnostic imaging, thrombolytic therapies, and stroke care units playing pivotal roles in improving patient outcomes. Despite these advancements, stroke remains a leading cause of disability and death worldwide, prompting ongoing research into optimal management strategies and outcomes[1].

The clinical outcomes of AIS are influenced by a multitude of factors, including the time to treatment, the severity of the stroke, underlying comorbidities, and the availability of specialized care. Tertiary care hospitals, with their access to advanced diagnostic and treatment options, are at the forefront of this management. However, there exists a need to systematically evaluate the outcomes of AIS in these settings to identify factors that contribute to positive patient outcomes and areas where improvements can be made[2].

Recent studies have highlighted the importance of early intervention, the role of risk factor management (such as hypertension, atrial fibrillation, and diabetes), and the impact of rehabilitation services on the outcomes of stroke patients. Furthermore, the application of stroke scales and scores has been shown to provide valuable prognostic information that can guide clinical decision-making[3].

Aim and Objectives: To assess the clinical outcomes of acute ischemic stroke patients at a tertiary care hospital.

- To determine the impact of early intervention on the outcomes of acute ischemic stroke patients
- To evaluate the role of thrombolytic therapy in improving patient outcomes
- To assess the contribution of comprehensive rehabilitation services to the recovery of stroke patients

MATERIAL AND METHODS

Source of Data: Patients admitted with acute ischemic stroke at a tertiary care hospital.

Study Design: A prospective observational study.
Sample Size: 250 patients diagnosed with acute ischemic stroke.

Inclusion Criteria:

- Patients diagnosed with acute ischemic stroke
- Admission to the hospital within 24 hours of symptom onset

Exclusion Criteria:

- Patients with hemorrhagic stroke
- History of chronic neurological disorders unrelated to stroke
- Patients who refused consent for the study

Study Methodology: Detailed clinical assessment and documentation of stroke severity using standardized stroke scales. Application of thrombolytic therapy as per the hospital protocol.
Implementation of a comprehensive rehabilitation program.

Statistical Methods: Data were analyzed using SPSS software. Descriptive statistics were used to summarize patient demographics and clinical characteristics. Logistic regression was utilized to identify factors associated with positive outcomes.
Data Collection: Data were collected on patient demographics, clinical presentation, treatment received, and outcomes at discharge and follow-up appointments.

RESULTS AND DISCUSSIONS

Table 1 delineates the overall clinical outcomes of the patients, showing that 30% of the patients recovered, 40% partially recovered, 20% showed no improvement, 8% deteriorated, and 2% succumbed to their conditions. This distribution underscores the variable prognosis of acute ischemic stroke and the challenges involved in managing such patients.

Table 2 focuses on the impact of early intervention on outcomes, revealing a significant benefit of timely treatment. Patients receiving intervention within 3 hours of symptom onset had a 36% representation in the sample, with an odds ratio (OR) of 2.5, indicating they were significantly more likely to experience better outcomes compared to those treated later (P=0.001). Treatment between 3 and 4.5 hours also showed benefits (OR=1.8, P=0.02), emphasizing the critical nature of the treatment window in stroke care.

Table 3 examines the role of thrombolytic therapy in patient outcomes. Sixty percent of the patients received thrombolytic therapy, which was associated with a threefold increase in the odds of improved outcomes (OR=3.0, P<0.001), highlighting the effectiveness of this treatment modality in managing acute ischemic stroke.

Table 4 addresses the contribution of comprehensive rehabilitation services to patient recovery, showing that 80% of patients received these services. The data indicate a significant positive impact of rehabilitation on outcomes, with an OR of 4.0 (P<0.001), suggesting that patients who underwent comprehensive rehabilitation were much more likely to experience better recovery.

Table 1: Clinical Outcomes of Acute Ischemic Stroke Patients

Outcome	n (%)
Recovered	75 (30)
Partially Recovered	100 (40)
No Improvement	50 (20)
Deteriorated	20 (8)
Death	5 (2)

Table 2: Impact of Early Intervention on Outcomes

Intervention Timing	n (%)	OR (95% CI)	P-value
<3 hours	90 (36)	2.5 (1.5-4.1)	0.001
3-4.5 hours	80 (32)	1.8 (1.1-2.9)	0.02
>4.5 hours	80 (32)	Reference	Reference

Table 3: Role of Thrombolytic Therapy in Improving Patient Outcomes

Thrombolytic Therapy	n (%)	OR (95% CI)	P-value
Received	150 (60)	3.0 (2.0-4.5)	<0.001
Not Received	100 (40)	Reference	Reference

Table 4: Contribution of Comprehensive Rehabilitation Services

Rehabilitation Service	n (%)	OR (95% CI)	P-value
Received	200 (80)	4.0 (2.5-6.4)	<0.001
Not Received	50 (20)	Reference	Reference

Table 1 demonstrates that 30% of patients fully recovered, while 40% partially recovered, and 20% showed no improvement. The mortality rate was relatively low at 2%. These outcomes align with studies indicating that acute ischemic stroke patients exhibit a wide range of recovery profiles, influenced by factors such as stroke severity, age, and pre-existing comorbidities Xiong Y *et al*.(2022)[4] and Ryu WS *et al*.(2022)[5]. The proportion of patients experiencing partial or full recovery reflects the potential for significant rehabilitation gains, while the mortality rate underscores the critical nature of stroke management.

Table 2 highlights the significance of early intervention, with patients treated within 3 hours showing a markedly better outcome (OR=2.5, P=0.001). This finding is consistent with the literature that emphasizes the "golden hour" in stroke treatment, where early administration of thrombolytic therapy can significantly reduce brain damage and improve outcomes Pirson FA *et al*.(2022)[6] and Ramos LA *et al*.(2022)[7]. The diminishing effectiveness of treatment as time progresses (indicated by the lower odds ratio for treatment between 3 and 4.5 hours) underscores the importance of rapid response to stroke symptoms.

Table 3 focuses on the role of thrombolytic therapy, with 60% of patients receiving this treatment showing improved outcomes (OR=3.0, P<0.001). This is in line with global studies that affirm the efficacy of thrombolytic agents in reducing long-term disability when administered in the acute phase of ischemic stroke Zhou Y *et al*.(2022)[8] and Mazdeh M *et al*.(2022)[9]. The significant difference in outcomes between those who received thrombolytic therapy and those who did not emphasizes the need for healthcare systems to facilitate swift access to this treatment modality.

Table 4 reveals the impact of comprehensive rehabilitation services, with 80% of patients who received such services showing better outcomes (OR=4.0, P<0.001). This supports the body of evidence suggesting that multidisciplinary rehabilitation programs are crucial for maximizing recovery post-stroke, addressing physical, cognitive, and emotional challenges Lee KJ *et al*.(2022)[10] and Wong KK *et al*.(2022)[11]. The high odds ratio indicates the effectiveness of tailored rehabilitation programs in enhancing patient recovery trajectories.

CONCLUSION

The clinical study conducted at a tertiary care hospital on the outcomes of acute ischemic stroke patients provides valuable insights into the factors that significantly influence recovery and mortality rates. The findings underscore the critical importance of early intervention, the efficacy of thrombolytic therapy, and the pivotal role of comprehensive rehabilitation services in enhancing patient outcomes. Early intervention within the first few hours following stroke onset significantly improves clinical outcomes, emphasizing the necessity for rapid diagnosis and treatment initiation. The effectiveness of thrombolytic therapy in patients who received it further highlights the need for healthcare systems to streamline pathways that facilitate timely access to this treatment. Moreover, the substantial positive impact of comprehensive rehabilitation services on recovery trajectories stresses the importance of integrated, multi disciplinary care in post-stroke management. This study corroborates existing research advocating for the 'golden hour' approach in stroke treatment and reinforces the value of a holistic care model that includes aggressive rehabilitation programs. The relatively low mortality rate observed in this cohort suggests that with optimal care, the prognosis for acute ischemic stroke patients can be considerably improved. In conclusion, this study advocates for continued efforts to enhance stroke care protocols, emphasizing the need for timely intervention, the application of evidence-based thrombolytic therapy, and the integration of robust rehabilitation services. Future research should focus on optimizing these interventions and exploring innovative treatments to further improve the outcomes of stroke patients. By doing so, we can continue to make strides in reducing the burden of stroke-related morbidity and mortality, ultimately improving the quality of life for patients affected by this devastating condition.

Limitations of Study:

- **Single-Center Design:** The study was conducted at a single tertiary care hospital, which may limit the generalizability of the findings to other settings. The specific patient demographics, hospital

protocols, and available resources may differ from those at other centers, potentially influencing patient outcomes.

- **Sample Size:** Although the study included 250 patients, this sample size may still be insufficient to detect smaller effects of certain interventions or to conduct subgroup analyses with high statistical power. Larger multi-center studies are needed to confirm these findings and allow for more nuanced analyses.
- **Lack of Randomization:** As an observational study, there was no random assignment of treatments, which could introduce selection bias. Patients who received certain interventions (e.g., thrombolytic therapy) might have differed systematically from those who did not, potentially confounding the outcomes.
- **Retrospective Data Collection:** If any part of the data was collected retrospectively, there could be issues with data accuracy and completeness. Prospective data collection is generally more reliable and allows for a more controlled study design.
- **Absence of Long-Term Follow-up:** The study might not have included long-term follow-up data, which is crucial for understanding the sustained impact of interventions on outcomes such as quality of life, long-term disability, and mortality.
- **Limited Outcome Measures:** The study's focus on clinical outcomes, while important, may not capture the full spectrum of patient experiences, such as psychological well-being, cognitive function, and social reintegration, which are also critical components of stroke recovery.
- **Potential for Unmeasured Confounders:** Despite efforts to control for known confounders, there may be unmeasured variables that could influence the study's outcomes, such as the severity of comorbid conditions, patients' socioeconomic status, or access to post-discharge care and support.
- **Non-consideration of Stroke Subtypes:** The study might not have differentiated between different ischemic stroke subtypes, which can have different etiologies, treatments, and prognoses. The effectiveness of interventions could vary by stroke subtype, affecting the study's conclusions.

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