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Original Research

Comparative Analysis of Early vs. Late Administration of Antiviral Therapy in Acute Viral Infections

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ABSTRACT

Background: Acute viral infections pose significant health challenges worldwide, often leading to severe complications if not managed promptly. Early administration of antiviral therapy is hypothesized to improve clinical outcomes compared to delayed treatment. This study aims to evaluate the efficacy of early versus late administration of antiviral therapy in patients with acute viral infections.

Materials and Methods: A total of 200 patients diagnosed with acute viral infections were included in this prospective study. Participants were randomly divided into two groups: the Early Treatment Group (ETG), receiving antiviral therapy within 24 hours of symptom onset, and the Late Treatment Group (LTG), receiving therapy after 72 hours. Clinical parameters, including symptom resolution time, hospitalization duration, and viral load reduction, were assessed. Statistical analyses were performed using t-tests and chi-square tests to compare outcomes between the groups, with a significance level set at $p < 0.05$.

Results: Patients in the ETG demonstrated a significantly shorter symptom resolution time (5.2 ± 1.3 days) compared to the LTG (8.6 ± 1.7 days, $p < 0.001$). The duration of hospitalization was also significantly reduced in the ETG (3.8 ± 1.2 days) versus the LTG (6.1 ± 1.5 days, $p < 0.001$). Additionally, viral load reduction at day 5 post-treatment initiation was greater in the ETG (85%) compared to the LTG (62%, $p < 0.01$). No significant adverse effects were observed in either group.

Conclusion: Early administration of antiviral therapy in acute viral infections significantly enhances clinical outcomes by reducing symptom resolution time, hospitalization duration, and viral load. These findings underscore the importance of initiating antiviral treatment promptly to achieve optimal therapeutic benefits.

Keywords: Acute viral infections, antiviral therapy, early treatment, late treatment, symptom resolution, hospitalization duration, viral load.

INTRODUCTION

Acute viral infections are a leading cause of morbidity and mortality worldwide, posing a significant burden on healthcare systems, particularly during epidemic outbreaks [1]. These infections can range from mild, self-limiting illnesses to severe, life-threatening conditions, depending on the virus and the patient's immune response. Antiviral therapy has emerged as a cornerstone in the management of such infections, aiming to limit viral replication, alleviate symptoms, and prevent complications [2].

The timing of antiviral administration plays a critical role in determining its efficacy. Early treatment has been associated with better outcomes due to the suppression of viral replication during its peak phase [3]. Conversely, delayed treatment may lead to suboptimal outcomes, as the virus might have already caused significant tissue damage and immune dysregulation [4]. Despite this understanding, the decision to initiate antiviral therapy often depends on various factors, including the availability of diagnostic tools, patient presentation, and healthcare accessibility [5].

Studies have suggested that early antiviral therapy in conditions like influenza and herpes simplex virus infections significantly reduces symptom duration and complications [6,7]. However, the evidence remains inconsistent across different viral infections and patient populations, necessitating further research to elucidate the benefits of early versus late treatment.

This study aims to compare the clinical outcomes of early and late antiviral administration in patients with acute viral infections, focusing on parameters such as symptom resolution, hospitalization duration, and viral load reduction. By addressing this gap, the findings can inform clinical guidelines and optimize

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therapeutic strategies in managing acute viral infections.

MATERIALS AND METHODS

Study Design and Setting: This prospective, comparative study was conducted at a tertiary care hospital over a period of six months. The study included 200 patients diagnosed with acute viral infections, confirmed through clinical evaluation and laboratory testing. Inclusion criteria consisted of individuals aged 18–60 years presenting within five days of symptom onset, with no prior antiviral treatment. Patients with chronic illnesses, immunocompromised conditions, or known allergies to antiviral drugs were excluded.

Study Groups: Participants were randomly assigned to two groups:

1. **Early Treatment Group (ETG):** Patients who received antiviral therapy within 24 hours of symptom onset.
2. **Late Treatment Group (LTG):** Patients who received antiviral therapy 72 hours or later after symptom onset.

Intervention: The antiviral therapy was administered as per the standard treatment protocol for the specific viral infection diagnosed. Drug dosages and durations were based on established guidelines and adjusted for individual patient factors such as weight and renal function.

Outcome Measures: The primary outcomes assessed included:

1. **Symptom Resolution Time:** The duration (in days) from the initiation of treatment to complete symptom resolution.
2. **Hospitalization Duration:** The length of hospital stay (in days).
3. **Viral Load Reduction:** Measured via quantitative polymerase chain reaction (qPCR) on days 3 and 5 post-treatment initiation.

Data Collection: Demographic and clinical data were recorded at baseline. Follow-up assessments were conducted daily during hospitalization and at outpatient visits. Laboratory investigations, including viral load testing, were performed at a central laboratory adhering to standard protocols.

Statistical Analysis: Data were analyzed using SPSS software (version 25.0). Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Group comparisons were performed using an independent t-test for continuous variables and a chi-square test for categorical variables. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 200 patients were included in the study, with 100 patients in the Early Treatment Group (ETG) and 100 in the Late Treatment Group (LTG). The demographic and baseline clinical characteristics were comparable between the two groups (Table 1).

Symptom Resolution Time: The mean symptom resolution time was significantly shorter in the ETG (5.2 ± 1.3 days) compared to the LTG (8.6 ± 1.7 days, $p < 0.001$) (Table 2). This highlights the benefit of early intervention in reducing the duration of symptoms.

Hospitalization Duration: Patients in the ETG had a significantly shorter hospitalization duration (3.8 ± 1.2 days) compared to those in the LTG (6.1 ± 1.5 days, $p < 0.001$) (Table 2).

Viral Load Reduction: At day 5 post-treatment initiation, the viral load reduction was 85% in the ETG compared to 62% in the LTG ($p < 0.01$) (Table 3). The ETG also demonstrated a more rapid decline in viral load at day 3 (65% vs. 42%, $p < 0.05$).

Adverse Effects: No significant difference in the incidence of adverse effects was observed between the groups (12% in ETG vs. 10% in LTG, $p = 0.45$) (Table 3).

Table 1. Demographic and Baseline Clinical Characteristics of Study Groups

Characteristic	ETG (n = 100)	LTG (n = 100)	p-value
Age (years)	35.4 ± 8.2	34.8 ± 7.9	0.72
Male (%)	54%	52%	0.82
Symptom onset (days)	1.2 ± 0.4	4.3 ± 0.6	<0.001

Table 2. Clinical Outcomes of Study Groups

Outcome	ETG (n = 100)	LTG (n = 100)	p-value
Symptom resolution (days)	5.2 ± 1.3	8.6 ± 1.7	<0.001
Hospitalization (days)	3.8 ± 1.2	6.1 ± 1.5	<0.001

Table 3. Viral Load Reduction and Adverse Effects

Parameter	ETG (n = 100)	LTG (n = 100)	p-value
Viral load reduction (%) (Day 3)	65%	42%	<0.05
Viral load reduction (%) (Day 5)	85%	62%	<0.01
Adverse effects (%)	12%	10%	0.45

The results consistently indicate that early antiviral administration provides superior clinical outcomes compared to delayed treatment (Tables 2 and 3).

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DISCUSSION

The present study highlights the significant benefits of early antiviral therapy in managing acute viral greater viral load reductions compared to those who received delayed treatment. These findings align with prior studies that emphasize the importance of timely intervention in controlling viral replication and mitigating disease severity [1,2].

The shorter symptom resolution time observed in the Early Treatment Group (ETG) supports the hypothesis that early antiviral administration interrupts viral replication during its peak phase, thereby reducing symptom severity and duration [3,4]. Similar trends have been reported in influenza and herpes simplex infections, where early intervention significantly shortened illness duration [5,6]. These results underscore the critical role of antiviral therapy in the early stages of infection, when viral replication is most active [7].

The reduced hospitalization duration in the ETG not only reflects better clinical outcomes but also has significant implications for healthcare resource utilization. Early treatment has been shown to decrease the need for intensive care and reduce healthcare costs in various viral infections, including influenza and respiratory syncytial virus infections [8,9]. This reinforces the potential of early antiviral administration to alleviate the burden on healthcare systems, especially during outbreaks.

The greater viral load reduction in the ETG compared to the Late Treatment Group (LTG) highlights the biological rationale behind early intervention. Suppressing viral replication early in the disease course prevents widespread tissue damage and immune dysregulation, which are often associated with poorer outcomes in delayed treatment [10,11]. These findings are consistent with studies on antiviral efficacy in COVID-19 and other respiratory viruses, where early initiation of therapy was associated with improved viral clearance [12,13].

Interestingly, the incidence of adverse effects was comparable between the two groups, indicating that early antiviral administration does not increase the risk of treatment-related complications. This is consistent with previous research demonstrating the safety of early antiviral therapy in a variety of patient populations [14,15].

However, this study has certain limitations. First, the study was conducted in a single center, which may limit the generalizability of the findings. Second, while the results highlight the benefits of early treatment, they do not explore the potential variations in efficacy among different antiviral agents. Further multicenter studies are needed to validate these findings across diverse populations and viral infections. Patients who received treatment within 24 hours of symptom onset experienced faster symptom resolution, shorter hospitalization durations, and

CONCLUSION

In conclusion, the results of this study underscore the importance of initiating antiviral therapy promptly in acute viral infections to achieve optimal clinical outcomes. By reducing symptom duration, hospitalization, and viral load, early treatment not only benefits individual patients but also contributes to better public health outcomes by limiting disease transmission and healthcare resource utilization.

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