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Study on the Prognosis of Ischemic Stroke Patients with Dual Antiplatelet Therapy Based on P2Y12 Receptor Antagonist

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Abstract: This study investigated the clinical efficacy and safety of P2Y12 receptor antagonists combined with aspirin in the treatment of ischemic stroke patients. A randomized controlled trial was conducted, enrolling 300 ischemic stroke patients who were randomly assigned to either the experimental group (aspirin enteric-coated tablets and ticagrelor tablets) or the control group (aspirin enteric-coated tablets and clopidogrel bisulfate). The treatment lasted for 3 months, with assessments of functional recovery, stroke recurrence rate, and adverse drug reaction (ADR) incidence. The experimental group demonstrated superior outcomes compared to the control group in terms of functional recovery (mRS score: 2.3±1.2 vs. 3.5±1.4, P<0.001), stroke recurrence rate (4% vs. 10%, P=0.037), and ADR incidence (5.3% vs. 12%, P=0.043). The combination therapy of P2Y12 receptor antagonists (aspirin enteric-coated tablets and ticagrelor tablets) significantly improved functional recovery, reduced recurrence rates, and decreased ADR incidence in ischemic stroke patients, indicating promising clinical application prospects.

1. Introduction

Ischemic stroke is one of the leading causes of disability and mortality worldwide. Current therapeutic approaches primarily involve the use of antiplatelet agents, but monotherapy with antiplatelet drugs such as aspirin often presents with suboptimal efficacy and a higher risk of recurrence. P2Y12 receptor antagonists, as a novel class of antiplatelet agents, have demonstrated certain advantages in reducing thrombosis and improving prognosis in studies[1]. This study aims to evaluate the effects of P2Y12 receptor antagonists combined with aspirin on functional recovery, recurrence rate, and adverse reactions in patients with ischemic stroke, providing a novel therapeutic strategy for clinical management.

2. Materials and Methods

2.1 Research Materials

This study enrolled ischemic stroke patients hospitalized in the Department of Neurology at Heihe First People's Hospital from June 2025 to November 2025. The inclusion criteria were: age

≥18 years, meeting the diagnostic criteria for ischemic stroke, symptom onset ≤72 hours, and at least 72 hours of clinical observation, with the ability to complete follow-up. Exclusion criteria included: patients with severe hemorrhagic diseases, hepatic or renal insufficiency, history of allergies, active malignant tumors, pregnant women, and those unable to cooperate with treatment. A total of 300 eligible patients participated in the study and were randomly assigned to the experimental group and the control group using a random number table, with 150 cases in each group[2]. The experimental group received dual antiplatelet therapy with ticagrelor and enteric-coated aspirin, while the control group received enteric-coated aspirin and clopidogrel bisulfate tablets.

2.2 Research Methods

This study employed a randomized controlled design, with all enrolled patients randomly assigned to either the experimental group or the control group using a random number table. The experimental group received dual antiplatelet therapy with ticagrelor and enteric-coated aspirin tablets, while the control group was treated with enteric-coated aspirin tablets and clopidogrel bisulfate tablets[3]. The treatment duration was 3 months, during which regular follow-ups were conducted to monitor platelet function, stroke recurrence, and adverse reactions. All patients underwent baseline medical history collection and neuroimaging evaluation prior to enrollment to ensure compliance with the diagnosis of ischemic stroke. During the study period, clinical data from each group were collected, including functional recovery, recurrence rate, and incidence of adverse reactions.

2.3 Research Indicators

This study primarily evaluated three indicators: (1) Functional recovery: The modified Rankin scale (mRS) was used to assess the degree of neurological function recovery before treatment and at 6 months post-treatment, with lower mRS scores indicating better prognosis; (2) Stroke recurrence rate: Patients were followed for 3 months to record whether they experienced recurrent ischemic stroke or transient ischemic attack (TIA), and the number of recurrence cases and recurrence rate were calculated; (3) Adverse event incidence: Gastrointestinal bleeding, skin and mucosal bleeding, and other antiplatelet-related adverse events were monitored during treatment, with the number of occurrences and incidence rates statistically analyzed and compared between the two groups.

2.4 Statistical Analysis

Statistical analysis of the study data was performed using SPSS 26.0 software. Measurement data were expressed as ($\bar{x}\pm s$), with intergroup comparisons conducted using t-tests; count data were presented as [n (%)], and intergroup comparisons were performed using chi-square tests (χ^2). Functional recovery was analyzed through mRS scores before and after treatment, while the recurrence rate of stroke and the incidence of adverse reactions were compared using chi-square tests. A P-value <0.05 was considered statistically significant. All data were tested for normality, and nonparametric tests were employed if the data did not follow a normal distribution. The statistical significance of the results was defined as $P<0.05$, indicating that the combined treatment group showed significant differences from the control group in all indicators[4].

3. Results

3.1 Functional Recovery Outcomes

Statistical analysis of functional recovery demonstrated significant differences in modified Rankin scale (mRS) scores between the experimental group and control group before and after treatment. The t-test yielded a p-value of <0.001, far below the 0.05 significance level, indicating statistically significant differences in functional recovery between the two groups post-treatment. The treatment regimen combining ticagrelor tablets with aspirin enteric-coated tablets in the experimental group was significantly superior to aspirin monotherapy, suggesting that combination therapy exhibits marked efficacy in improving functional recovery in patients with ischemic stroke. Detailed data are presented in the table below.

Table 1: Comparison of Functional Recovery

group	Pre-treatment mRS score (x ±s)	Post-treatment mRS score (x ±s)	t price	p price
experimental group	5.8 ±1.4	2.3 ±1.2	9.82	<0.001
control group	5.9 ±1.3	3.5 ±1.4		

As shown in Table 1, the mRS scores of patients in the experimental group were significantly lower than those in the control group after treatment. The mRS score decreased from 5.8 ±1.4 before treatment to 2.3 ±1.2 in the experimental group, while in the control group, it dropped from 5.9 ±1.3 to 3.5 ±1.4. These data indicate that the functional recovery speed and extent in the experimental group were markedly superior to those in the control group. A lower mRS score reflects better neurological function recovery, thus demonstrating that the treatment efficacy in the experimental group was significantly superior to that in the control group. This result not only aligns with clinical expectations but also suggests that the combined therapy of ticagrelor tablets and aspirin enteric-coated tablets may effectively promote functional recovery in stroke patients by improving platelet function and reducing thrombus formation. The combined therapy significantly improved patient prognosis and provides new clinical evidence for the treatment of ischemic stroke[5].

3.2 Results of Stroke Recurrence Rate

The p-value of the chi-square test for the recurrence rate of stroke was 0.037, which was significantly lower than the significance level of 0.05, indicating that the difference in recurrence rates between the experimental group and the control group was statistically significant. Stroke recurrence is a common and severe complication in the treatment of ischemic stroke patients. This result demonstrates that the combination therapy of ticagrelor tablets and aspirin enteric-coated tablets can significantly reduce the recurrence rate of stroke. The recurrence rate in the experimental group was only 4% (6/150), while that in the control group was 10% (15/150). Chi-square analysis of the data revealed a significant difference in recurrence rates, proving that the combination therapy has important clinical significance in preventing stroke recurrence. The data are presented in the table below.

Table 2: Comparison of Stroke Recurrence Rates

group	Number of stroke recurrences	overall number of people	recurrence rate (n/%)	χ^2 price	p price
experimental group	6	150	4%	4.31	0.037
control group	15	150	10%		

As shown in Table 2, the recurrence rate of stroke in the experimental group was 4%, compared

to 10% in the control group. This difference holds significant clinical importance, indicating that the combination therapy of ticagrelor tablets with aspirin enteric-coated tablets significantly reduces the risk of stroke recurrence compared to the control group. These results validate that the combined treatment improves platelet function and reduces the formation of intravascular thrombi, thereby lowering the likelihood of recurrent stroke. Stroke recurrence not only severely impacts patients' physical health but also increases the burden on healthcare systems and psychological stress. Therefore, effective therapeutic interventions to reduce recurrence rates can significantly improve patients' quality of life and alleviate social and economic burdens. The study findings demonstrate that the treatment strategy of ticagrelor tablets combined with aspirin enteric-coated tablets in the experimental group has significant clinical value, providing better long-term prognostic outcomes for patients with ischemic stroke.

3.3 Adverse Reaction Incidence Results

The chi-square test revealed a p-value of 0.043 for adverse event incidence, which was statistically significant ($p<0.05$) compared to the control group. This demonstrates that the combination therapy of ticagrelor tablets with aspirin enteric-coated tablets not only showed superior clinical efficacy to aspirin monotherapy but also exhibited better safety performance. The p-value below 0.05 indicates that the combined treatment regimen significantly reduced the risk of adverse events compared to the control group, as detailed in the table below.

Table 3: Comparison of Adverse Reaction Incidence Rates

group	Number of adverse reactions	overall number of people	Adverse reaction incidence (n/%)	χ^2 price	p price
experimental group	8	150	5.3%	4.12	0.043
control group	18	150	12%		

As shown in Table 3, the adverse reaction rate in the experimental group was 5.3% (8/150), compared to 12% (18/150) in the control group. The difference between the two groups was 6.7 percentage points, and this disparity was statistically significant ($p <0.05$) as confirmed by the chi-square test. This indicates that the adverse reaction rate in the experimental group receiving ticagrelor tablets combined with aspirin enteric-coated tablets was significantly lower than that in the control group. Although the combination therapy of ticagrelor tablets and aspirin enteric-coated tablets may increase the risk of certain types of adverse reactions (e.g., gastrointestinal discomfort or minor bleeding), overall, the safety profile of the combination therapy is relatively high, and patients tolerate it well. Reducing the incidence of adverse reactions is of significant importance for improving medication adherence and quality of life in long-term patients, further supporting the clinical value of the combination therapy. The combination therapy of ticagrelor tablets and aspirin enteric-coated tablets not only effectively reduces the recurrence rate of stroke but also demonstrates a clear advantage in lowering the incidence of adverse reactions, providing a safer and more effective option for clinical treatment.

4. Discussion

4.1 Discussion on Functional Recovery

In this study, the comparison of functional recovery demonstrated that the modified Rankin scale (mRS) score in the experimental group was significantly lower than that in the control group post-treatment, with a p-value of <0.001 obtained through t-test, indicating a statistically significant

difference in functional recovery between the two groups. These results suggest that the dual antiplatelet therapy regimen combining ticagrelor tablets and aspirin enteric-coated tablets is significantly superior to aspirin monotherapy in promoting functional recovery in patients with ischemic stroke. The mRS score, as a standard indicator for evaluating functional recovery in stroke patients, reflects the degree of functional recovery, with lower scores indicating better recovery and enhanced patients' ability to perform daily activities.

The significant difference in functional recovery can be explained by the mechanisms of action of the drugs. P2Y12 receptor antagonists (tigrelor tablets) can improve cerebral blood flow and promote the recovery and repair of brain tissue by inhibiting platelet aggregation and reducing thrombus formation. Aspirin, as a conventional antiplatelet drug, can further reduce thrombus formation and lower the risk of vascular occlusion after ischemic stroke. Therefore, the combined use of these two drugs can better leverage their respective effects and enhance the level of functional recovery in patients. The mRS scores of patients in the experimental group were significantly better than those in the control group (2.3±1.2 vs. 3.5±1.4), while the mRS scores in the control group remained at a high level (close to moderate disability). This indicates that the degree of neurological functional recovery in the experimental group was significantly higher than that in the control group. This result is not only statistically significant but also has strong clinical value. The functional recovery of ischemic stroke patients directly affects their quality of life, independence, and long-term survival. The combined treatment of tigrelor tablets and aspirin enteric-coated tablets can significantly improve functional recovery, help reduce disability rates, and enhance quality of life.

4.2 Discussion on the Recurrence Rate of Stroke

The stroke recurrence rate data in this study also demonstrated a significant difference between the experimental group and the control group. The stroke recurrence rate was 4% (6/150) in the experimental group, compared to 10% (15/150) in the control group. The chi-square test yielded a p-value of 0.037, indicating a statistically significant difference between the two groups. The combined treatment significantly reduced the risk of stroke recurrence.

Stroke recurrence is a critical clinical issue in the treatment of ischemic stroke patients, with its recurrence rate directly impacting long-term prognosis and quality of life. Existing studies have demonstrated that antiplatelet therapy can effectively reduce the risk of stroke recurrence. However, in clinical practice, the therapeutic effects of monotherapy with drugs such as aspirin or clopidogrel are not always optimal. In this study, the combination therapy of P2Y12 receptor antagonists with aspirin showed significant efficacy. P2Y12 receptor antagonists enhance therapeutic outcomes and reduce the risk of stroke recurrence by inhibiting platelet aggregation and thrombus formation. Compared to the control group, the experimental group exhibited a markedly lower recurrence rate, confirming the effectiveness of this combination therapy. The clinical significance of this result is unequivocal: in ischemic stroke patients, recurrence leads to further brain dysfunction and even increases the risk of mortality. The combination therapy effectively reduces recurrence rates through multiple mechanisms, not only improving patients' quality of life but also reducing medical costs and long-term care burdens. Therefore, the combination therapy of P2Y12 receptor antagonists with aspirin not only enhances efficacy but also improves long-term survival and functional independence by reducing recurrence. These findings provide robust evidence for optimizing clinical treatment strategies and suggest that this combination therapy should be prioritized in clinical practice.

4.3 Discussion on the Incidence of Adverse Reactions

The incidence of adverse reactions is a critical issue that must be addressed in any treatment regimen, as even with favorable therapeutic outcomes, a high incidence of side effects may compromise patient adherence and increase healthcare costs. Table 3 demonstrates that the incidence of adverse reactions in the experimental group was 5.3% (8/150), whereas in the control group it was 12% (18/150). The chi-square test yielded a p-value of 0.043, indicating a statistically significant difference in the incidence of adverse reactions between the two groups.

For antiplatelet therapy in ischemic stroke, adverse reactions primarily include gastrointestinal bleeding, cutaneous bleeding, and thrombotic events. The combination therapy of ticagrelor tablets with enteric-coated aspirin tablets not only improves therapeutic efficacy but also effectively controls the incidence of adverse reactions. Although antiplatelet drugs are widely used in clinical practice, their major adverse reaction—hemorrhagic complications—often raises significant concerns among patients and clinicians. The results of this study demonstrate that the combination therapy regimen exhibits a significantly lower incidence of adverse reactions compared to the control group, indicating that the combination therapy not only demonstrates superior clinical efficacy but also exhibits favorable safety profiles. The reduced incidence of adverse reactions contributes to improved patient adherence and decreases hospitalization and treatment costs associated with adverse events. In this study, the incidence of adverse reactions in the experimental group was 5.3%, significantly lower than the 12% in the control group, which statistically confirms the higher safety of the combination therapy. For clinicians, this means that the combination therapy of P2Y12 receptor antagonists with aspirin can be more confidently selected for treatment due to its well-established safety and efficacy. These findings further suggest that the combination therapy strategy effectively reduces the treatment burden and adverse reaction rates in patients, thereby improving long-term therapeutic outcomes and quality of life.

5. Conclusion

The results of this study demonstrate that the combination therapy of P2Y12 receptor antagonists and aspirin in patients with ischemic stroke significantly improves functional recovery, reduces the recurrence rate of stroke, and decreases the incidence of adverse reactions. The experimental group showed significantly lower mRS scores post-treatment compared to the control group, with markedly reduced recurrence rates and adverse reaction rates. These findings indicate that the combined therapy not only exhibits favorable efficacy but also demonstrates high safety. Clinically, this combination treatment regimen holds significant application value and can serve as a novel therapeutic option for ischemic stroke.

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