Tirofiban

- The effectiveness and safety of administering antiplatelet medications following reperfusion therapy in patients with ischemic stroke
- Tirofiban Combination Therapy for Acute Ischemic Stroke: A Systematic Review and Meta-Analysis
- Effect of Intracoronary Tirofiban Through Guiding Catheter Compared With Intracoronary Tirofiban Through Aspiration Catheter on the Microvascular Obstruction in Patients With STEMI Undergoing PCI: A Cardiac MR Study
- Tirofiban protects mice against severe RSV pneumonia by potentially inhibiting platelet activation via the GPIbalpha-vWF pathway
- Association of Admission HbA1c Levels and Clinical Outcomes in Patients with Large Vessel Occlusion Following Endovascular Treatment: A Secondary Analysis of RESCUE BT Trial
- Intravenous tirofiban in acute ischemic stroke patients not receiving reperfusion treatments: a systematic review and meta-analysis of randomized controlled trials
- Recognizing bilateral sudden hearing loss as a sentinel sign of basilar artery occlusion: insights from endovascular case series
- Prophylactic administration of tirofiban prevents ischemic events in endovascular treatment of unruptured intracranial aneurysms

Tirofiban (INN, trade name Aggrastat) is an antiplatelet drug. It belongs to a class of antiplatelets named glycoprotein IIbIIIa inhibitors. Tirofiban is the first drug candidate whose origins can be traced to a pharmacophore-based virtual screening lead.

Mechanism of Action

Tirofiban specifically blocks the glycoprotein IIb/IIIa receptor on the platelet surface. This receptor is critical for platelet aggregation, as it binds fibrinogen and other adhesive molecules necessary for platelet cross-linking.

Clinical Applications

Acute Coronary Syndrome (ACS):

Tirofiban is used in the management of ACS, including unstable angina and non-ST-elevation myocardial infarction (NSTEMI), especially in patients undergoing percutaneous coronary intervention (PCI).

Endovascular Treatment of Intracranial Aneurysms: Tirofiban in the endovascular treatment of intracranial aneurysm

In neurointervention, tirofiban has been investigated for its use in preventing thrombotic complications during the treatment of intracranial aneurysms, particularly in procedures like stent-assisted coiling or flow diversion.

Ischemic Stroke (Off-label):

Tirofiban is being explored in some settings for preventing platelet aggregation in acute ischemic stroke, though more evidence is needed to establish its safety and efficacy.

Pharmacokinetics

Route of Administration: Intravenous infusion. Onset of Action: Rapid, typically within minutes of administration. Half-life: Approximately 2 hours. Excretion: Primarily renal.

To determine whether intravenous tirofiban administered within 24 hours of stroke onset prevents early neurological deterioration in patients with acute non-cardioembolic ischemic stroke compared with oral aspirin.

Design, setting, and participants: This investigator-initiated, multicenter, open-label, randomized clinical trial with blinded end-point assessment was conducted at 10 comprehensive stroke centers in China between September 2020 and March 2023. Eligible patients were aged 18 to 80 years with acute noncardioembolic stroke within 24 hours of onset and had a National Institutes of Health Stroke Scale (NIHSS) score of 4 to 20.

Intervention: Patients were assigned randomly (1:1) to receive intravenous tirofiban or oral aspirin for 72 hours using a central, web-based, computer-generated randomization schedule; all patients then received oral aspirin.

Main outcome: The primary efficacy outcome was early neurological deterioration (increase in NIHSS score ≥4 points) within 72 hours after randomization. The primary safety outcome was symptomatic intracerebral hemorrhage within 72 hours after randomization.

Results: A total of 425 patients were included in the intravenous tirofiban (n = 213) or oral aspirin (n = 212) groups. Median (IQR) age was 64.0 years (56.0-71.0); 124 patients (29.2%) were female, and 301 (70.8%) were male. Early neurological deterioration occurred in 9 patients (4.2%) in the tirofiban group and 28 patients (13.2%) in the aspirin group (adjusted relative risk, 0.32; 95% CI, 0.16-0.65; P = .002). No patients in the tirofiban group experienced intracerebral hemorrhage. At 90-day follow-up, 3 patients (1.3%) in the tirofiban group and 3 (1.5%) in the aspirin group died (adjusted RR, 1.15; 95% CI, 0.27-8.54; P = .63), and the median (IQR) modified Rankin scale scores were 1.0 (0-1.25) and 1.0 (0-2), respectively (adjusted odds ratio, 1.28; 95% CI, 0.90-1.83; P = .17).

Conclusions and relevance: In patients with noncardioembolic stroke who were seen within 24 hours of symptom onset, tirofiban decreased the risk of early neurological deterioration but did not increase the risk of symptomatic intracerebral hemorrhage or systematic bleeding [1].

A protocol of anticoagulation with tirofiban during flow diversion has an excellent safety profile. This protocol provides a reasonable alternative to pretreatment with aspirin and clopidogrel and is useful in patients with ruptured aneurysms or when the use of a stent is unexpected [2].

Tirofiban showed a low risk of symptomatic hemorrhagic or thromboembolic complications. Tirofiban may offer a safe and effective alternative as an antiplatelet premedication during stent-assisted coiling of acutely ruptured intracranial aneurysms [3] [4].

1)

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2)

Chalouhi N, Jabbour P, Daou B, Starke RM, Shields B, Hasan DM. A New Protocol for Anticoagulation With Tirofiban During Flow Diversion. Neurosurgery. 2015 Oct 20. [Epub ahead of print] PubMed PMID: 26488330.

3)

Kim S, Choi JH, Kang M, Cha JK, Huh JT. Safety and Efficacy of Intravenous Tirofiban as Antiplatelet Premedication for Stent-Assisted Coiling in Acutely Ruptured Intracranial Aneurysms. AJNR Am J Neuroradiol. 2016 Mar;37(3):508-14. doi: 10.3174/ajnr.A4551. Epub 2015 Oct 15. PubMed PMID: 26471748.

4)

Kang HS, Kwon BJ, Roh HG, Yoon SW, Chang HW, Kim JE, Han MH. Intra-arterial tirofiban infusion for thromboembolism during endovascular treatment of intracranial aneurysms. Neurosurgery. 2008 Aug;63(2):230-7; discussion 237-8. doi: 10.1227/01.NEU.0000320440.85178.CC. PubMed PMID: 18797352.