

Anti-glycoprotein autoantibodies are related to bleeding severity in children with newly diagnosed ITP and very low platelet counts

Shuyue Dong¹, Hao Gu¹, Jialu Zhang¹, Lingling Fu¹, Xingjuan Xie¹, Jingyao Ma¹, Jie Ma¹, Zhenping Chen¹, and Runhui Wu¹

¹Capital Medical University

October 27, 2022

Abstract

Background and Objective: Immune thrombocytopenia (ITP) is an autoimmune-mediated hemorrhagic disease. Anti-glycoprotein autoantibodies play a key role in the pathophysiology of ITP, but the relationship between platelet-specific antibodies and bleeding severity is unclear. This study aimed to analyze the relationship between anti-glycoprotein autoantibodies and bleeding severity in children with newly diagnosed ITP and platelet count $<10 \times 10^9/L$. **Method:** This was a single-center prospective observational study that analyzed children with newly diagnosed ITP and platelet count $<10 \times 10^9/L$ between June 2018 and September 2021 at our hospital. The children were classified into the mild and severe groups based on the bleeding scores. The type and titer of anti-glycoprotein autoantibodies were detected using an ELISA kit (PAKAUTO). We analyzed the relationship between bleeding severity and anti-glycoprotein autoantibodies. **Results:** A total of 86 cases were enrolled, including 42 in the mild group and 44 in the severe group. Patients with anti-GPIIb/IIIa or anti-GPIb/IX antibodies suffered more severe bleeding than patients without them ($c_2=7.303$, $p=0.007$; $c_2=3.875$, $p=0.049$), but there was no significant difference between patients with or without anti-GPIa/IIa antibody ($c_2=0.745$, $p=0.388$). When antibodies were analyzed together, patients with three antibodies suffered more severe bleeding than those without three antibodies ($c_2=5.053$, $p=0.025$). Patients with higher antibody titer in the eluent, but not in the plasma, suffered more severe bleeding in all three antibodies ($Z=-2.389$, $p=0.017$; $Z=-2.108$, $p=0.035$; $Z=-2.557$, $p=0.011$). **Conclusion:** Anti-glycoprotein autoantibodies led to more severe bleeding in children under 18 years of age without drug treatment with newly diagnosed ITP and platelet count $<10 \times 10^9/L$.

Anti-glycoprotein autoantibodies are related to bleeding severity in children with newly diagnosed ITP and very low platelet counts

Shuyue Dong, MD¹, Hao Gu, MD^{2,3}, Jialu Zhang, MD¹, Lingling Fu, MD¹, Xingjuan Xie, MD¹, Jingyao Ma, MD¹, Jie Ma, MD¹, Zhenping Chen, PhD^{2*}, Runhui Wu, MD^{1*}

Shuyue Dong, Hao Gu and Jialu Zhang have contributed equally to this work.

¹Hematology Center, Beijing Key Laboratory of Pediatric Hematology Oncology; National Key Discipline of Pediatrics (Capital Medical University); Key Laboratory of Major Diseases in Children, Ministry of Education; Beijing Children's Hospital, Capital Medical University, National Center for Children's Health, China, 100045

²Hematologic Disease Laboratory, Beijing Pediatric Research Institute, China, Beijing Children's Hospital, Capital Medical University, 100045

³Department of Immunology, Ministry of Education Key Laboratory of Major Diseases in Children, Beijing Children's Hospital, Capital Medical University, National Center for Children's Health, China, 100045

*Correspondence to:

Runhui Wu, MD, Hematology Oncology Center, Beijing Children’s Hospital, Capital Medical University, Beijing, 100045, China, Tel: +86 13370115037, Email: runhuiwu@hotmail.com

Zhenping Chen, PhD, Hematology Oncology Center, Beijing Children’s Hospital, Capital Medical University, Beijing, 100045, China, Tel: +86 15011221677, Email: chenzhenping@outlook.com

Text word count 1637;

Abstract word count 249;

Brief running title: Anti-glycoprotein autoantibodies are related to bleeding severity

Key words: Children, primary immune thrombocytopenia, anti-glycoprotein autoantibodies, bleeding severity

Tables: 2

Figures: 2

Abbreviate table

| Abbreviations |
|---------------|
| ITP |
| GP |
| ELISA |
| vWF |

Abstract

Background and Objective:

Immune thrombocytopenia (ITP) is an autoimmune-mediated hemorrhagic disease. Anti-glycoprotein autoantibodies play a key role in the pathophysiology of ITP, but the relationship between platelet-specific antibodies and bleeding severity is unclear. This study aimed to analyze the relationship between anti-glycoprotein autoantibodies and bleeding severity in children with newly diagnosed ITP and platelet count $<10 \times 10^9/L$.

Method:

This was a single-center prospective observational study that analyzed children with newly diagnosed ITP and platelet count $<10 \times 10^9/L$ between June 2018 and September 2021 at our hospital. The children were classified into the mild and severe groups based on the bleeding scores. The type and titer of anti-glycoprotein autoantibodies were detected using an ELISA kit (PAKAUTO). We analyzed the relationship between bleeding severity and anti-glycoprotein autoantibodies.

Results:

A total of 86 cases were enrolled, including 42 in the mild group and 44 in the severe group. Patients with anti-GPIIb/IIIa or anti-GPIb/IX antibodies suffered more severe bleeding than patients without them ($c^2=7.303$, $p=0.007$; $c^2=3.875$, $p=0.049$), but there was no significant difference between patients with or without anti-GPIa/IIa antibody ($c^2=0.745$, $p=0.388$). When antibodies were analyzed together, patients with three antibodies suffered more severe bleeding than those without three antibodies ($c^2=5.053$, $p=0.025$). Patients with higher antibody titer in the eluent, but not in the plasma, suffered more severe bleeding in all three antibodies ($Z=-2.389$, $p=0.017$; $Z=-2.108$, $p=0.035$; $Z=-2.557$, $p=0.011$).

Conclusion:

Anti-glycoprotein autoantibodies led to more severe bleeding in children under 18 years of age without drug treatment with newly diagnosed ITP and platelet count $<10 \times 10^9/L$.