

# Korelacija prijeimplantacijske vrijednosti aktivacije trombocita i kliničkog ishoda u bolesnika liječenih dugotrajnom mehaničkom cirkulacijskom potporom

## Correlation between platelet reactivity level before implantation and clinical outcomes in patients treated with long term mechanical circulatory support

Jure Samardžić\*,  
Marijan Pašalić,  
Ivo Planinc,  
Hrvoje Gašparović,  
Dora Fabijanović,  
Mate Petričević,  
Maja Čikeš,  
Boško Skorić,  
Bojan Biočina,  
Davor Miličić

Medicinski fakultet  
Sveučilišta u Zagrebu, Klinički  
bolnički centar Zagreb,  
Zagreb, Hrvatska  
University of Zagreb School of  
Medicine, University Hospital  
Centre Zagreb, Zagreb,  
Croatia

RECEIVED:  
October 3, 2016  
ACCEPTED:  
October 10, 2016



**KLJUČNE RIJEČI:** zatajivanje srca, mehanička cirkulacijska potpora, reaktivnost trombocita, ishodi.

**KEYWORDS:** heart failure, mechanical circulatory support, platelet reactivity, outcomes.

**CITATION:** *Cardiol Croat.* 2016;11(10-11):401-402. | DOI: <http://dx.doi.org/10.15836/ccar2016.401>

\***ADDRESS FOR CORRESPONDENCE:** Jure Samardžić, Klinički bolnički centar Zagreb, Kišpatičeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-98-537-864 / E-mail: [jure.samardzic@gmail.com](mailto:jure.samardzic@gmail.com)

**ORCID:** Jure Samardžić, <http://orcid.org/0000-0002-9346-6402> • Marijan Pašalić, <http://orcid.org/0000-0002-3197-2190>  
Ivo Planinc, <http://orcid.org/0000-0003-0561-6704> • Hrvoje Gašparović, <http://orcid.org/0000-0002-2492-3702>  
Dora Fabijanović, <http://orcid.org/0000-0003-2633-3439> • Mate Petričević, <http://orcid.org/0000-0002-2083-7751>  
Maja Čikeš, <http://orcid.org/0000-0002-4772-5549> • Boško Skorić, <http://orcid.org/0000-0001-5979-2346>  
Bojan Biočina, <http://orcid.org/0000-0003-3362-9596> • Davor Miličić, <http://orcid.org/0000-0001-9101-1570>

**Uvod:** Dugoročna mehanička cirkulacijska potpora (MCS) je namijenjena bolesnicima sa zatajivanjem srca koji nisu pogodni za liječenje transplantacijom srca ili zbog težine bolesti ne mogu dočekati pojavu adekvatnog donora. Poznato je kako je hemostaza u tih bolesnika poremećena te da značajan udio pacijenata razvija krvarenja, a rjeđe i tromboembolijske događaje. Razvojem adekvatnih i pouzdanih modela koji bi predviđali ove događaje moglo bi se poboljšati liječenje i ishodi ovih bolesnika. Poznato je kako MCS, ali i zatajivanje srca utječe na funkciju trombocita koji imaju važnu ulogu u održavanju hemostaze.<sup>1,2</sup> U ovom istraživanju smo ispitali povezanost preimplantacijske razine reaktivnosti trombocita (RT) s kliničkim dugoročnim ishodima nakon ugradnje MCS-a.

**Pacijenti i metode:** Analizirana je prijeimplantacijska RT pomoću Multiplate uređaja koristeći ASPI i ADP test kod bolesnika koji su podvrgnuti ugradnji dugotrajnog MCS u našoj ustanovi. Ukupno je mjerenje RT-a učinjeno kod 19 bolesnika (12 HeartMate II, 4 HeartMate III, 2 HeartWare, 1 TAH Syncardia) kojima je uređaj ugrađen u razdoblju od srpnja 2013. do veljače 2016. godine. Srednje vrijeme ukupnog praćenja je iznosilo 11 mjeseci, prosječno 13,7 mjeseci (raspon 1-31 mjesec). Analizirana je povezanost vrijednosti RT-a s ukupnom smrtnošću te posebno s ishemijskim događajima i velikim krvarenjima nakon što je završilo kirurško liječenje.

**Rezultati:** Ukupno je 9 bolesnika umrlo (47,3%), značajno krvarenje je imalo 6 bolesnika (31,5%), a ishemijski događaj 3 bolesnika (15,7%). Nije bilo statistički značajne povezanosti između prijeimplantacijske reaktivnosti trombocita i ukupne smrtnosti te ishemijskih i velikih krvarećih događaja (slika 1).

**Zaključak:** Rezultati ukazuju da prijeimplantacijska razina RT-a nije povezana sa smrtnošću, niti sa krvarenjima, to jest, ishemijskim događajima. Daljnja istraživanja na većem broju bolesnika trebaju ove rezultate potvrditi. Buduća istraživanja bi trebala koristiti sveobuhvatnu analizu ne samo puteva ak-

**Introduction:** Long term mechanical circulatory support (MCS) is intended for heart failure patients who are not eligible for heart transplantation or who cannot wait for adequate donor due to severity of their condition. It is known that hemostasis in these patients is deranged and that significant number of patients develop bleeding and thromboembolic events. Development of adequate and reliable models which could predict these events might improve treatment and outcomes of patients. MCS, as well as heart failure, affects platelet reactivity (PR) which has an important role in hemostatic balance.<sup>1,2</sup> We sought to investigate correlation between PR before MCS implantation and long term clinical outcomes.

**Patients and Methods:** We analyzed PR before implantation using Multiplate function analyzer (ASPI and ADP tests) in patients who underwent long term MCS implantation in our institution. Measurement was performed in 19 patients (12 HeartMate II, 4 HeartMate III, 2 HeartWare, 1 TAH Syncardia) who underwent the procedure in the period between July 2013 and February 2016. Median follow up was 11 months, mean 13.7 months (range 1-31 months). We analyzed correlation between PR and overall mortality, as well as ischemic and big bleeding events after the surgical treatment has ended.

**Results:** In total, 9 patients died (47.3%), 6 patients had significant bleeding (31.5%) while 3 patients had an ischemic event (15.7%). There was no statistically significant correlation between preimplantation PR and overall mortality, ischemic and bleeding events (Figure 1).

**Conclusion:** Results indicate that preimplantation PR is not connected with mortality, nor bleeding and ischemic events. Further investigations on a larger number of patients are warranted to confirm these results. Future studies should be using comprehensive analysis not only to measure platelet activation pathways but other coagulation parameters as well continuously, to eventually improve prediction and pre-

tivacije trombocita već i ostalih parametara koagulacije kontinuirano, kako bi se eventualno poboljšalo predviđanje i prevencija nepovoljnih događaja u kratkoročnom, ali i dugoročnom razdoblju.

vention of events in both short term and long term period after MCS implantation.

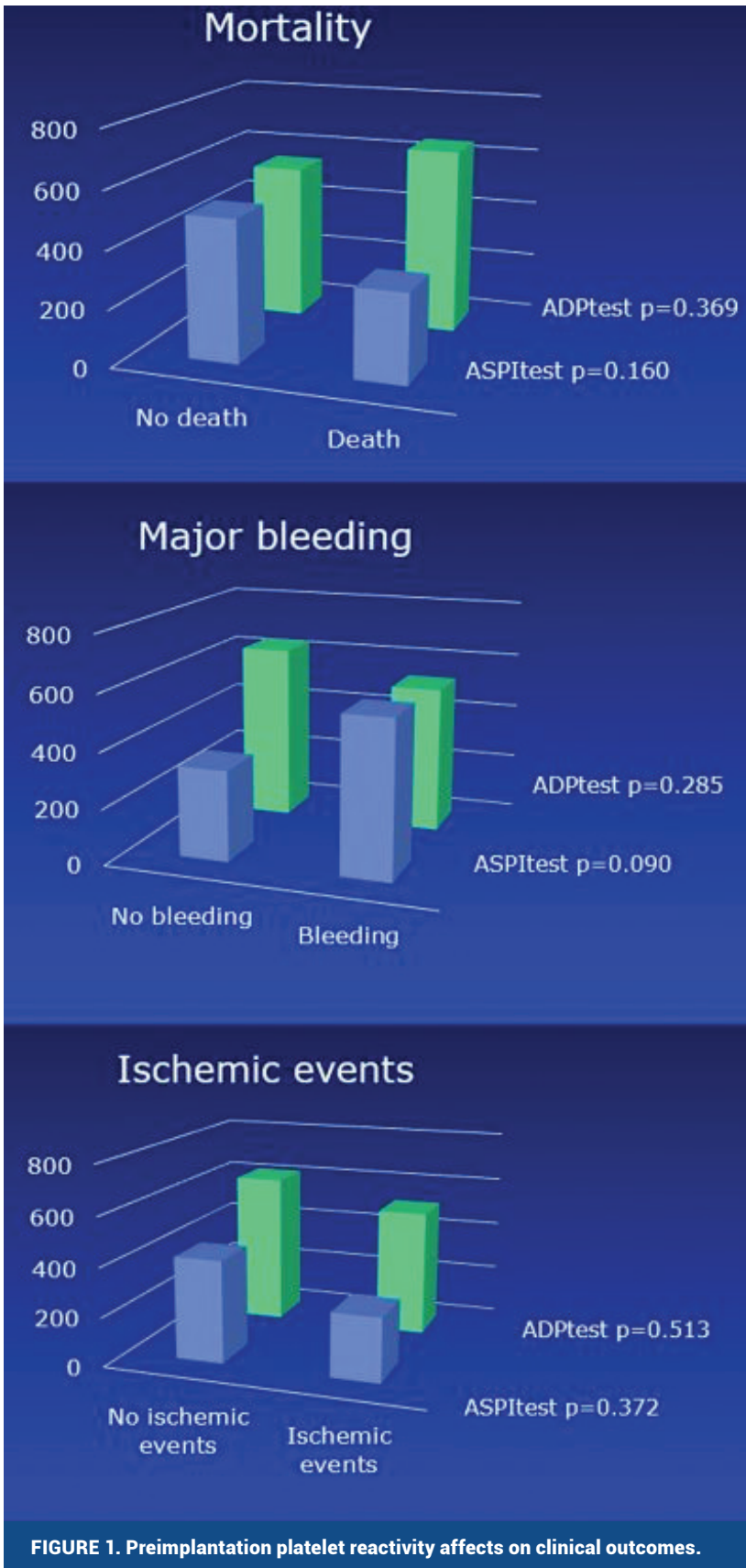


FIGURE 1. Preimplantation platelet reactivity affects on clinical outcomes.

#### LITERATURE

1. Draper KV, Huang RJ, Gerson LB. GI bleeding in patients with continuous-flow left ventricular assist devices: a systematic review and meta-analysis. *Gastrointest Endosc.* 2014;80(3):435-446.e1. DOI: <http://dx.doi.org/10.1016/j.gie.2014.03.040>
2. Lahpor J, Khaghani A, Hetzer R, Pavie A, Friedrich I, Sander K, et al. European results with a continuous-flow ventricular assist device for advanced heart-failure patients. *Eur J Cardiothorac Surg.* 2010;37(2):357-61. DOI: <http://dx.doi.org/10.1016/j.ejcts.2009.05.043>