See Article page 61.



# Commentary: Perceval S bioprosthesis valve and platelets: The thrombocytopenia is behind the corner and the mystery continues

Francesco Formica, MD,[a] and Fabio Guarracino, MD[b]

Francesco Formica, MD (*left*), and Fabio Guarracino, MD (*right*)

**CENTRAL MESSAGE**

The Perceval S valve implant is still linked to thrombocytopenia, a relevant and unsolved event early after surgery. No severe complications are directly correlated with this reversible phenomenon.

During the last decade, several studies have reported a greater incidence of thrombocytopenia and a slower recovery of the platelet count in the Freedom Solo (FS; LivaNova PLC, London, United Kingdom) compared with other stented bioprosthesis in the early postoperative period.[1,2] However, this phenomenon is still controversial and is not well correlated with early and late adverse outcome. The Perceval S bioprosthesis valve (LivaNova, London, United Kingdom) may be considered an evolution of the FS and is one of the new-generation sutureless valves on the market.[3] Recent studies have reported the same phenomenon described with FS in the Perceval S bioprosthesis.[4,5] Unfortunately, these studies analyzed few patients, and the authors could not explain exactly the cause of thrombocytopenia. Several causes of platelet dysfunction were speculated: (1) the detoxification process with homocysteic acid and the storage aldehyde-free solution[6]; (2) the naked alloy stent[7]; and (3) mechanical stress and turbulence, especially in small valve sizes.[8] Furthermore, some authors have compared the Perceval S with a new-generation sutureless rapid deployment valve (INTUITY; Edwards Lifesciences LLC, Irvine, Calif) and again the thrombocytopenia phenomenon appeared in the early postoperative period only in the patients receiving a Perceval S. However, no differences in early outcome were reported in both groups, and the platelet count at 1 year was comparable between the 2 groups.[9]

In this issue of the *Journal*, Stegmeier and colleagues[1] retrospectively reviewed data on 3 groups of patients operated during 1-year period, ranging from 2009 to 2010: 25 patients with Perceval S, 23 with Labcor (Belo Horizonte, Brazil), and 39 with Hancock II (Medtronic, Minneapolis, Minn) aortic bioprostheses. The early results reported by the authors are in line with the literature: reversible greater thrombocytopenia in patients with a Perceval S valve compared with the other 2 bioprostheses and comparable early outcome among the groups.

At a glance, the Steigmer and colleague's observations might not seem original and helpful: the authors reported well-known results and the sample size was small. However, some topics deserve to be discussed. The authors did not find any surgeon's effect on the early outcome. This point has to be highlighted because the surgeon's effect represents always a deep bias that is often neglected. Another important topic regards the use of the hematocrit-corrected platelet count (PTL count) to reduce the effect of transfusions/hemodilution. The hematocrit-corrected PTL count allows us to better understand any direct correlation between the valve and the severity of thrombocytopenia. Nevertheless, the minimum corrected PTL count was $<70 \times 10^3/\mu L$, suggesting that other factors may affect this transitory phenomenon, such as cardiopulmonary

From the [a]Cardiac Surgery Unit, San Gerardo Hospital, Department of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy; and [b]Department of Anaesthesia and Critical Care Medicine, Cardiothoracic and Vascular Anaesthesia and Intensive Care, Azienda Ospedaliero Universitaria Pisana, Pisa, Italy.

Disclosures: Authors have nothing to disclose with regard to commercial support.

Received for publication July 31, 2019; accepted for publication Aug 1, 2019; available ahead of print Sept 9, 2019.

Address for reprints: Francesco Formica, MD, Clinica Cardiochirurgica Ospedale San Gerardo, ASST Monza Via G.B. Pergolesi 33, 20052, Monza (MB), Italy (E-mail: francesco_formica@fastwebnet.it).

J Thorac Cardiovasc Surg 2020;160:69-70

0022-5223/$36.00



https://doi.org/10.1016/j.jtcvs.2019.08.015

bypass, concomitant procedures, hypothermia, postoperative blood loss, and preoperative and postoperative drugs. Worthy of note is the greatest incidence of reoperation for bleeding (20%) and the lowest minimum corrected PTL count ($38 \times 10^3/\mu L$) in the Perceval S compared with the other bioprostheses. Due to the small sample size, the authors failed to find any statistical difference among the groups; however, the absence of evidence is not evidence of absence and therefore a correlation between early thrombocytopenia after Perceval S implant and severe bleeding should be speculated. The early thrombocytopenia after Perceval S implant is always behind the corner, and the mystery[10,11] continues.

## References

1. Stegmeier P, Schlomicher M, Stiegler H, Strauch JT, Bechtel JFM. Thrombocytopenia after implantation of the Perceval S aortic bioprosthesis. *J Thorac Cardiovasc Surg*. 2020;160:61-8.e8.
2. Miceli A, Gilmanov D, Murzi M, Parri MS, Cerillo AG, Bevilacqua S, et al. Evaluation of platelet count after isolated biological aortic valve replacement with Freedom Solo bioprosthesis. *Eur J Cardiothorac Surg*. 2012;41:69-73.
3. Miceli A, Santarpino G, Pfeiffer S, Murzi M, Gilmanov D, Concistrè G, et al. Minimally invasive aortic valve replacement with Perceval S sutureless valve: early outcomes and one-year survival from two European centers. *J Thorac Cardiovasc Surg*. 2014;148:2838-43.
4. Sanchez E, Corrales JA, Fantidis P, Tarhini IS, Khan I, Pineda T, et al. Thrombocytopenia after aortic valve replacement with Perceval S sutureless bioprosthesis. *J Heart Valve Dis*. 2016;25:75-81.
5. Mujtaba SS, Ledingham S, Shah AR, Schueler S, Clark S, Pillay T. Thrombocytopenia after aortic valve replacement: comparison between sutureless Perceval S valve and Perimount Magna Ease bioprosthesis. *Braz J Cardiovasc Surg*. 2018;33:169-75.
6. Piccardo A, Rusinaru D, Petitprez B, Marticho P, Vaida I, Tribouilloy C, et al. Thrombocytopenia after aortic valve replacement with Freedom Solo bioprosthesis: a propensity study. *Ann Thorac Surg*. 2010;89:1425-30.
7. Albacker TB. Thrombocitopenia associated with Perceval sutureless aortic valve replacement in elderly patients: a word of caution. *Heart Surg Forum*. 2015;18:E093-7.
8. Yerebakan C, Kaminski A, Westphal B, Kundt G, Ugurlucan M, Steinhoff G, et al. Thrombocytopenia after aortic valve replacement with Freedom Solo stentless bioprosthesis. *Interact Cardiovasc Thorac Surg*. 2008;7:616-20.
9. Jiritano F, Cristodoro L, Malta E, Mastroroberto P. Thrombocytopenia after sutureless aortic valve implantation: comparison between Intuity and Perceval bioprosthesis. *J Thorac Cardiovasc Surg*. 2016;152:1631-3.
10. Santarpino G, Pfeiffer S, Fischlein T. Thrombocytopenia after freedom solo: the mystery goes on. *Ann Thorac Surg*. 2011;91:330.
11. Miceli A. Tissue valve, nitinol stent, or storage solution? The mystery still goes on. *J Thorac Cardiovasc Surg*. 2016;152:1633-4.

See Article page 61.



# Commentary: Thrombocytopenia yes…thrombocytopenia no…that is the question

Antonio Miceli, MD, PhD

Antonio Miceli, MD, PhD

**CENTRAL MESSAGE**

Thrombocytopenia is a transient and multifactorial phenomenon in the absence of clinical complications. Mechanical stress induced by oversizing may be a potential cause of thrombocytopenia.

Thrombocytopenia after cardiopulmonary bypass is a transient and common event in cardiac surgery, mainly secondary to hemodilution, platelet consumption, and perioperative blood loss. It usually occurs between the second and third postoperative days, resulting in a reduction of platelet counts by 30% to 60% from baseline values.[1,2] Small retrospective studies have concluded that the

From the Minimally Invasive Cardiac Surgery Department, Istituto Clinico Sant'Ambrogio, Milano, Italy.

Disclosures: Dr Miceli is consultant for LivaNova.

Received for publication July 25, 2019; accepted for publication July 29, 2019; available ahead of print Sept 5, 2019.

Address for reprints: Antonio Miceli, MD, PhD, Minimally Invasive Cardiac Surgery Department, Istituto Clinico Sant'Ambrogio, Via Faravelli 16, Milano, Italy (E-mail: antoniomiceli79@alice.it).

J Thorac Cardiovasc Surg 2020;160:70-1
0022-5223/$36.00



https://doi.org/10.1016/j.jtcvs.2019.07.115