Platelet activation and aggregation in different centrifugal-flow left ventricular assist devices

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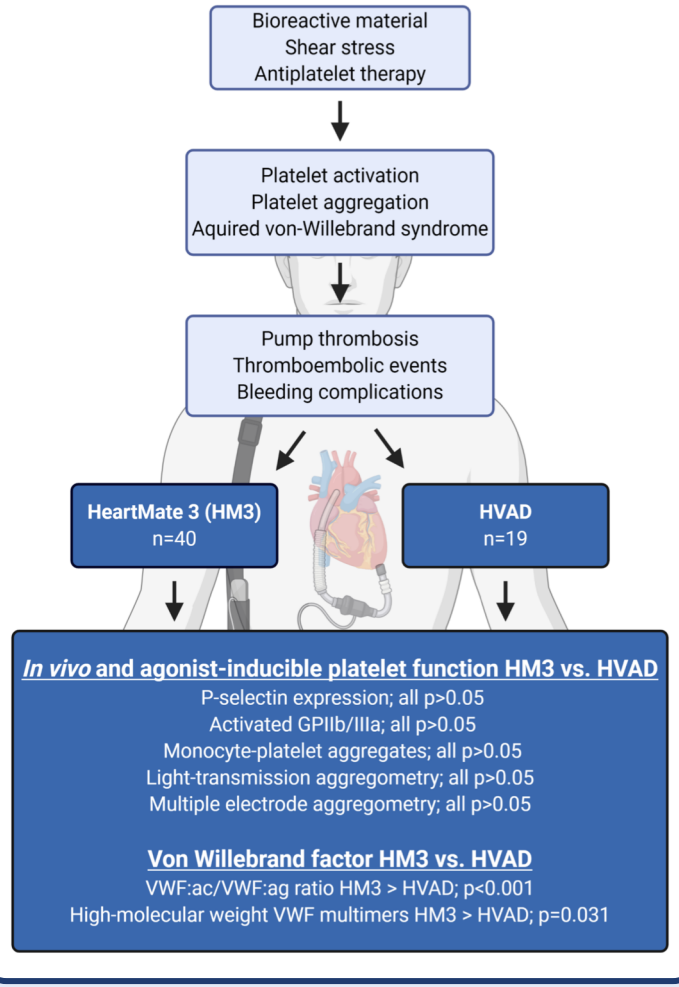
BACKGROUND

- HM3 and HVAD are approved for patients with end-stage heart failure.
- **Results of the landmark trials for both devices indicate differences in thrombogenicity between HM3 and HVAD.**
- **We compared markers of platelet activation and aggregation between HM3 and HVAD.**

Methods and Results

- We prospectively included **59 LVAD patients (40 HM3, 19 HVAD)**.
- Platelet P-selectin expression, activated glycoprotein (GP) IIb/IIIa and monocyte-platelet aggregates (MPA) were assessed by flow-cytometry.
- Platelet aggregation was measured by light-transmission aggregometry (LTA) and multiple-electrode aggregometry (MEA).
- Von-Willebrand factor (VWF) antigen (VWF:Ag), VWF activity (VWF:Ac), and VWF multimer pattern analysis were determined.
- Soluble P-selectin (sP-selectin) was measured with an enzyme-linked immunoassay.

Central Figure



- **Except for diabetes all baseline characteristics were similar between patients with HVAD and HM3.**
- P-selectin, GPIIb/IIIa and MPA levels in vivo and in response to arachidonic acid, adenosine diphosphate, and thrombin receptor activating peptide were similar between HM3 and HVAD (all $p > .05$).
- Likewise, agonist-inducible platelet aggregation by LTA and MEA did not differ between HM3 and HVAD (all $p > .05$).
- VWF:Ag levels and FVIII:C were similar between both systems (both $p > .05$).
- Patients with HVAD had significantly lower VWF:Ac ($p = .011$) and reduced large VWF multimers ($p = .013$).
- sP-selectin levels were similar in patients with HVAD and HM3 ($p = .845$).

Conclusions

- **On-treatment platelet activation and aggregation are similar in HM3 and HVAD patients.**
- Potential clinical implications of observed differences in VWF profiles between both LVAD systems need to be addressed in future clinical trials..

Declaration of interest

DW is consultant and proctor for Abbott and Medtronic. DZ receives research grants from Abbott and Medtronic, is advisory board member for Abbott, Medtronic and Berlin Heart, and proctor for Abbott and Medtronic. The other authors have no conflict of interest to declare.