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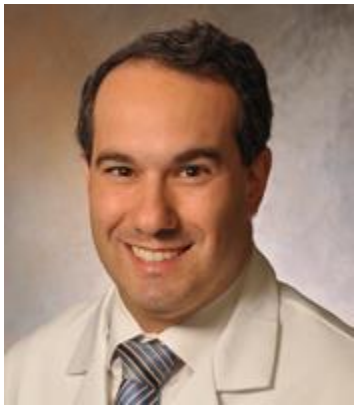

Mehra MR , Goldstein DJ , **Uriel N ,** Cleveland JC Jr. , Yuzefpolskaya M , Salerno C , Walsh MN , Milano CA , Patel CB , Ewald GA , Itoh A , Dean D, Krishnamoorthy A, Cotts WG, Tatooles AJ, Jorde UP, Bruckner BA, Estep JD, Jeevanandam V, **Sayer G**, Horstmanshof D, Long JW, Gulati S, Skipper ER, O'Connell JB, Heatley G, Sood P, Naka Y; MOMENTUM 3 Investigators. **Two-Year Outcomes with a Magnetically Levitated Cardiac Pump in Heart Failure**. *N Engl J Med*. 2018 Mar 11.

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ORIGINAL ARTICLE

Two-Year Outcomes with a Magnetically Levitated Cardiac Pump in Heart Failure

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ABSTRACT

BACKGROUND
In an early analysis of this trial, use of a magnetically levitated centrifugal continuous-flow circulatory pump was found to improve clinical outcomes, as compared with a mechanical-bearing axial continuous-flow pump, at 6 months in patients with advanced heart failure.

METHODS
In a randomized noninferiority and superiority trial, we compared the centrifugal-flow pump with the axial-flow pump in patients with advanced heart failure, irrespective of the intended goal of support (bridge to transplantation or destination therapy). The composite primary end point was survival at 2 years free of disabling stroke (with disabling stroke indicated by a modified Rankin score of >3; scores range from 0 to 6, with higher scores indicating more severe disability) or survival free of reoperation to replace or remove a malfunctioning device. The noninferiority margin for the risk difference (centrifugal-flow pump group minus axial-flow pump group) was −10 percentage points.

RESULTS
Of 366 patients, 190 were assigned to the centrifugal-flow pump group and 176 to the axial-flow pump group. In the intention-to-treat population, the primary end point occurred in 151 patients (79.5%) in the centrifugal-flow pump group, as compared with 106 (60.2%) in the axial-flow pump group (absolute difference, 19.2 percentage points; 95% lower confidence boundary, 9.8 percentage points [P<0.001 for noninferiority]; hazard ratio, 0.46; 95% confidence interval [CI], 0.31 to 0.69 [P<0.001 for superiority]). Reoperation for pump malfunction was less frequent in the centrifugal-flow pump group than in the axial-flow pump group (3 patients [1.6%] vs. 30 patients [17.0%]; hazard ratio, 0.08; 95% CI, 0.03 to 0.27; P<0.001). The rates of death and disabling stroke were similar in the two groups, but the overall rate of stroke was lower in the centrifugal-flow pump group than in the axial-flow pump group (10.1% vs. 19.2%; hazard ratio, 0.47; 95% CI, 0.27 to 0.84, P=0.02).

CONCLUSIONS
In patients with advanced heart failure, a fully magnetically levitated centrifugal-flow pump was superior to a mechanical-bearing axial-flow pump with regard to survival free of disabling stroke or reoperation to replace or remove a malfunctioning device. (Funded by Abbott; MOMENTUM 3 ClinicalTrials.gov number, NCT02224755.)

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*A complete list of the investigators in the MOMENTUM 3 trial is provided in the Supplementary Appendix, available at NEJM.org.

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