Abracadabra I, II...HeartMate 3?

Jay K. Bhama, MD

From the Division of Cardiothoracic Surgery, Department of Surgery, Carver College of Medicine and University of Iowa Health Care, Iowa City, Iowa.

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Address for reprints: Jay K. Bhama, MD, Division of Cardiothoracic Surgery, Department of Surgery, Carver College of Medicine, University of Iowa Health Care, 200 Hawkins Dr, SE500 GH, Iowa City, IA 52246 (E-mail: jay-bhama@uiowa.edu).

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The word *abracadabra* is a frequently used as an incantation by magicians¹ and occasionally by 1980s classic rock bands.² The first known mention was in *Liber Medicinalis* by Quintus Sammonicus,³ who served as a physician to the Roman Empire. Sammonicus prescribed that malaria sufferers wear an amulet containing the word written in its triangular form (Figure 1) or “abracadabrange.”⁴ The power of the amulet was thought to make lethal disease go away. The word now is commonly used by magicians when performing a magic trick and sometimes, contemptuously, to describe a conception purporting a simple solution to an insoluble phenomenon.

In this issue of the *Journal*, the Hannover group of Hanke and colleagues⁵ provide the first “real-world” experience with the HeartMate 3 (HM3) left ventricular assist device in 27 patients followed up out to 1 year. With a 1-year survival rate of 85%, this experience is on par with those of larger populations of patients being bridged to transplant and superior to the experience of those being supported as destination therapy.⁶ The absence of stroke is remarkable and seemingly consistent with the low rate of 7.9% in early clinical trial data from the Multicenter Study of MagLev Technology in Patients Undergoing Mechanical Circulatory Support Therapy with HeartMate 3 (MOMENTUM3),⁷ albeit higher at 1 year than in the CE mark study at 18%.⁸ Even more incredible is the complete absence of pump thrombosis. This is consistent with both the MOMENTUM3 and CE mark studies in patients followed up out to 6 months and 1 year, respectively.^{8,9} Gastrointestinal bleeding occurred in 3.7% in this study, compared with 12% in the CE mark and MOMENTUM3 trials.^{7,8}

The Hannover group, led by Dr Schmitto, are to be commended for their pioneering approach with this device⁹ and in the field of mechanical support. They have demonstrated a strong commitment to clinical innovation and investigation, often paving the way for other programs. Given these seemingly “magical” results regarding the biocompatibility of the HeartMate 3 device, they astutely ask whether reduction in anticoagulation is a tangible end point with this

next-generation heart pump. Certainly, a randomized trial evaluating a lower threshold for anticoagulation seems the next logical step. It should be pointed out, however, that the same question was asked with the HeartMate II device, both for short- and long-term anticoagulation,^{10,11} and that device subsequently demonstrated a much higher rate of pump thrombosis than had been seen in the initial trial and real-world experiences. The management trends associated with left ventricular assist device use for longer periods are not trivial and have contributed to the evolution of new problems, or at least the exchange of one problem for another.

It is likely that the technologic advances of the HeartMate 3, including full magnetic levitation and pulsatility, will improve the device’s blood compatibility. There will still be a steep learning curve, however, with this new technology and its adoption into contemporary surgical heart failure management. There will also be staged introduction of the device initially to a younger and healthier population (as is being seen now in the United States after US Food and Drug Administration approval), followed by another expansion to an older and sicker population should the device be approved for long-term use. One might argue that it would be prudent to exercise caution regarding anticoagulation at this critical juncture. As this technology expands to a broader swath of implanting centers, it will remain to be seen whether this device will demonstrate the same indecorous impact of expansion seen with the HeartMate II.

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Triangular form of “abracadabra” used for its healing powers in ancient Roman times.

Central Message

Early experience with the HeartMate 3 LVAD shows excellent short-term outcomes. With no reported pump thrombosis, we are left wondering...do we need that much anticoagulation with this magical device?

See Article page 662.

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FIGURE 1. Abracadabra written in the triangular form, as used for its healing powers in ancient Roman times.

In the meantime, when it comes to this seemingly revolutionary technology, Hanke and colleagues⁵ have us all contemplating the magical incantation: Abracadabra I, II...HeartMate 3?

References

1. Soanes C, Stevenson A, eds. *Oxford English Dictionary*. Oxford, UK: Oxford University Press; 2009.
2. Miller S. *Abracadabra* [compact disc]. Los Angeles: Capitol Records; 1981.
3. Vollmer F. *Quinti Sereni Liber Medicinalis*, Vol 4. chapter 52. Leipzig: Teubner; 1916.
4. Chisholm H, ed. *Encyclopedia Britannica*. 11th ed. Cambridge, UK: Cambridge University Press; 1911.
5. Hanke JS, Dogan G, Zoch A, Ricklefs M, Wert L, Feldmann C, et al. One-year outcomes with the HeartMate 3 left ventricular assist device. *J Thorac Cardiovasc Surg*. 2018;156:662-9.
6. Kirklin JK, Pagani FD, Kormos RL, Stevenson LW, Blume ED, Myers SL, et al. Eighth annual INTERMACS report: special focus on framing the impact of adverse events. *J Heart Lung Transplant*. 2017;36:1080-6.
7. Mehra MR, Naka Y, Uriel N, Goldstein DJ, Cleveland JC Jr, Colombo PC, et al; MOMENTUM 3 Investigators. A fully magnetically levitated circulatory pump for advanced heart failure. *N Engl J Med*. 2017;376:440-50.
8. Krabatsch T, Netuka I, Schmitto JD, Zimpfer D, Garbade J, Rao V, et al. HeartMate 3 fully magnetically levitated left ventricular assist device for the treatment of advanced heart failure—1 year results from the CE mark trial. *J Cardiothorac Surg*. 2017;12:23.
9. Schmitto JD, Hanke JS, Rojas SV, Avsar M, Haverich A. First implantation in man of a new magnetically levitated left ventricular assist device (HeartMate III). *J Heart Lung Transplant*. 2015;34:858-60.
10. Slaughter MS, Naka Y, John R, Boyle A, Conte JV, Russell SD, et al. Post-operative heparin may not be required for transitioning patients with a HeartMate II left ventricular assist system to long-term warfarin therapy. *J Heart Lung Transplant*. 2010;29:616-24.
11. Boyle AJ, Russell SD, Teuteberg JJ, Slaughter MS, Moazami N, Pagani FD, et al. Low thromboembolism and pump thrombosis with the HeartMate II left ventricular assist device: analysis of outpatient anti-coagulation. *J Heart Lung Transplant*. 2009;28:881-7.