

Assessment of the Melody valve in the mitral position in young children by echocardiography



Lindsay R. Freud, MD,^a Gerald R. Marx, MD,^a Audrey C. Marshall, MD,^a Wayne Tworetzky, MD,^a and Sitaram M. Emani, MD^b

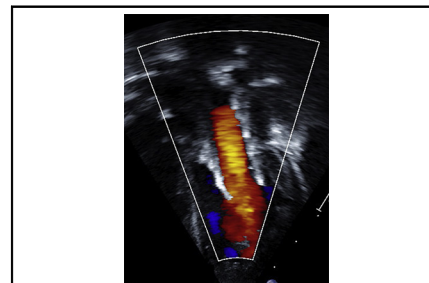
ABSTRACT

Objectives: Mitral valve replacement (MVR) in young children is limited by the lack of small prostheses. Our institution began performing MVR with modified, surgically placed, stented jugular vein grafts (Melody valve) in 2010. We sought to describe key echocardiographic features for pre- and postoperative assessment of this novel form of MVR.

Methods: The pre- and postoperative echocardiograms of 24 patients who underwent Melody MVR were reviewed. In addition to standard measurements, preoperative potential measurements of the mitral annulus were performed whereby dimensions were estimated for Melody sizing. A ratio of the narrowest subaortic region in systole to the actual mitral valve dimension (SubA:MV) was assessed for risk of postoperative left ventricular outflow tract obstruction (LVOTO).

Results: Melody MVR was performed at a median of 8.5 months (5.6 kg) for stenosis (5), regurgitation (3), and mixed disease (16). Preoperatively, actual mitral z scores measured hypoplastic (median -3.1 for the lateral [lat] dimension; -2.1 for the anteroposterior [AP] dimension). The potential measurements often had normal z scores with fair correlation with intraoperative Melody dilation ($\rho = 0.51$ and 0.50 for lat and AP dimensions, respectively, both $P = .01$). A preoperative SubA:MV <0.5 was associated with postoperative LVOTO, which occurred in 4 patients. Postoperatively, mitral gradients substantially improved, with low values relative to the effective orifice area of the Melody valve. No patients had significant regurgitation or perivalvar leak.

Conclusions: Preoperative echocardiographic measurements may help guide intraoperative sizing for Melody MVR and identify patients at risk for postoperative LVOTO. Acute postoperative hemodynamic results were favorable; however, ongoing assessment is warranted. (*J Thorac Cardiovasc Surg* 2017;153:153-60)



Echocardiographic image of the Melody valve in the mitral position in a young child.

Central Message

Preoperative echocardiographic measurements may help guide intraoperative placement of the Melody valve in the mitral position in young children.

Perspective

Surgical placement of the Melody valve in the mitral position is a new, evolving technique for mitral valve replacement in young children. We define preoperative echocardiographic measurements that may inform intraoperative sizing and implantation. In addition, we provide a comprehensive description of the echocardiographic features of the Melody valve in the mitral position postoperatively.

See Editorial Commentary page 161.

See Editorial page 151.

Valve replacement in infants and young children is complicated by the lack of adequately sized prostheses and the need for subsequent replacements over time

due to somatic growth. Mitral valve replacement (MVR), in particular, has proven to be challenging in this population with relatively high rates of reintervention and mortality.¹⁻⁹ A stent-mounted, valved, bovine jugular vein graft (Melody valve, Medtronic, Inc, Minneapolis, Minn), which is approved for transcatheter pulmonary valve replacement, was adapted for implantation into the mitral position in

From the Departments of ^aCardiology and ^bCardiac Surgery, Boston Children's Hospital, Harvard Medical School, Boston, Mass. Dr Freud was supported by the National Institutes of Health (T32-HL007572) and the Kenrose Kitchen Foundation.

L. Freud is now at Columbia University Medical Center.

Received for publication Feb 22, 2016; revisions received June 24, 2016; accepted for publication July 1, 2016; available ahead of print Aug 11, 2016.

Address for reprints: Lindsay R. Freud, MD, Morgan Stanley Children's Hospital of New York-Presbyterian, 3959 Broadway, CHN2, New York, NY 10032 (E-mail: lrf2136@columbia.edu).

0022-5223/\$36.00

Copyright © 2016 by The American Association for Thoracic Surgery

<http://dx.doi.org/10.1016/j.jtcvs.2016.07.017>

Scanning this QR code will take you to supplemental videos and figure for this article.



Abbreviations and Acronyms

AP	= anteroposterior
lat	= lateral
LVOTO	= left ventricular outflow tract obstruction
MVR	= mitral valve replacement
SubA:MV	= subaortic dimension to mitral valve ratio
VTI	= velocity-time integral

2010.^{10,11} This technique permits tailoring of valve size to small annular dimensions (<15 mm) at the time of implantation, as well as the opportunity for later expansion in the catheterization laboratory to accommodate somatic growth.

The surgical techniques and short-term outcomes of Melody MVR have been previously described.¹¹ Although the early results are encouraging, postoperative complications, such as left ventricular outflow tract obstruction (LVOTO), have been reported. Sizing of the Melody valve at the time of implantation is currently determined by intraoperative inspection. We hypothesized that the preoperative echocardiogram would be useful to determine appropriate sizing for Melody valve expansion and to help predict which patients may be at risk for LVOTO. Echocardiographic characteristics of the Melody valve after implantation in the mitral position have also not been described. Therefore, the aims of this exploratory study were to (1) define preoperative echocardiographic measurements that may inform intraoperative sizing of the Melody valve and the risk for postoperative LVOTO; and (2) provide a comprehensive



VIDEO 1. Intraoperative insertion of the modified Melody valve in the mitral position in a young patient. Video available at [http://www.jtcvsonline.org/article/S0022-5223\(16\)30828-5/addons](http://www.jtcvsonline.org/article/S0022-5223(16)30828-5/addons).

description of early echocardiographic features after Melody MVR.

METHODS

Patients who underwent Melody MVR from March 2010 to March 2015 at Boston Children’s Hospital were retrospectively reviewed. The operative procedure has been described previously.^{10,11} Briefly, the Melody valve is modified with the addition of a sewing cuff and resection of stent crowns. Right atriotomy is most often performed, and the compressed, modified valve is placed in the mitral annulus via a transseptal approach. Mitral annulus upsizing, as previously reported by our group,¹² is not performed because the Melody valve may be dilated over time. The ventricular end of the valve stent is fixed to the posteroinferior left ventricular wall to prevent LVOTO. The Melody valve is anchored to the mitral annulus and expanded to the desired diameter using catheterization balloons (see Video 1). Fenestrated closure of the interatrial septum is performed.

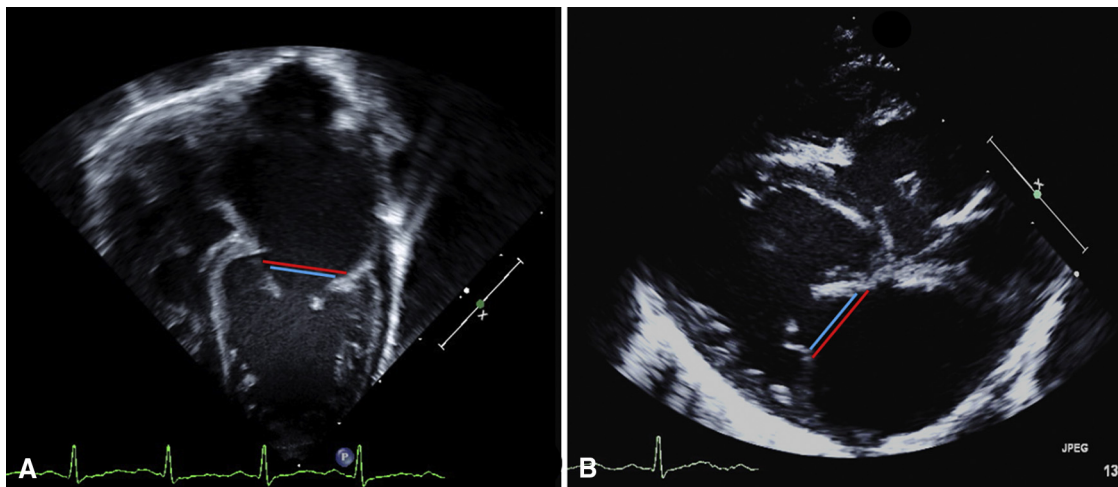


FIGURE 1. Illustration of the actual (blue) and potential (red) mitral valve measurements in the (A) lateral and (B) anteroposterior dimensions at the level of the annulus.

Download English Version:

<https://daneshyari.com/en/article/5616459>

Download Persian Version:

<https://daneshyari.com/article/5616459>

[Daneshyari.com](https://daneshyari.com)