HHS Public Access

Author manuscript

JACC Cardiovasc Imaging. Author manuscript; available in PMC 2017 July 03.

Published in final edited form as:

JACC Cardiovasc Imaging. 2014 December ; 7(12): 1286–1287. doi:10.1016/j.jcmg.2014.06.019.

REPLY: Tricuspid Regurgitation Severity Associated With Positioning of RV Lead or Other Etiology Assessed by Intracardiac Echocardiography

Anuj Mediratta, MD, **Karima Addetia, MD**, and **Roberto M. Lang, MD***

*Section of Cardiology, University of Chicago Medical Center, 5841 South Maryland Avenue, MC5084 Chicago, Illinois 60637

We would like to thank Dr. Ren and colleagues for their interest and feedback and appreciate the opportunity to reply. The main limitation of our study (1) is that it is retrospective; therefore, assumptions of cause and effect regarding tricuspid regurgitation (TR) are impossible to make. As a "proof of concept," we used transthoracic echocardiography to evaluate the feasibility of visualizing tricuspid valve leaflet motion and device location in 3 dimensions (3D) as well as the degree of TR. In our single-center study, 3D evaluation of lead location was feasible in 90% of studies and an association did exist between lead position and degree of TR (1).

As opposed to mitral regurgitation, TR lacks standardized recommendations for severity and data for etiology (2). For TR severity assessment, a comprehensive "semiquantitative" approach is recommended due to the lack of standardized reference values (2). Three-dimensional effective regurgitant orifice area and regurgitant fraction may provide more precise volumes; however, they are more difficult to reliably obtain and lack reference values.

Tricuspid valve regurgitation, regardless of the etiology, is associated with high morbidity and mortality. In a study by Nath et al. (3), the investigators showed that significant TR was associated with worse outcomes. In their study (n = 5,223), the severity of TR correlated with worse outcomes, independent of right ventricular size, left ventricular function, or pulmonary artery systolic pressures (3). Furthermore, Lin et al. (4) described device-associated TR requiring cardiac surgery as well as several mechanisms leading to valve malfunction, including adherence, impingement, perforation, or entanglement (4).

Ren et al. have experience with intracardiac echocardiography and should be applauded for their efforts using this imaging modality in clinical practice. This imaging modality may be useful to guide lead placement in the future; however, routine intracardiac echocardiography to guide device placement is not the standard of care and should be considered investigational.

We proposed 3D echocardiographic guidance as a possible way to limit device lead-associated TR; however, several questions need to be answered prior to considering a prospective clinical trial to investigate this issue:

1. Do device leads remain in the same location after insertion?

2. Is guidance of lead location possible? If so, what imaging modality would best guide lead placement (3D transthoracic echocardiography, 2D/3D transesophageal echocardiography, or intracardiac echocardiography)?

Once these questions are answered with randomized, prospective studies, the clinical utility of lead placement under imaging guidance could be determined.

References

1. Mediratta A, Addetia K, Lang RM, et al. 3D echocardiographic location of implantable device leads and mechanism of associated tricuspid regurgitation. J Am Coll Cardiol Img. 2014; 7:337–47.
2. Zoghbi WA, Enriquez-Sarano M, Foster E, et al. for the American Society of Echocardiography. Recommendations for evaluation of the severity of native valvular regurgitation with two-dimensional and Doppler echocardiography. J Am Soc Echocardiogr. 2003; 16:777–802. [PubMed: 12835667]
3. Nath J, Foster E, Heidenreich PA. Impact of tricuspid regurgitation on long-term survival. J Am Coll Cardiol. 2004; 43:405–9. [PubMed: 15013122]
4. Lin G, Nishimura RA, Connolly HM, Dearani JA, Sundt TM 3rd, Hayes DL. Severe symptomatic tricuspid valve regurgitation due to permanent pacemaker or implantable cardioverter-defibrillator leads. J Am Coll Cardiol. 2005; 45:1672–5. [PubMed: 15893186]