

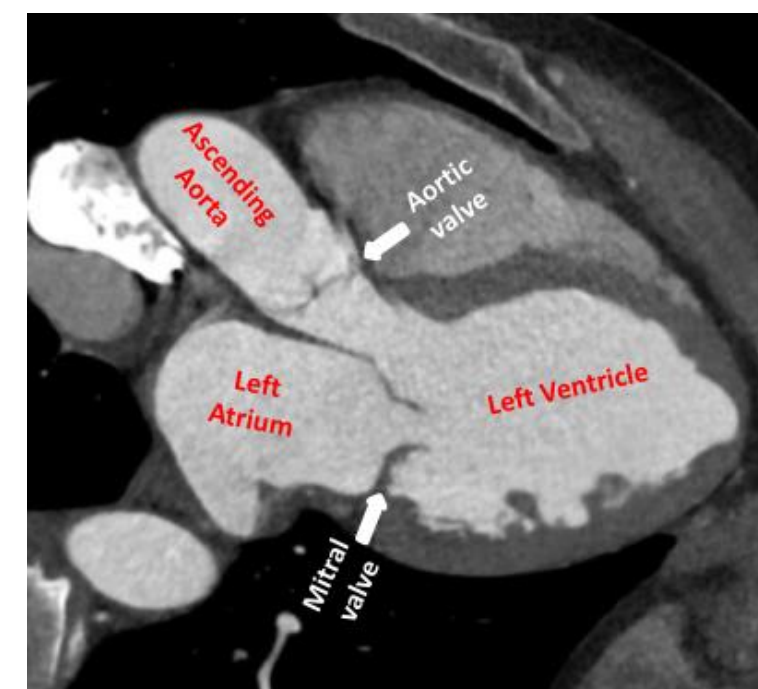


Structural Heart Disease: CT Imaging Of The Mitral Valve

Anoushka Kapoor, Danielle Lynch, Nicole Paulson, Jennifer Shafer, Madison Winter, and Kelly Yang 2020

Background

- Mayo Structural Heart Disease Program focuses on diseases affecting the structure of the heart, such as congenital heart disease and valvular heart disease [1].
 - This study more specifically focuses on diseases of the mitral valve (MV).
- Oxygen-rich blood passes through the mitral valve, located between the left atrium (LA) and the left ventricle (LV). The mitral valve closes during LV contraction to prevent blood leaking into the LA [2].
- MV disease affects about 10% of people over the age of 75 and is increasing. Out of all the valvular heart disorders, MV diseases is the most common and is increasingly encountered [3].
- CT plays an important role in the evaluation of MV disease. It can assist with:
 - Characterization of MV disease and quantification
 - Pre-procedural planning
 - Evaluation of post-procedural complications



Courtesy of Mayo Clinic

Relevant Mitral-related Diseases

- **Stenosis**- Narrowing of the mitral valve
 - **Rheumatic disease**- Complication of strep infection that leads to scarring of mitral valve; a common cause of MV stenosis
 - **Radiation therapy**- Can lead to stenosis due to valve thickening and calcification
 - **Mitral annular calcification (MAC)**- Build up of calcium in MV that can lead to stenosis.
- **Regurgitation**- MV does not close properly, causing blood to flow backwards into LA
 - **Mitral Prolapse**- Bulging of MV leaflets during contraction; often leads to MV regurgitation
 - **Flail Leaflet**- Rupture of the papillary muscles that connect the leaflets to cardiac muscle; flail allows blood to flow back into the LA



Flail posterior mitral leaflet with prolapse
Courtesy of Mayo Clinic

Strength of CT for Mitral Valve Imaging

- **High spatial resolution**- Allows visualization of submillimeter anatomic structures
- **Intrinsic contrast resolution**- Allows visualization of calcium (important in mitral valve pathology)
- **Iodinated contrast**- Intravenous contrast allows visualization of intra-cardiac structures
- **ECG-gating**- Allows motion free images of the heart and cine reconstruction of cardiac motion



Courtesy of Mayo Clinic

Ongoing Mitral Valve CT Research at Mayo Clinic

- The mission of the CT Clinical Innovation Center (CIC) at Mayo Clinic is to aid in novel imaging innovations that can translate directly into patient care [4].
- Evaluate new Computerized Tomography (CT) technology, clinical applications and dose-reduction techniques.
- Quantitative assessment of radiation dosage, disease progression and regression, and organ function.
- Equips Mayo Clinic staff with access to state-of-the-art CT technology, advanced imaging processing, and CT physics support.

How We Played a Role and Our Experience

- Attended weekly Structural Heart Disease team meetings
- C42 software training
- Syngo.via software training
- Mitral annulus tracing training
- Helped create documents for future interns to navigate HR process
- Submitted an abstract to 2020 SCCT national conference

References

- [1] Heart Disease. (2018, March 22). *Mayo Clinic*. Retrieved from <https://www.mayoclinic.org/diseases-conditions/heart-disease/care-at-mayo-clinic/mac-20353128>
- [2] Mitral Valve Disease. (2016, September 20). *Heart, Vascular, and Thoracic Care. UWHealth*. Retrieved from <https://www.uwhealth.org/heart-cardiovascular/mitral-valve-function-and-disorders/10721>
- [3] Wier-McCall et. al. (2018, July 31) Mitral Valve Imaging with CT. *RSNA*. Retrieved from <https://pubs.rsna.org/doi/full/10.1148/radiol.2018172758>
- [4] CT Clinical Innovation Center- About the center. (2016, March 9). *Mayo Clinic*. Retrieved from <https://mayo.edu>.