What I did during ISCORE

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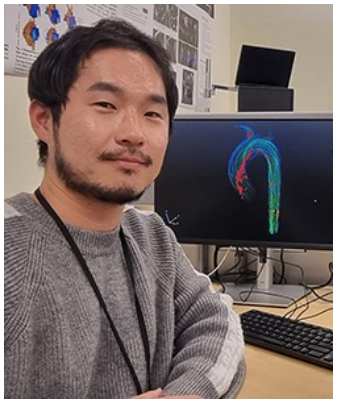

Radiology department, Advanced Imaging Lab

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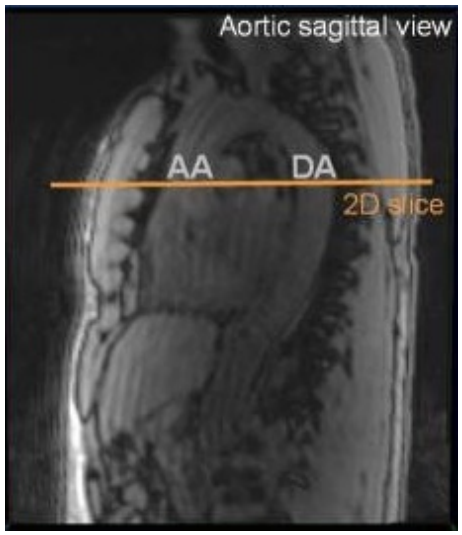
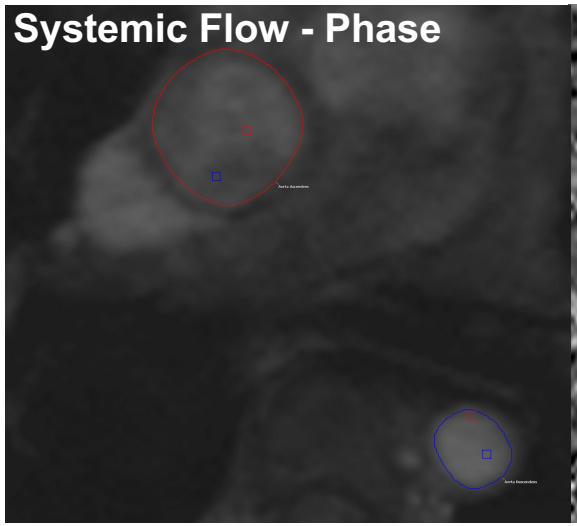
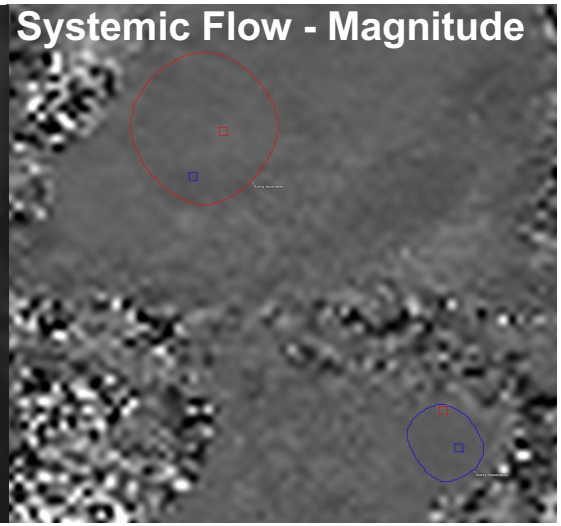
Introduction

- 2D phase contrast (PC) MRI measures time-resolved 2D image of the aorta with tracking its movement
- Using phase and magnitude images of 2D PC MRI, we can obtain velocity and flow rate for assessing cardiovascular disease (CVD)

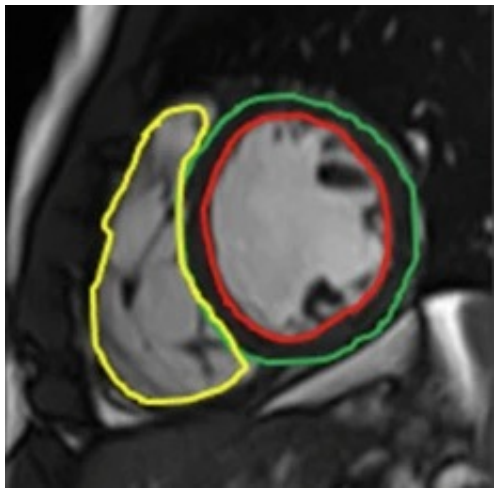


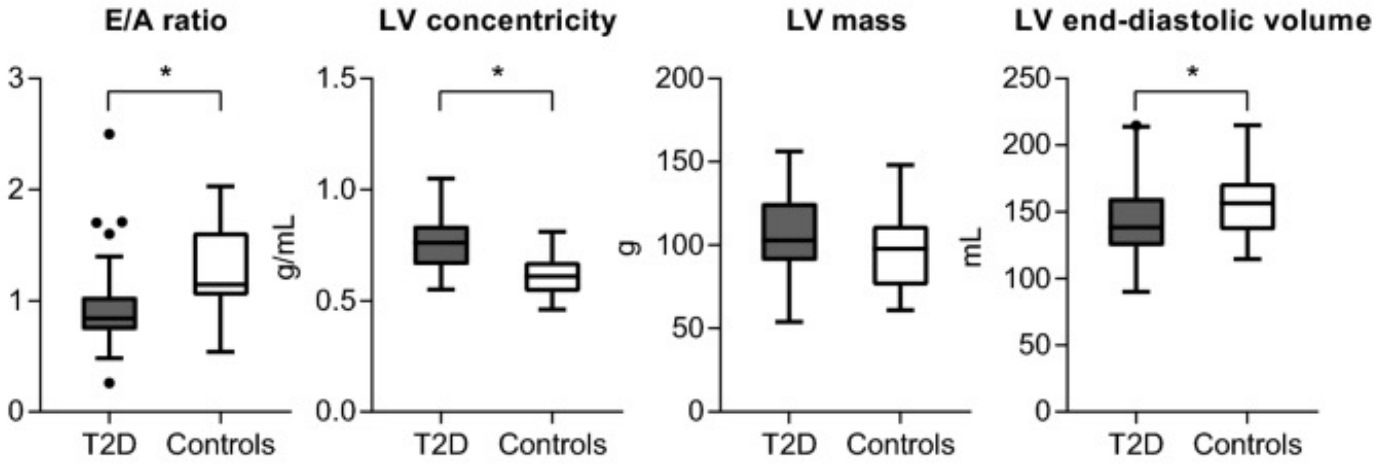




Introduction

- Cardiac magnetic resonance (CMR) provides the most important clinical data, such as global functions and global strains
- Global functions provide the baseline characteristics of heart function
- Global strains provide the detailed understanding of heart function





Goal during ISCORE program

I. **To learn about how to use clinical software for the analysis**
   - Cardiovascular imaging software (CVI42) was utilized

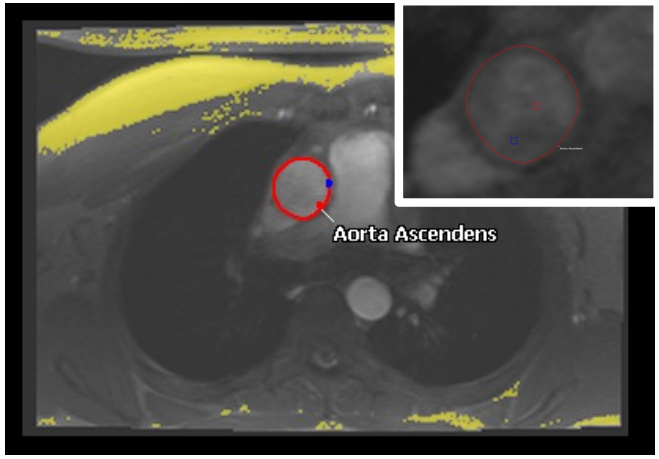
II. **To analyze 2D PC MRI and CMR data**
   - Peak velocity, flow rate, flow-area curves from 2D PC MRI
   - Global functions and global strains from CMR

Methods

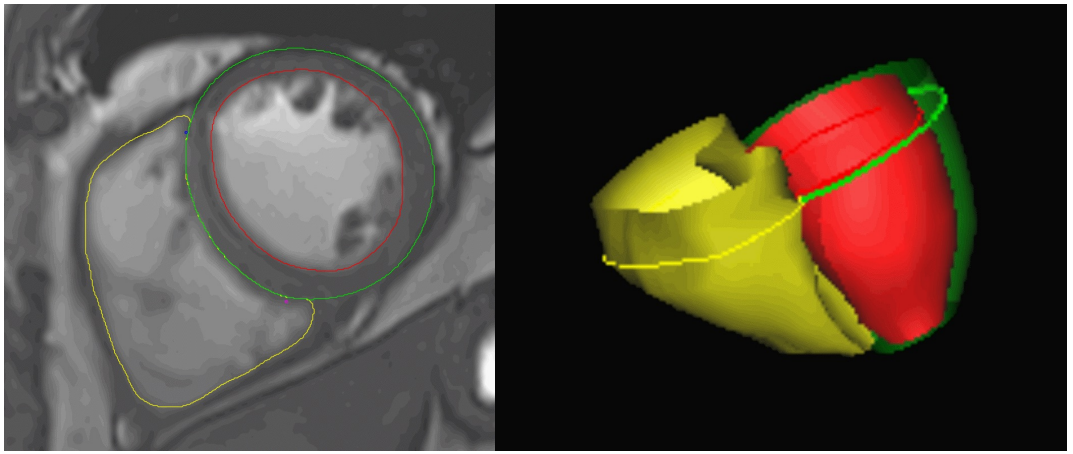
I. **2D PC MRI -** Draw the contours (Ascending and descending aorta) at each time point, ensuring the region of interest (ROI) ascends linearly during early systole. Then export data to analyze.

II. **CMR-** Draw the contours (endo- and epi-cardium) temporally. Do not allow endo and epi contours to overlap. View global functions and strain in report section.

2D PC MRI

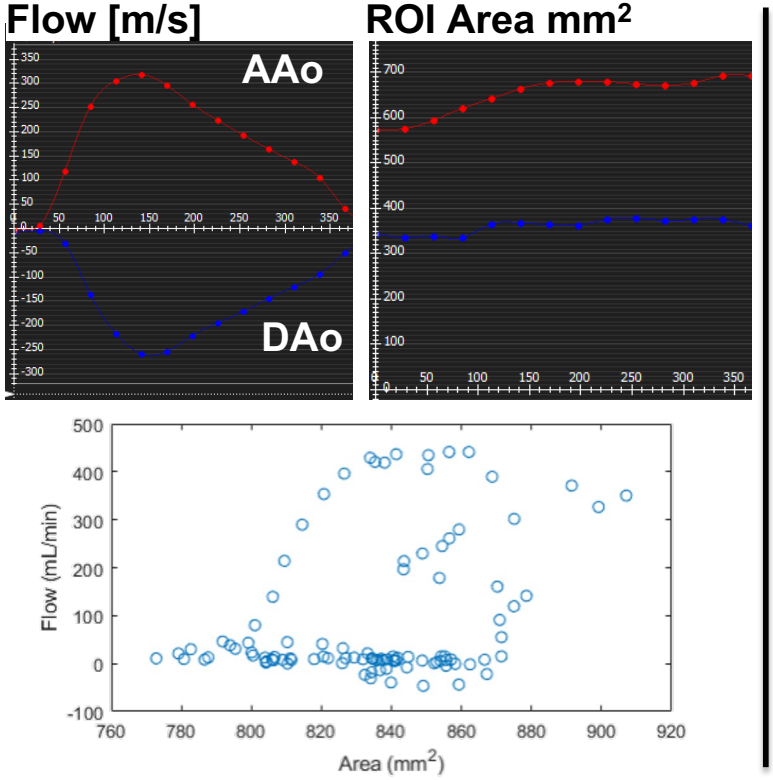


CMR analysis



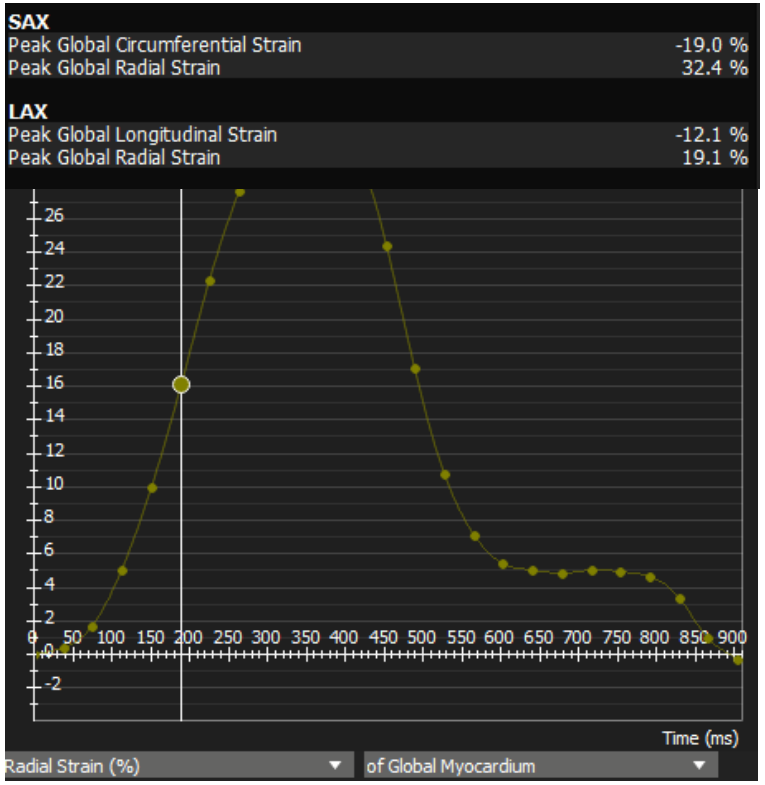
Results

2D PC MRI



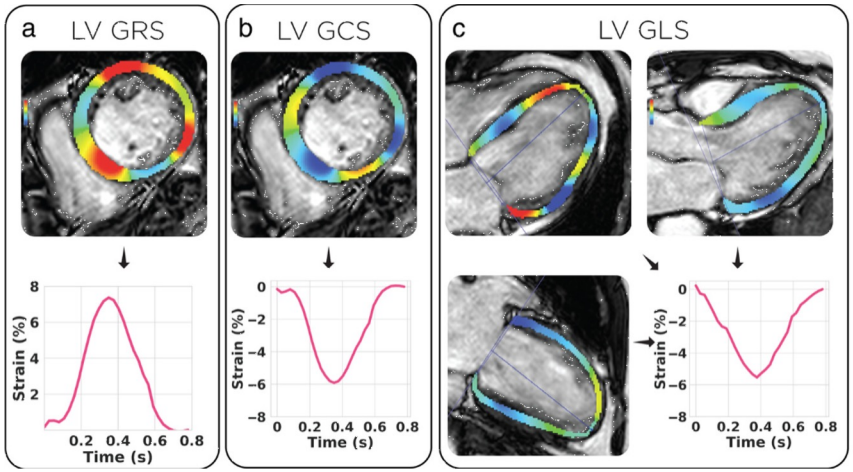
CMR analysis

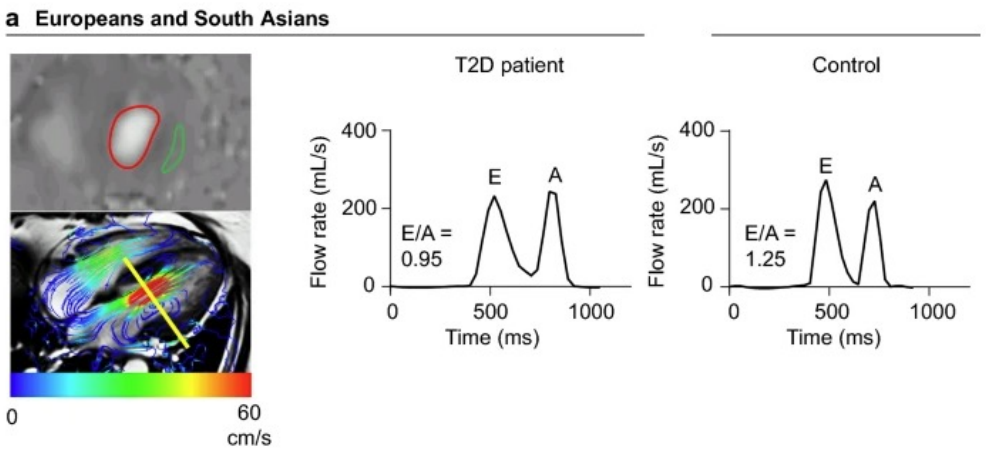
Measurement	*P1*
Total Forward Volume:	70.18
Total Volume:	69.82
Regurgitation Fraction:	0.50%
Heart Rate:	65.1
Max Pressure Gradient:	2.99
Mean Pressure Gradient:	0.65
Maximum Velocity (1x1 px):	86.5
Maximum Flow:	303.54
Minimum Flow:	-9.27
Net Positive Volume:	74.82



Discussion

- Flow information was obtained from 2D PC MRI, global functions and strains were from CMR
- Normal global longitudinal strain (GLS) is around 15 – 20%, while **we had roughly 12%**. When compared to a participant with arrhythmic events, a GLS of 6% is demonstrated.
- This shows a participant with T2D has less cardiovascular function than a control participant, but higher than one with arrhythmic events.
- For future research, advanced technique such as intracardiac 4D flow MRI can be available for detailed heart dysfunction, showing diastole results.





Cultural Exchange

ISCORE allowed me to interact with someone of a different culture who not only could teach me things from their own culture, but also could teach me knowledgeable information with research. I enjoyed being able to learn more and expand my knowledge in a space I one day want to be in.

Thank You

I would like to extend my deepest gratitude to Sungho Park for his outstanding mentorship, to Alex Barker and the Advanced Imaging Lab group for providing me the supportive environment necessary for my research endeavors, and to Dr. Cristina Cenciarelli and Liz Evans for offering me this amazing experience.

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