Cardiac Sarcoidosis and Arrhythmogenic Right Ventricular Cardiomyopathy Can Be Differentiated Using Voltage Mapping Data During Electrophysiological Study

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BACKGROUND

- Cardiac sarcoidosis (CS) can mimic arrhythmogenic right ventricular cardiomyopathy (ARVC)
- Both diseases can affect the right ventricular myocardium and cause arrhythmias
- CS has been described as having patchy distribution compared to ARVC which may be more homogenous
- Discrimination between these two conditions is important due to their different management strategies
- Electroanatomic mapping (EAM) can identify differences in the impedance and voltage makeup of myocardial tissue during EP study

METHODS

- Patients diagnosed with ARVC (n=100) [using the 2010 Task Force Criteria], and CS (n=26) [using the 2014 HRS diagnostic criteria] who underwent right ventricular EAM were selected for retrospective analysis.
- Abnormal unipolar voltage (UV) defined as <5.5 mV; abnormal bipolar voltage (BV) defined as <1.5 mV
- Categorical variables were compared with Student's t-test method.

RESULTS

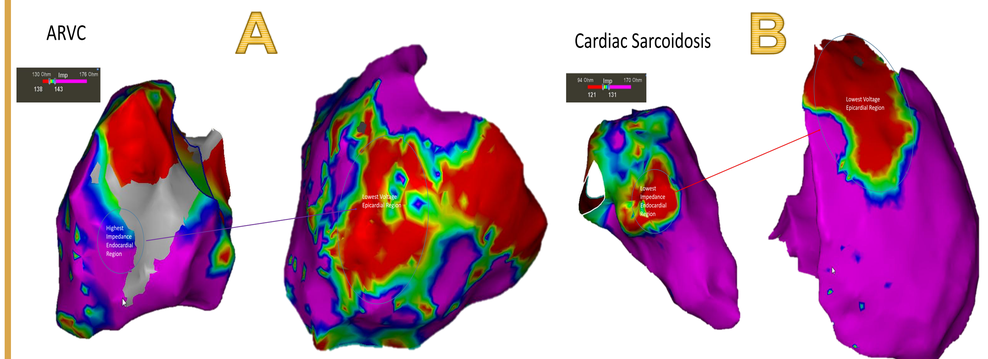
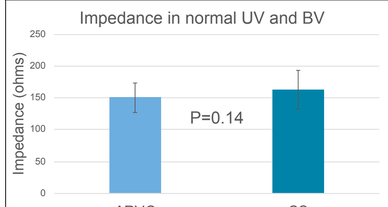


Figure 1. Electroanatomic mapping of the right ventricle in an ARVC (A) and CS (B) patients show differences in the impedance /voltage regions.

Average Impedance values	No. Patients	Mean	P-value
ARVC	48	151 (144.6-157.8)	0.14
CS	14	162.57 (146.6-178.5)	
Impedance difference (nl BV- abnl UV)			
ARVC	45	8.87 (4.76-12.98)	0.03
CS	14	28.5 (19.8-37.21)	
Impedance ratio (normal BV/abnormal unipolar voltage)			
ARVC	45	1.083 (1.05-1.11)	0.03
CS	14	1.24 (1.15-1.32	
Voltage ratio (abnormal UV / normal BV)			
ARVC	100	0.35 (0.337-0.363)	<0.001
CS	26	0.46 (0.433-0.486)	
Average Voltage (abnormal UV and abnoraml BV)			
ARVC	100	1.64 (1.57 -1.71)	<0.0001
CS	25	2.43 (2.19-2.66)	

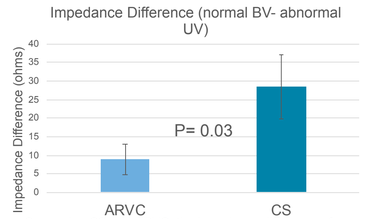
Table 1. ARVC vs CS impedance, voltage, and voltage ratios

FIGURE 2



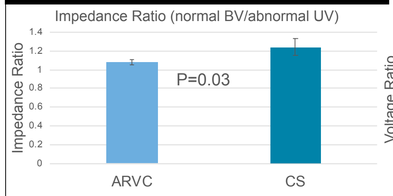
Average impedance values were slightly higher in CS than ARVC but not statistically different.

FIGURE 3



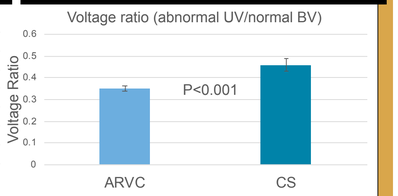
Comparing CS and ARVC, the impedance difference of "normal-voltage tissue minus abnormal-voltage tissue" was much larger in CS patients.

FIGURE 4



CS patients had a higher impedance ratio between "normal tissue and abnormal tissue" when compared to ARVC patients.

FIGURE 5



The voltage ratio between abnormal and normal tissue was larger in CS patients than ARVC.

CONCLUSION

- This study found that EAM can use the differences in myocardial involvement to distinguish CS and ARVC during EP study
- When the "*abnormal-unipolar to normal-bipolar-voltage*" ratios are compared, CS and ARVC can be differentiated
- Isolated endocardial impedance values obtained in normal or abnormal unipolar/bipolar voltage areas did not differ significantly between ARVC and CS patients
- The impedance ratios support the idea that ARVC ventricular myocardium may have a more homogenous distribution compared to CS

IMPLICATIONS

- This study advances knowledge of the expected EAIVM difference between ARVC and CS
- Using the results of this project, clinicians can further stratify abnormal electroanatomic mapping results for patients with concern for cardiac sarcoidosis vs ARVC.
- Further study will look to validate these results in a prospective cohort of patients.

Disclosures

- Joseph Adewumi: No Disclosures.