0057

Influence of the model used to combine data acquired during multiple heart beats on temporal resolution of cardiac Cine MRI: is high temporal resolution achievable with children and young adults?

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Purpose: Cardiac Cine-MRI combines data acquired in different cycles of variable lengths to reconstruct images. This study aims at assessing the temporal misalignment induced by different methods for combining k-space lines.

Methods: The durations of the six cardiac stages of 306 cardiac cycles were assessed with Tissue-Doppler Imaging in a population of 7 children and young adults. Different models from the literature (Chung and Feinstein), and were assessed with Tissue-Doppler Imaging in a population of 7 children and young adults. Simple personalized adaptive cardiac models due to time misalignments during cine reconstruction, at least within a pediatric population. Single personalized adaptive cardiac models may reduce this limitation.

Results: The averages of the 95% confidence limits of temporal misalignments caused by two-stage models were between 20 and 30ms but during early diastole they reached 40-50ms. Chung’s model behaved slightly better than Feinstein’s (26ms vs 31ms, p<0.001). The adaptive models significantly reduced time misalignments (22ms vs 26ms, p<0.001 for the 2-stage model and 18ms vs 22ms, p<0.001 for the six-stage model).

Conclusion: There is a theoretical limitation to high temporal resolution cardiac acquisitions due to time misalignments during cine reconstruction, at least within a pediatric population. Simple personalized adaptive cardiac models may reduce this limitation.

0297

Risk stratification using CMR delayed enhancement in LMNA mutation carriers

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Background: Laminopathy is a frequent cause of familial dilated cardiomyopathy (DCM) associated with peripheral myopathy. The clinical cardiac manifestations are usually atrial fibrillation, atrio-ventricular blocks with a DCM. Myocardial delayed enhancement (DE) with cardiac magnetic resonance imaging (CMR) is known to be associated with a worse rhythmical prognosis in DCM.

Aim: Determine if myocardial DE can be used as a risk stratification tool for cardiac prognosis in asymptomatic LMNA mutation carriers.

Material and methods: Cohort study of 15 LMNA mutation carriers with left ventricular ejection fraction (LVEF) > 50% followed between 2009 et 2013 (10 DE+, 5 DE-). Primary endpoint was rhythmical events uprise and secondary endpoint was LVEF evolution.

Results: Regarding patients with DE since 2009, 60% required pacemaker or implantable cardioverter-defibrillator (ICD) implantation for atrio-ventricular blocks, atrial arrhythmias or left ventricular dysfunction whereas no patient with a normal CMR did (p = 0.027). In 2009, LVEF was similar in the two groups (LVEF = 68% DE+ group vs 65% DE- group, p = 0.18), whereas in 2013, DE group has a lower LVEF (LVEF = 53% DE+ group vs 65% DE- group, p = 0.009).

Conclusion: Myocardial DE seems to be an early cardiac marker for PM or ICD implantation risk and left ventricular dysfunction in LMNA mutation carriers with normal LVEF.

0181

Interest of atrial function assessment by tissue Doppler imaging in coronary patients

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Background: Atrial function is an integral part of cardiac function which is often neglected. The presence of coronary artery disease may impair atrial function. This study investigated if atrial mechanical dysfunction was present in coronary patients by tissue Doppler echocardiography (TDI).

Materials and methods: Prospective study in 60 patients hospitalized for coronary heart disease that we compared to 40 healthy subjects matched for age and sex. With pulsed TDI we measured the peak velocity of atrial contraction (Va) at the free wall of the RA (RA-Va), the LA (LA-Va) and in the inter-atrial septum (Va-IAS). We studied the electromechanical delay of the onset, the peak and the end of atrial contraction by measuring respectively the time between the beginning of the P wave and the onset, the peak and the end of atrial contraction.

Results: The mean age was 53.5±10.9 years [26;76] comparable to the average age of witnesses. 90% of the population was male. Va was similar in the free wall of the RA and LA (p=0.1) and less on the IAS (p<0.001) respectively 14.9±3.5cm/s, 14.1±3.8cm/s and 10.9±2.6cm/s. In coronary patients, there are a significant decrease in the rate of atrial contraction in the three atrial sites (Vs-LA:11.5±4.6cm/s vs Vs-RA:14.1±3.8cm/s). In coronary patients, there are a significant decrease in the rate of atrial contraction in the three atrial sites (Vs-LA:11.5±4.6cm/s vs Vs-RA:14.1±3.8cm/s, p<0.001). Similarly, there’s a significant lengthening (p<0.001) in the electromechanical delay affecting the onset (RA:67.3±17.9ms vs 50±11.9ms; IAS:73.1±18.3ms vs 59.3±15.9ms; LA:81.3±17.7ms vs 55.4±13.1ms), the peak (RA:27.2±23ms vs 110.3±27ms; IAS: 130.2±18.3ms vs 120±17.4 ms; LA:138.1±17.3 ms Vs 126.8±17.4 ms) and the end (RA:196.8±25.7ms Vs 175.6±25.3ms; IAS: 195±22.2ms Vs 179.6±16.4ms; LA:195.9±22.8ms Vs 177.6±23.6ms) of the atrial contraction. We found that the Va-LA is independent of the presence or absence of a trans-wall myocardial infarction.