Immediate recovery of atrial mechanical function after electrical cardioversion in patients with persistent atrial fibrillation is predictive of maintenance of sinus rhythm

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Background: Electrical or structural degeneration in left atrium (LA) occur after long period of atrial fibrillation (AF). This change of left atrium lead to increase of LA size and might be related to success rate of sinus conversion and relapse of AF after cardioversion. Purpose: We investigated whether recovery of left atrial mechanical function over time after electrical cardioversion in patients with persistent AF is related to relapse of AF, using serially measured echocardiographic parameters. Methods: We included 20 patients with persistent AF who have no valvular or structural heart disease and unsuccessful in pharmacological cardioversion. After electrical cardioversion, we recorded trans-mitral and pulmonary vein flow to evaluate mechanical function of LA at 30 min, 1 day, 7 days, and 30 days in each patient. We evaluated clinical parameters such as age, sex, duration of AF, presence of heart failure, risk factors, and antiarrhythmic agents; and echocardiographic parameters such as chamber size, left ventricular ejection fraction, and Doppler measurements, including estimated right ventricular pressure. Results: Mean age is 59 ± 12 years old (male, n=12, 60%). Duration of AF is 47 month (median: 22 month). Hypertension was most prevalent risk factor (55%). Electrical cardioversions were successful in 16 patients (80%). In cardioverted patients, AF recurred in 8 patients (50%) and AF relapse occurred within 15 days in 6 patients among them. Left ventricular ejection fraction decreased transiently after electrical cardioversion and left atrial size decreased over time. In all converted patients, A wave of trans-mitral flow was more than 0.35 m/sec at 7 days during follow-up. Early S wave and reverse a wave of pulmonary vein flow appeared during follow-up in most patients. Trans-mitral flow and pulmonary vein flow were normalized at 30 days after electrical cardioversion. AF relapse was not related to age and duration of atrial fibrillation. Maintenance of sinus conversion is associated with earlier elevation of mitral A wave and earlier detection of early S wave and reverse a wave of pulmonary vein flow. Muscle enzymes such as isoenzyme of creatine kinase and lactate dehydrogenase were elevated in 7 patients. Conclusions: Systolic and diastolic function of left atrium were much improved at 7 days after electrical cardioversion for patients with persistent atrial fibrillation and were normalized at 30 days. Immediate recovery of atrial mechanical function using trans-mitral flow and pulmonary flow might be useful predictor for maintenance of sinus rhythm after cardioversion of atrial fibrillation.
Abstract: Immediate recovery of atrial mechanical function after electrical cardioversion in patients with persistent atrial fibrillation is predictive of maintenance of sinus rhythm.

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Background: Electrical or structural degeneration in left atrium (LA) occur after long period of atrial fibrillation (AF). This change of left atrium lead to increase of LA size and might be related to success rate of sinus conversion and relapse of AF after cardioversion. Purpose: We investigated whether recovery of left atrial mechanical function over time after electrical cardioversion in patients with persistent AF is related to relapse of AF, using serially measured echocardiographic parameters. Methods: We included 20 patients with persistent AF who have no valvular or structural heart disease and unsuccessful in pharmacological cardioversion. After electrical cardioversion, we recorded transmitral and pulmonary vein flow to evaluate mechanical function of LA at 30 min, 1 day, 7 days, and 30 days in each patient. We evaluated clinical parameters such as age, sex, duration of AF, presence of heart failure, risk factors, and antiarrhythmic agents; and echocardiographic parameters such as chamber size, left ventricular ejection fraction, and Doppler measurements, including estimated right ventricular pressure. Results: Mean age is 59 ± 12 years old (male, n=12, 60%). Duration of AF is 47 month (median: 22 month). Hypertension was most prevalent risk factor (55%). Electrical cardioversions were successful in 16 patients (80%). In cardioverted patients, AF recurred in 8 patients (50%) and AF relapse occurred within 15 days in 6 patients among them. Left ventricular ejection fraction decreased transiently after electrical cardioversion and left atrial size decreased over time. In all converted patients, A wave of transmitral flow was more than 0.35 m/sec at 7 days during follow-up. Early S wave and reverse a wave of pulmonary vein flow appeared during follow-up in most patients. Transmitral flow and pulmonary vein flow were normalized at 30 days after electrical cardioversion. AF relapse was not related to age and duration of atrial fibrillation. Maintenance of sinus conversion is associated with earlier elevation of mitral A wave and earlier detection of early S wave and reverse a wave of pulmonary vein flow. Muscle enzymes such as isoenzyme of creatine kinase and lactate dehydrogenase were elevated in 7 patients. Conclusions: Systolic and diastolic function of left atrium were much improved at 7 days after electrical cardioversion for patients with persistent atrial fibrillation and were normalized at 30 days. Immediate recovery of atrial mechanical function using transmitral flow and pulmonary flow might be useful predictor for maintenance of sinus rhythm after cardioversion of atrial fibrillation.