DEFIBRILLATION THRESHOLD TESTING DURING IMPLANTABLE Cardioverter-Defibrillator IMPLANTATION IMPAIRS CARDIAC SYSTOLIC AND DIASTOLIC FUNCTION AND PROLONGS BLOOD PRESSURE RECOVERY IN PATIENTS WITH HEART FAILURE

ACC Poster Contributions
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Session Title: Defibrillation Threshold Testing and Predictors of Shocks in ICD Recipients
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Background: Defibrillation threshold (DFT) testing is routinely performed during implantable cardioverter-defibrillator (ICD) implantation, though it is sometimes associated with critical complications in patients with severely reduced left ventricular (LV) function. There, however, have been no data regarding the effect of DFT testing on cardiac function and on hemodynamics in relation to LV function. We assessed the effects of DFT testing on LV systolic and diastolic functions using echocardiography and on hemodynamics by direct central arterial pressure (CAP) measurement.

Methods: We studied 41 patients who underwent ICD implantation and DFT testing: 20 patients with LV ejection fraction (EF) < 40% and 21 patients with LVEF ≥ 40%. We assessed global strain rate during the isovolumetric relaxation period (SRIVR), which correlates well with LV relaxation, using a 2-dimensional speckle tracking system (EchoPAC PC (GE)). LVEF and global SRIVR were measured before, immediately after, and 5 min and 4 h after two consecutive 20 joule DFT testing. CAP was measured directly before and after DFT testing.

Results: LVEF was decreased immediately after and at 5 min after DFT testing and had recovered to the baseline level at 4 h in the reduced-LVEF group, while it showed no significant change in the preserved-LVEF group (reduced-LVEF: 28 ± 9 vs. 23 ± 9* vs. 23 ± 9* vs. 27 ± 8 %, *p < 0.05 vs. baseline; preserved-LVEF: 61 ± 7 vs. 61 ± 7 vs. 61 ± 7 vs. 61 ± 7 %, ns). Global SRIVR was decreased immediately after and at 5 min after DFT testing and had recovered to the baseline level at 4 h in both groups (reduced-LVEF: 0.14 ± 0.05 vs. 0.08 ± 0.03† vs. 0.09 ± 0.04† vs. 0.15 ± 0.05 s-1, †p < 0.05 vs. baseline; preserved-LVEF: 0.40 ± 0.15 vs. 0.24 ± 0.14† vs. 0.25 ± 0.14† vs. 0.41 ± 0.14 s-1, †p < 0.05 vs. baseline). Time to recovery of CAP to the baseline level was longer in the reduced-LVEF group (17.1 ± 9.7 vs. 8.3 ± 5.9 sec., p<0.05).

Conclusions: DFT testing during ICD implantation caused not only LV systolic and diastolic dysfunction but also prolonged decrease in CAP in patients with reduced LVEF. In patients with preserved LVEF, although only LV diastolic function was impaired, CAP decreased transiently.