

Impact of the Covid-19 related lockdown on physical activity, heart rate and arrhythmia burden in a large prospective cohort of CHF patients

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Background

At the beginning of the Covid-19 pandemic in spring 2020, governments around the world issued curfews and other stay at home orders ('lockdown') to limit the spread of the SARS-CoV19 virus. This may have forced people to decrease their physical activity. Physical inactivity as well as social stress is known to be especially deleterious for heart failure (HF) patients. The BIO|STREAM.HF study enrolled such HF patients into a prospective registry with Home Monitoring.

Purpose: We aimed to evaluate the impact of the lockdown during the first Covid-19 pandemic wave on physical activity and arrhythmia burden of heart failure patients.

Methods: We analysed daily transmitted data of patients enrolled into a large international registry (BIO|STREAM.HF) being implanted with a cardiac resynchronization therapy (CRT) devices. Patients with NYHA \geq II and LVEF \leq 40% before CRT implantation were selected.

Intra-individual weekly mean and median values were calculated for the following daily transmitted parameters: physical activity (measured as % of the day during which the patient moves), atrial arrhythmia burden, mean heart rate (at rest), PP variability, PVC burden, and rate of biventricular pacing. Values were calculated for 12 weeks before and 12 weeks after the country-specific effective date of most rigorous restrictions in spring 2020 to visualize the general trend of parameter changes. Moreover, values for intra-individual changes between three 28-days periods (before, during, and after the lockdown) were calculated.

Results: Of 444 patients, 76% were male. They had a mean age of 69 ± 10 years and LVEF of $28.2 \pm 6.7\%$. HF was of ischemic etiology in 42% of cases and they were in NYHA class II (47.5%), III (50.0%) or IV (2.5%).

On average, patients were active for 9% of the day (2 h 10 min). The physical activity decreased by approx. 10% with the onset of the lockdown (figure 1) and recovered within the following eight weeks.

Comparison of the 28-days periods before, during and after the lockdown showed a statistically significant intra-individual decrease in physical activity (mean decrease 9 min per day) during the lockdown compared to pre- and post-lockdown values and a trend toward reduced mean heart rates. In parallel, a significant increase in device detected atrial arrhythmia burden (mean increase 17 min per day) was observed. All other parameters did not change significantly.

Conclusion

Our results show that patients reduced their physical activity during the Covid-19 related lockdown in spring 2020. This was associated with an increase in atrial arrhythmia burden and a reduction of the mean heart rate. Prognostic implications of these results will further be analysed.

Abstract Figure.

