Temporal relationship between training and episodes of atrial fibrillation in endurance athletes

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Background: Prolonged endurance training promotes exercise-induced cardiac remodeling and atrial fibrillation (AF), the most common arrhythmia among middle-aged endurance athletes. However, there is a lack of data on the impact of training sessions on the recurrence of AF episodes and current guidelines do not provide specific training recommendations for athletes diagnosed with AF. Both sympathetic stimulation during exercise and parasympathetic activity after exercise are possible mechanisms for recurrent episodes of AF.

Purpose: To assess the temporal relationship of training sessions with recurrent AF episodes among endurance athletes with paroxysmal AF.

Methods: The Effects of Detraining in Endurance Athletes with Atrial Fibrillation Trial is an international multicenter randomized controlled trial that includes athletes engaged in regular endurance sports ≥ five hours per week, diagnosed with paroxysmal AF. AF episodes lasting ≥ 30 seconds were registered using wireless insertable cardiac monitors (ICM) and reviewed by an experienced cardiologist. Training sessions were registered using sports watches. We analyzed AF episodes and training data for the period from ICM implantation to randomization, and report event rates and rate ratios with 95% confidence intervals (CIs) for recurrent AF episodes during or within 3 hours after training sessions, compared to >3 hours after training.

Results: Eighteen athletes (1 female, 17 male) with a median age of 55 years (range 44-74) were included. The combined duration of monitoring was 845 days/20,280 hours (median 38.5, range 12-97 days). The athletes performed a total of 619 hours of training during 559 training sessions. In total, 66 AF episodes (median 1, range 0-15) were registered, of which 37 (56%) occurred within 24 hours after the start of a training session. Ten AF episodes (15%) occurred during a training session, 12 (18%) occurred within 3 hours after a training session and 44 (67%) occurred >3 hours after training. Figure 1 shows recurrent AF episodes during training (red bars) and within 24 hours from the start of a training session (blue bars) and smoothed density estimates. The event rate per 24 hours was 0.39 for AF during training, 0.17 the first 3 hours after training and 0.06 >3 hours after training. As compared to >3 hours after training, the rate ratio was 6.6 (95% CI 3.8 to 11.6) for recurrent AF episodes during or within 3 hours after training sessions, compared to >3 hours after training.

Conclusion: Among middle-aged endurance athletes with paroxysmal AF, the rate of recurrent AF episodes was highest during and within 3 hours after training sessions. The impact of training and the pathophysiology of exercise-induced AF should be investigated further, with the aim of developing preventive strategies specific to athletic populations.

Figure 1