## Symptoms and atrial fibrillation burden measured by an insertable cardiac monitor in endurance athletes

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**Background:** Atrial fibrillation (AF) is the most common cardiac arrhythmia in athletes, but knowledge regarding AF burden, symptoms and quality of life (QoL) in endurance athletes with AF is limited.

**Purpose:** To study AF burden by continuous monitoring using insertable cardiac monitor (ICM), AF symptoms and QoL in endurance athletes with paroxysmal AF.

**Methods:** In endurance athletes diagnosed with paroxysmal AF who reported  $\geq 2$  episodes of AF, of which  $\geq 1$  during the past six months, we continuously monitored AF using ICM. Episodes recognized as AF by ICM were validated by a cardiologist. We defined AF burden as the cumulative duration of AF episodes lasting  $\geq 30$  secs divided by the total duration of monitoring. AF symptoms were assessed using the 21-item Atrial Fibrillation Effect on QualiTy-of-Life Questionnaire (AFEQT). AFEQT produces a summary score and three subscale scores (symptoms, daily activities, treatment concerns), ranging from 0 (complete AF-related disability) to 100 (no AF-related disability). We defined any score <80 as clinically relevant AF symptoms. We classified athletes according to the modified European Heart Rhythm Association (mEHRA) classification. Sport participation was obtained by questionnaires. Height and weight were measured and physical fitness was examined during cardiopulmonary exercise testing.

**Results:** A total of 38 athletes (3 female, 8%) were included. Table 1 shows their characteristics. Eight of the athletes (21%) had recurrent AF after previous AF ablation therapy. ICM recordings were available in 30 athletes who were monitored for an average of  $53\pm21$  days (mean $\pm$ SD). Eighteen athletes (60%) had  $\geq 1$  AF episode, the median number of AF episodes was 2 (interquartile range 8.75), and the mean AF burden was  $1.4\pm2.5\%$ . The mean AFEQT summary score was  $84\pm12$  and 11 athletes (29%) had an AFEQT summary score <80. The mean AFEQT symptom subscale score was  $78\pm18$ ). While 21 athletes (55%) had a symptom subscale score <80, indicating clinically relevant symptomatic AF, 9 (24%) scored <60, indicating more severely symptomatic AF. Figure 1 shows ICM-detected AF burden across categories of mEHRA classes and categories of the AFEQT summary score. The AF burden corresponded to both AFEQT scores and mEHRA categories, with a higher AF burden associated with more symptomatic AF (Figure 1). AF burden was numerically lower in athletes with recurrent AF after previous AF ablation therapy, compared to athletes previously not treated with AF ablation (0.6% vs. 1.7%, p= 0.66), but previously ablated athletes were more symptomatic (AFEQT symptom subscale score 68 vs. 80, p= 0.04).

**Conclusions:** Despite a relatively low AF burden during continuous monitoring with ICM, a majority of the athletes had clinically relevant symptomatic AF. Athletes with recurrent AF after previous ablation therapy had a numerically lower AF burden, but were more symptomatic compared to athletes with paroxysmal AF not previously treated with AF ablation.

Table 1. Base	line chara	cteristics of	of the	studied	endurance	athletes
with paroxys	mal atrial	fibrillation	<b>1</b> .			

Mean (SD)	
58 (10)	
181 (8)	
24.3 (2.4)	
6.9 (2.2)	
44.5 (7.7)	
146 (22)	
n (%)	
3 (8)	
13 (34)	
22 (58)	
0 (0)	
0 (0)	
16 (42)	
10 (26)	
9 (24)	
3 (8)	

<sup>1</sup> During the past six months (self-reports), <sup>2</sup> maximal oxygen

consumption, <sup>3</sup> Predicted values based on age, sex, body height and weight (Wasserman/Hansen formula), <sup>4</sup> Modified European Heart Rhythm Association classification.

Figure 1. Atrial fibrillation (AF) burden (% of total time monitored and number of AF episodes) during continuous monitoring by insertable cardiac monitor across categories of Atrial Fibrillation Effect on QualiTy-of-Life Questionnaire (AFEQT) summary scores (an AFEQT score of <80 was defined as clinically relevant) and modified European Heart Rhythm Association classification (mEHRA) where 1= no symptoms, 2a = mild symptoms, 2b = moderate symptoms. No athletes wer classified as mEHRA 3 (severe symptoms) or 4 (disabling symptoms).

