177. Physical exercise interferes with episodic LH release


Approximately one third of the women participating in endurance sports suffer from oligo-amenorrhea [1]. Intensity of training, reduced body fat with decreased steroid conversion and altered hypothalamic function have been described as causative. In order to elucidate the influence of short-term exhaustive and prolonged exercise on LH-episodes we examined six healthy young volunteers with regular cycles. After a basal observation over 3 hrs on day 8 of the cycle, 25 µg LHRH was injected, followed by a 1 to 3 watt/kg body weight increasing exhaustive (EE) exercise on the bicycle ergometer until anaerobe metabolism. On the following morning at the same time the ergometer exercise at 30% of the EE was expanded over three hours, followed by a 25 µg LHRH bolus injection. Blood was drawn every 15 min, and 25 and 45 min after LHRH to determine LH, FSH, Prl and estradiol. The LH episode was defined as a rise of at least 30%, followed by at least two descending values.

Results: Untrained women had a normal frequency of 1 pulse/1.5 hrs and a normal LHRH-induced LH rise (<300 ng/ml). During prolonged 3-hour exercise with 1 watt/kg the episodes were completely abolished, the LHRH-induced increment was impaired, no major change was seen in Prl and FSH. Trained women with weekly exercise of 2–5 hrs showed different patterns: low basal LH, few small LH pulses (1 pulse/3 hrs, LH amplitude 18 ng/ml), impaired LH response (72–100 ng/ml) to LHRH, and a decrease of LH through exhaustive exercise. During prolonged exercise LH pulses increased in amplitude (24–45 ng/ml) and frequency (1 pulse/1.0 hrs). The LHRH-induced LH increment was enhanced or even exaggerated (122–670 ng/ml). Sport performance may lead to a complete elimination of LH episodes and reduction of LHRH-induced response in untrained subjects, while entrainment apparently leads to a “conditioning” of the hypothalamus [2] with frequent high LH pulses.

References