TACSM Abstract

Obesity Contributes to an Attenuated Spontaneous Baroreflex Sensitivity in UCD-Type 2 Diabetic Rats

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ABSTRACT

Previous studies suggest impaired baroreflex function in individuals with type 2 diabetes (T2D), which is critically important since it leads to an increased risk for adverse cardiovascular events. Currently, the underlying mechanisms remain poorly understood. The baroreflex, essential for maintaining blood pressure homeostasis, can also be influenced by several risk factors, one of which is obesity. Obesity has been shown to markedly decrease baroreflex sensitivity (BRS) in non-diabetic individuals, and given that the majority of T2D patients are obese, it is likely that impairment in baroreflex function in T2D is mainly driven by obesity. **PURPOSE**: To investigate the effects of obesity on baroreflex function in T2D rats at different phases of the disease. We hypothesized that BRS would be attenuated in T2D rats, and this would be associated with increased adiposity. **METHODS**: Experiments were performed on male University of California Davis (UCD)-T2D rats assigned to four experimental groups (n=6 in each group): prediabetic (PD), diabetes-onset (DO), 4 weeks after onset [recent-onset (RO)], and 12 weeks after onset [late-onset (LO)]. Age-matched healthy Sprague-Dawley rats were assigned to the same experimental groups as controls (n=6 in each). Rats were anesthetized and blood pressure was directly measured for 5 min. Hemodynamic variables were obtained on a beat-to-beat basis and spontaneous BRS was assessed using the sequence technique. Dual-energy X-ray absorptiometry (DEXA) was used to assess body composition and visceral fat was determined by identifying an abdominal region of interest. Data are presented as mean ± SD. **RESULTS**: Spontaneous BRS was significantly lower in T2D compared to control rats at DO (3.7 ± 3.2 ms/mmHg vs 16.1 ± 8.4 ms/mmHg; P=0.01). However, this difference was abolished by LO (13.4 ± 8.1 ms/mmHg vs 9.2 ± 6.0 ms/mmHg; P=0.16). T2D rats had the highest level of adiposity during the RO phase but it significantly decreased by LO (PD: 136 ± 14 g; DO: 175 ± 24 g; RO: 207 ± 44 g; LO: 163 ± 45 g; P=0.03). In addition, T2D rats had greater visceral fat compared to control rats regardless of the disease phase (P<0.01). **CONCLUSION**: These findings suggest that obesity may contribute to an attenuated spontaneous BRS in T2D rats and suggests a link between metabolic and autonomic dysfunction in T2D.