

## CARDIAC AUTONOMIC MODULATION ASSESMENT IN WOMEN WITH URINARY INCONTINENCE

### Hypothesis / aims of study

The urgency urinary incontinence (UUI) is the involuntary loss of urine associated with miccional urgency [1]. It is believed that a dysfunction of the autonomic nervous system (ANS), responsible for bladder control, may impair bladder function and the activity of sphincter, causing IUU [2]. Thus, our aim was to compare the cardiac autonomic modulation by means of heart rate variability (HRV) in response to postural change in women with and without urinary incontinence (IU).

### Study design, materials and methods

A cross-sectional study was conducted at Federal University of Sao Carlos and approved by the research ethics committee and all participants signed an informed consent term. Twenty three women were subdivided, 13 in control group (CG) and 10 in a group presenting urinary incontinence complaint (UIG). All volunteers underwent functional evaluation of the pelvic floor muscles (PFM) by digital palpation and ANS evaluation by means of analysis of HRV. During the functional evaluation, all participants were in supine position and the physiotherapist introduced a finger into the their's vagina and requested the contraction of PFM with maximum strength (Power). During the SNA evaluation, the heart rate monitor (Polar<sup>®</sup> RS800CX) was attached to the volunteer's chest with an elastic strap. They were instructed to perform active postural change from supine to standing position, remaining in rest for 10 minutes in each position. The heart rate and the R-R interval were collected. The target sample size was calculated considering a 5% type I error, a 2-sided test, and an 80% power to detect a significant difference in the ratio between the low and high frequency bands from spectral analysis of HRV. The statistical analysis was performed by SigmaPlot 11.0 software. We used the Shapiro-Wilk test to assess the normality and applied Student T-test and Mann-Whitney when appropriate. The level of significance considered was 5%.

### Results

There were no difference between groups in antropometric and demografic data, as well as, in functional evaluation of PFM data (age = 55±11 and 49 ± 9 years; body mass index = 23 ± 4 and 24 ± 3 kg/m<sup>2</sup>; Power = 2,8 ± 1,0 and 2,5 ± 0,8, respectively for CG and UIG). The CG presented normal response to postural change for all variables studied as shown in the table 1.

Table 1. Values obtained in the cardiac autonomic modulation evaluation

	CG (n=13)		UIG (n=10)	
	Supine	Standing	Supine	Standing
<b>HRM</b>	67.2 ± 7.2	80.6 ± 7.2 <sup>†</sup>	66.2±12.2	77.1±13.5 <sup>†</sup>
<b>LF</b>	51.4 ± 22.7	67.0 ± 18.1 <sup>†</sup>	50.4± 20.7	65.7±17.2 <sup>†</sup>
<b>HF</b>	46.6 ± 22.7	33.0 ± 18.1 <sup>†</sup>	49.6± 20.7	34.3±17.2 <sup>†</sup>
<b>LF/HF</b>	1.7 ± 1.7	3.0 ± 2.3 <sup>†</sup>	1.3 ± 0.9	2.3 ± 2.0
<b>RMSSD</b>	25.5 ± 10.8	15.0 ± 6.3 <sup>†</sup>	23.5 ± 11.9	16.0 ± 8.1
<b>SD1</b>	18.2 ± 7.6	10.7 ± 4.5 <sup>†</sup>	16.7 ± 8.4	12.7 ± 5.7
<b>SD2</b>	49.8 ± 25.7	35.9 ± 10.7	37.3± 21.8	30.7±13.1

Data expressed as mean ± SD. CG= control group; UIG= urinary incontinence group; HRM = heart rate mean; LF= low frequency band; HF= hight frequency band; LF/HF= ratio between the low and high band frequency; RMSSD= root-mean square of differences between normal RR intervals; SD1= Index of instantaneous recording of HRV; SD2= long-term records of HRV; <sup>†</sup>comparing the values: supine and standing between the groups (p<0,05);

### Interpretation of results

In apparently healthy individuals presenting integrate ANS, the overall variability of HRV and vagal modulation are reduced, as well as, the sympathovagal balance is increased in response to active postural change [3]. In the present study, we observed that only CG responded significantly as expected. The table 1 shows that only in CG the indexes SD1 and RMSSD presented reduced values after active postural change, as well as, the LF/HF ratio increased in standing position compared to supine.

### Concluding message

Thus, it is possible to conclude that women with urinary complaints presents lower autonomic modulation in response to postural change when compared to those without complaints. However, more studies are necessary to understand the level of the ANS dysfunction in that population.

### References

1. Haylen BP, Ridder D, Freema RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN. An international urogynecological association (IUGA)/ international continence society (ICS) joint report on the terminology for female pelvic floor dysfunction. 2009:1-83
2. Thor KB, Donatucci C. Central nervous system control of the lower urinary tract: new pharmacological approaches to stress urinary incontinence in women. J Urol 2004;172:27-33.
3. Malik M, Camm AJ. Heart rate variability. Clin Cardiol. 1990;13(8):570-6.

### Disclosures

**Funding:** FAPESP process number: 2012/04363-8 and 2011/20046-0 **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Research ethics committee of the Centro Universitário Central Paulista (Unicep) number: 099/2011 **Helsinki:** Yes **Informed Consent:** Yes