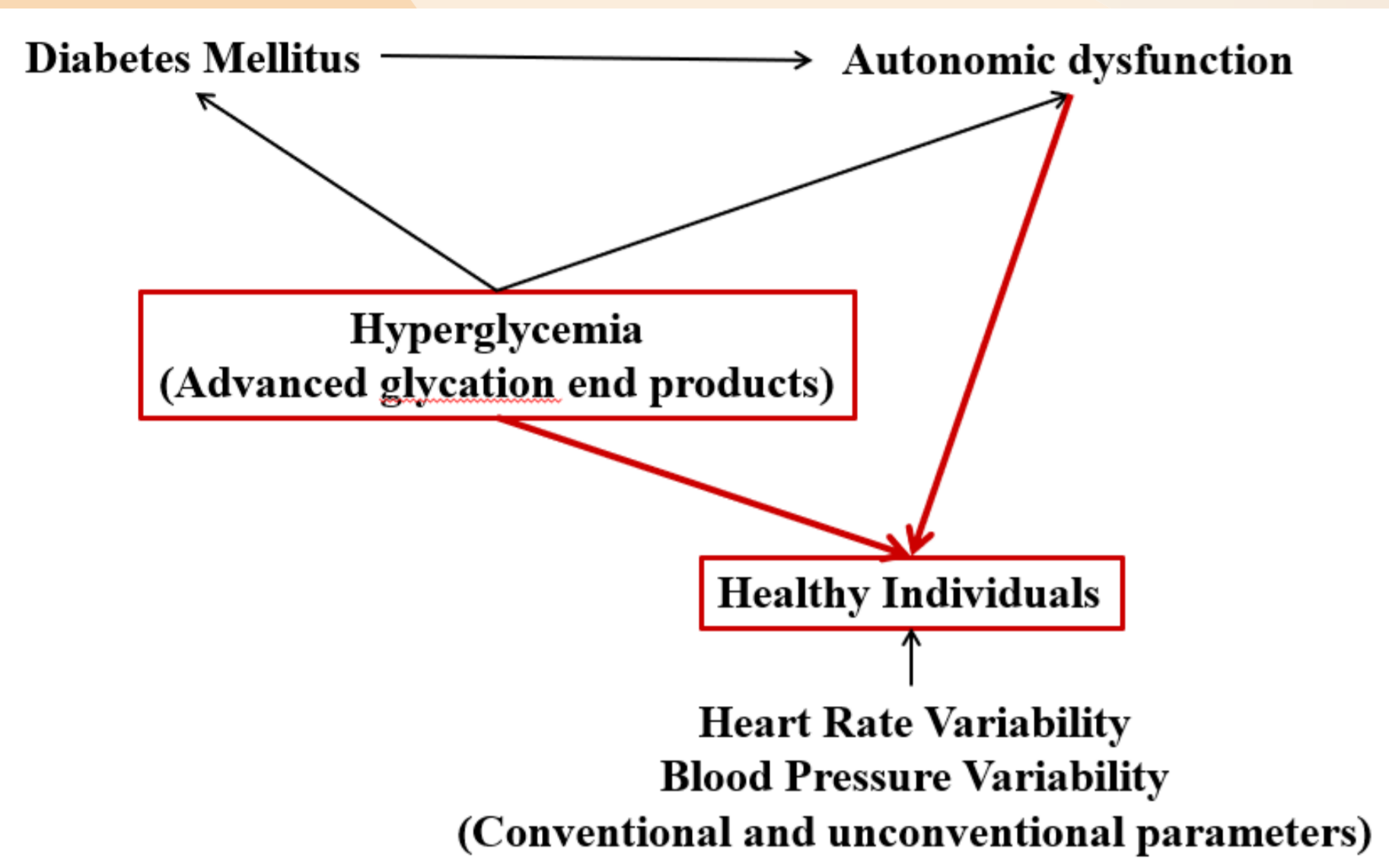


196 - Autonomic function assessed by blood-pressure-variability is a noble biomarker during hyperglycemia in late adolescents

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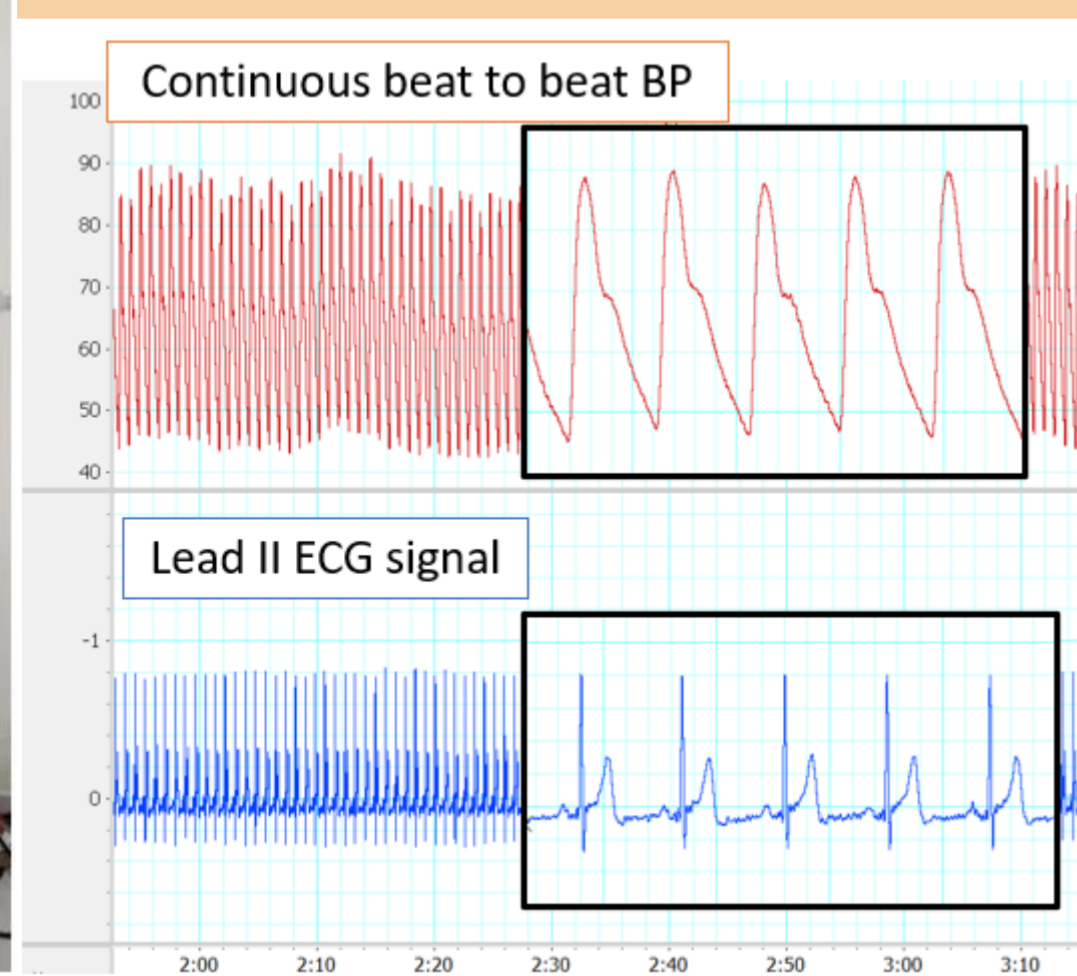
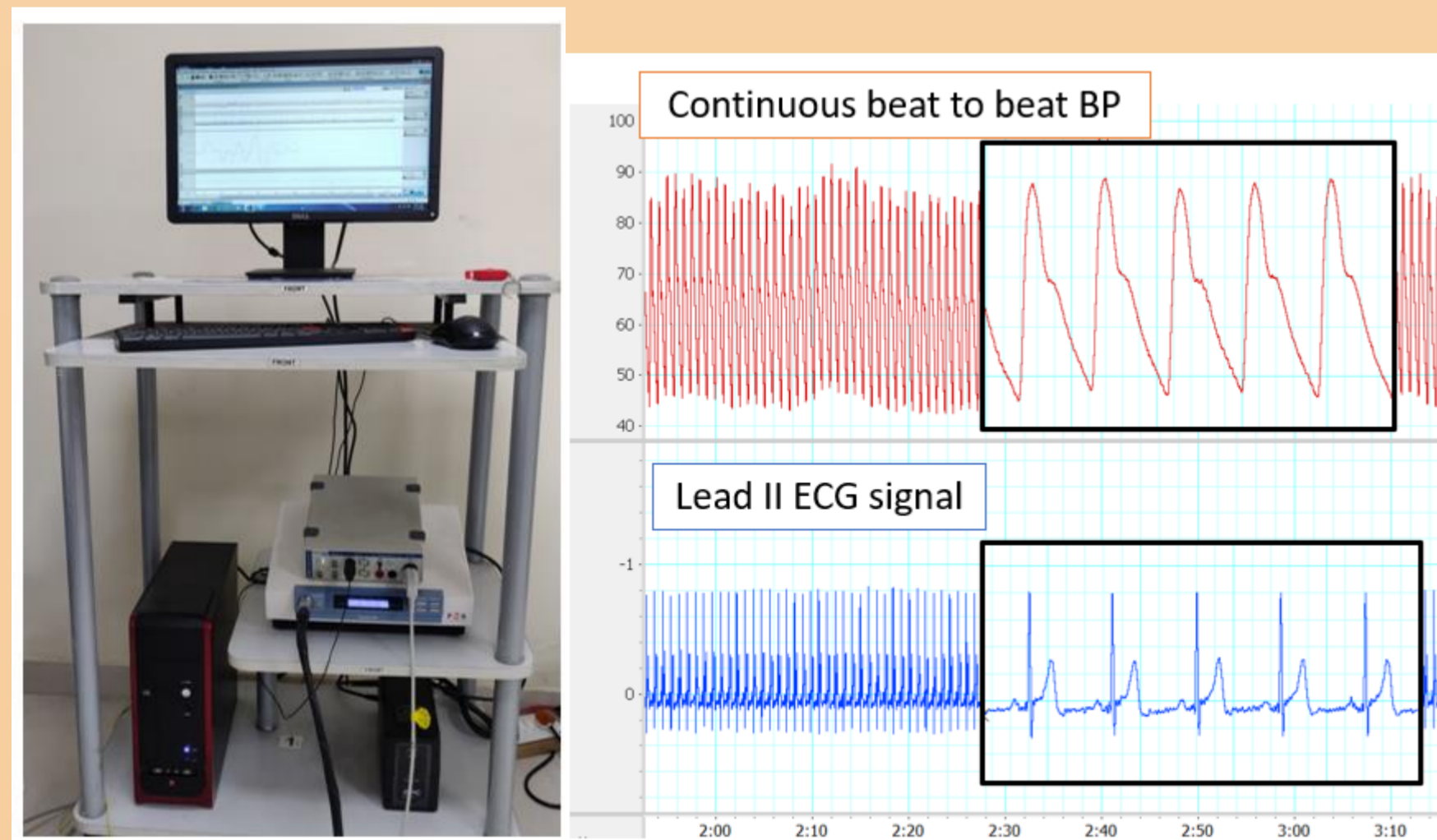
Introduction



Objectives

Present study was planned to explore the effect of acute relative hyperglycemia on Heart Rate Variability (HRV) and BPV, and study their mutual associations in young healthy adolescents.

Signal Acquisition



Materials and Methods

Beat-to-beat blood pressure and electrocardiogram were recorded for the assessment of heart rate variability (HRV) and BPV in forty-two young, healthy subjects during fasting and hyperglycemic state. Correlations among analyzed parameters of cardiovascular autonomic variabilities were explored.



Results

HRV Parameters	Fasting	PP	P value
SDNN	56.80 (43.28-76.85)	56.94 ± 18.58	NS
SD of delta NN	47.42 (39.11-83.19)	46.80 (35.33-67.37)	NS
Ratio	1.00 (0.89-1.24)	1.13 ± 0.25	NS
RMSSD	47.35 (39.06-83.08)	46.74 (35.29-67.29)	NS
NN50	34.40 ± 20.28	29.68 ± 19.12	NS
Total Power	2973 (1783-5997)	2931 (1655-4542)	NS
LF	732.4 (390.6-1563)	734.2 (363.6-1468)	NS
LF(nu)	41.85 ± 17.17	40.83 ± 16.52	NS
HF	898.6 (572.2-2043)	810.8 (449.0-1663)	NS
HF(nu)	48.44 ± 17.55	48.33 ± 16.16	NS
LF/HF Ratio	0.81 (0.50-1.86)	0.91 (0.48-1.40)	NS

BPV Parameters	Fasting	1 hr of Glucose Load	P value
Systolic BPV_CV	3.97 ± 1.18	3.48 ± 1.53	0.1750
Systolic BPV_VAR	24.18 ± 13.88	11.49 (6.02 – 28.29)	0.0430*
Systolic BPV_SDNN	4.71 ± 1.44	4.02 ± 1.84	0.0035*
Systolic BPV_SENN	0.25 ± 0.08	0.18 (0.13 – 0.27)	0.0014*
Systolic BPV_SSDS	1.82 ± 0.50	1.79 ± 0.62	0.6970
Systolic BPV_RMSSD	1.82 ± 0.50	1.79 ± 0.62	0.6970
Systolic BPV_LF	36.94 (19.29 – 67.51)	42.67 ± 34.90	0.1650
Systolic BPV_HF	9.48 (6.57 – 16.89)	10.92 (6.32 – 18.14)	0.4020
Systolic BPV_TP	233.6 ± 172.5	133.6 (46.33 – 301.9)	0.2110
Systolic BPV_LF (nu)	71.88 ± 13.35	64.67 ± 16.10	0.0088*
Systolic BPV_HF (nu)	21.48 ± 13.04	28.11 ± 15.81	0.0080*
Mean BPV_CV	2.92 ± 0.70	2.66 (2.17 – 3.24)	0.1683
Mean BPV_VAR	6.73 ± 2.84	4.76 (3.04 – 7.62)	0.0400*
Mean BPV_SDNN	2.54 ± 0.57	2.36 ± 0.87	0.1921
Mean BPV_SENN	0.14 ± 0.03	0.12 (0.09 – 0.14)	0.0154*
Mean BPV_SSDS	1.03 ± 0.29	0.89 (0.76 – 1.06)	0.1709
Mean BPV_RMSSD	1.03 ± 0.29	0.88 (0.76 – 1.06)	0.1766
Mean BPV_LF	20.96 ± 11.49	18.29 (9.44 – 25.98)	0.3734
Mean BPV_HF	2.73 ± 1.91	2.15 (1.73 – 3.56)	0.9643
Mean BPV_TP	60.54 ± 26.14	41.22 (27.62 – 69.99)	0.0550
Mean BPV_LF (nu)	189.1 (153.3 – 233.6)	189.5 ± 63.26	0.7440
Mean BPV_HF (nu)	26.12 ± 11.65	23.61 ± 10.50	0.1295
Diastolic BPV_CV	3.11 ± 0.82	2.7 (2.15 – 3.50)	0.1510
Diastolic BPV_VAR	5.41 ± 2.19	3.69 (2.46 – 6.53)	0.0615
Diastolic BPV_SDNN	2.26 ± 0.48	2.11 ± 0.73	0.1756
Diastolic BPV_SENN	0.12 ± 0.028	0.1 (0.08 – 0.14)	0.0651
Diastolic BPV_SSDS	1.08 (0.93 – 1.68)	1.06 ± 0.33	0.0256*
Diastolic BPV_RMSSD	1.08 (0.93 – 1.68)	1.05 ± 0.33	0.0231*
Diastolic BPV_LF	17.99 ± 10.31	15.8 (6.89 – 21.41)	0.3207
Diastolic BPV_HF	3.23 (2.22 – 5.57)	3.39 ± 2.22	0.0811
Diastolic BPV_TP	49.28 ± 20.55	34.92 (21.54 – 63.3)	0.0952
Diastolic BPV_LF (nu)	148.2 ± 62.06	151.6 ± 39.59	0.7165
Diastolic BPV_HF (nu)	31.93 (23.08 – 50.36)	30.31 ± 14.51	0.1656

Conclusion

Present study concludes that the BPV is affected significantly during acute hyperglycemia in healthy late adolescents, however, the HRV does not show such changes. Also, many of the parameters of HRV and BPV show significant correlations.

References

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HRV, Heart Rate Variability; BPV, Blood Pressure Variability. SDNN, standard deviation of RR interval or square root of the variance; SENN, standard error of RR interval; SSDS, standard deviation of the differences between adjacent RR interval; RMSSD, square root of the mean of the sum of the squares of differences between adjacent RR interval; NN50, number of those adjacent RR intervals which differs by more than 50ms; LF, absolute power in low frequency band; nu, normalized unit; HF, absolute power in high frequency band; TP, total power; LF/HF, ratio of LF-to-HF power. CV, Coefficient of variance; VAR, Variance; SDNN, Standard deviation of beat-to-beat BP or square root of the variance; SENN, Standard error of beat-to-beat BP; SSDS, Standard deviation of the differences between adjacent beat-to-beat BP; RMSSD, Square root of the mean of the sum of the squares of differences between adjacent beat-to-beat BP.