

# Autonomic Dysregulation Remotely after Kawasaki Disease Is Associated with Onset Myocardial NT-proBNP.

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## INTRODUCTION

- Following Kawasaki disease (KD), chronotropic and barotropic response to exercise are reported, irrespective of whether or not a CA aneurysm occurred.
- Myocardial autonomic cell ganglia inflammation coupled with QTc prolongation are documented in the animal model of KD.

## OBJECTIVES

To verify whether autonomic dysregulation of the nervous system is present in children following KD.

## METHODS

KD patients without coronary aneurysms and age-matched controls underwent 24h Holter recording.

Total recording, day-time and sleep-time recording segments were computed with Kubios HRV-premium in temporal, frequency and non-linear domain.

Results were analyzed according to serum NT-proBNP obtained at onset of KD, an indicator of myocardial involvement during the inflammatory phase.  
*NT-proBNP serum levels were adjusted according to diagnostic age.*

HRV parameters recorded for the current study were correlated to onset serum NT-proBNP Z-score.

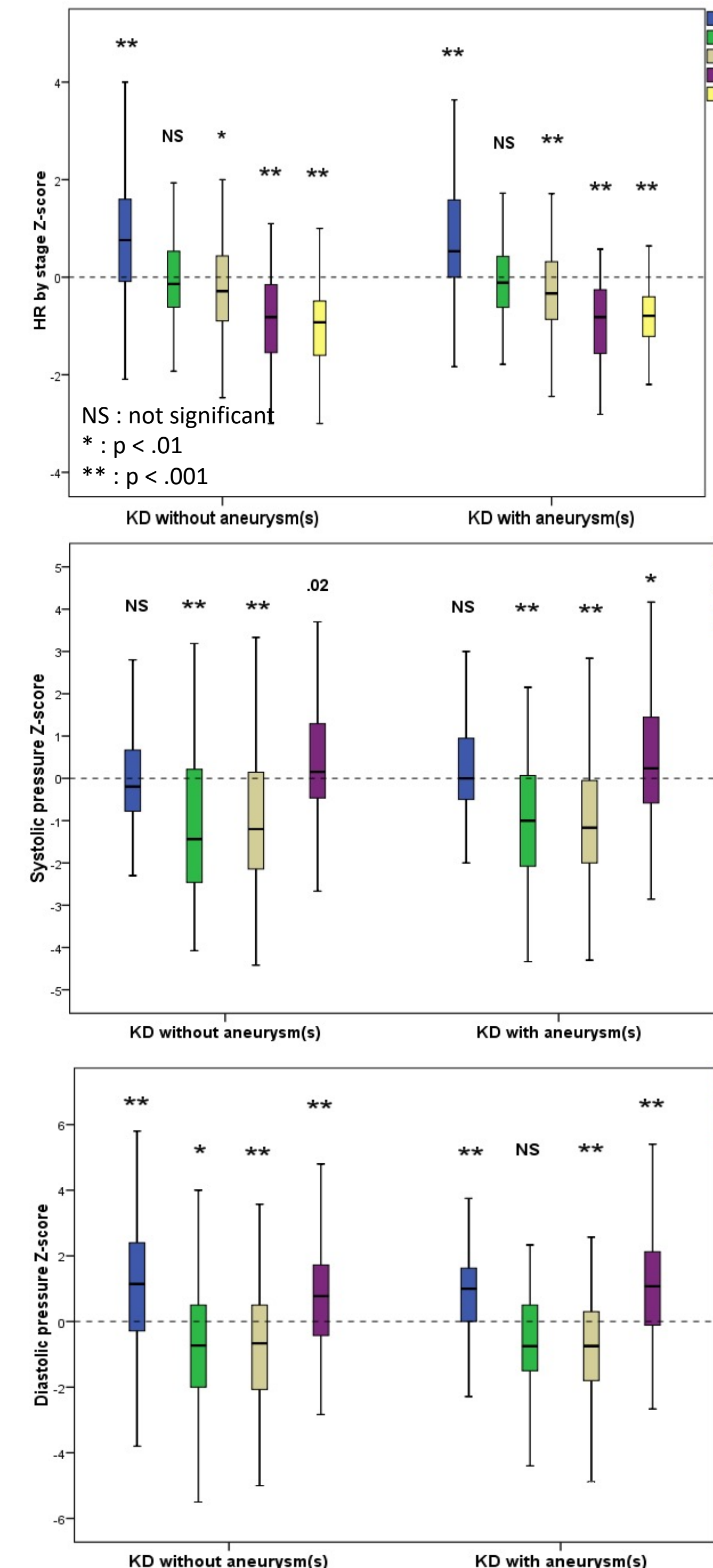
## RESULTS

- 19 KD patients diagnosed at 6.4±2.7 yo were investigated at 11±2 yo.
- Age-adjusted NT-proBNP (Z) at diagnosis was 3.4±2.1
- Patients were compared to age matched controls
  - The maximum heart rate was lower in KD (144±17 bpm) compared to controls (156±17 bpm); p<0.05
- Association between onset NT-proBNP of KD subjects and HR analysis:
  - There was a statistically significant correlation between Z-score and:
    - mean heart rate (Slope S=-2.5; Pearson Coefficient R=-0.54)
    - mean RR (S=25.6; R=+0.59)
    - Despite unaffected minimum HR (i.e. sleeping RR interval)
  - The parasympathetic tonus indicators correlated positively with onset NT-proBNP Z-score:
    - HF (S=+1.44; R=+0.51), SD1 (S=+4.56; R=+0.59); SDANN (S=10.45; R=+0.54), RMSSD (S=+6.45; R=+0.59)
  - whereas the orthosympathetic tonus indicators was inversely proportional to NT-proBNP Z-score:
    - LF (S=-1.42; R=-0.50)
  - There was a resulting imbalance between the parasympathetic and the orthosympathetic systems with the highest onset NT-proBNP
    - LF/HF (S=-0.05; R=-0.52)

## CONCLUSIONS

- Dominant parasympathetic tonus is observed late after KD during daily activity. There is a correlation with documented myocardial release of NT-proBNP at onset of the disease.
- The persistent nervous system imbalance may explain previously described lower blood pressure and lower chronotropic response to exercise in KD compared to healthy children.
- The findings being independent of coronary aneurysmal complications exclude an incompetent ischemic myocardium and favor a central nervous system involvement, including peripheral cardiac innervation injury.

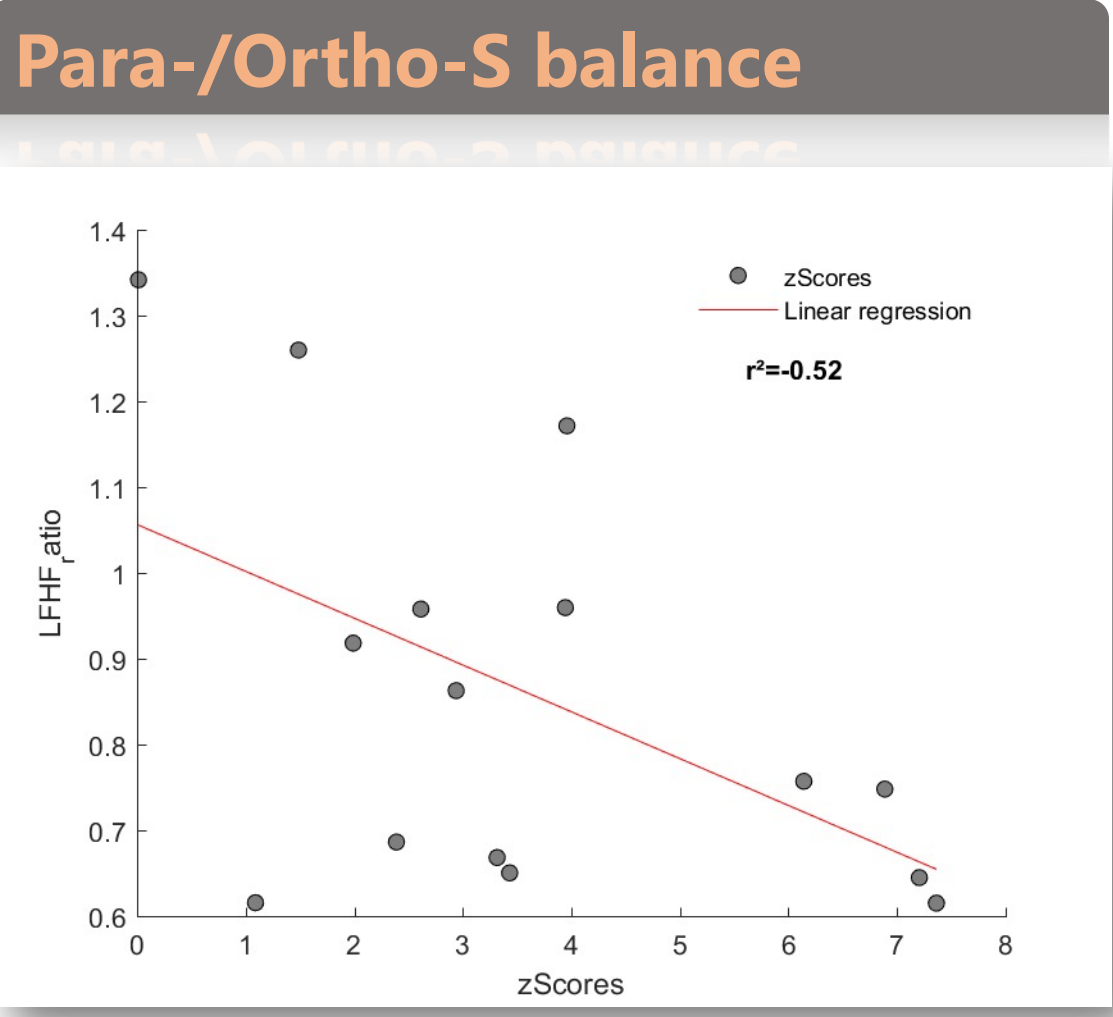
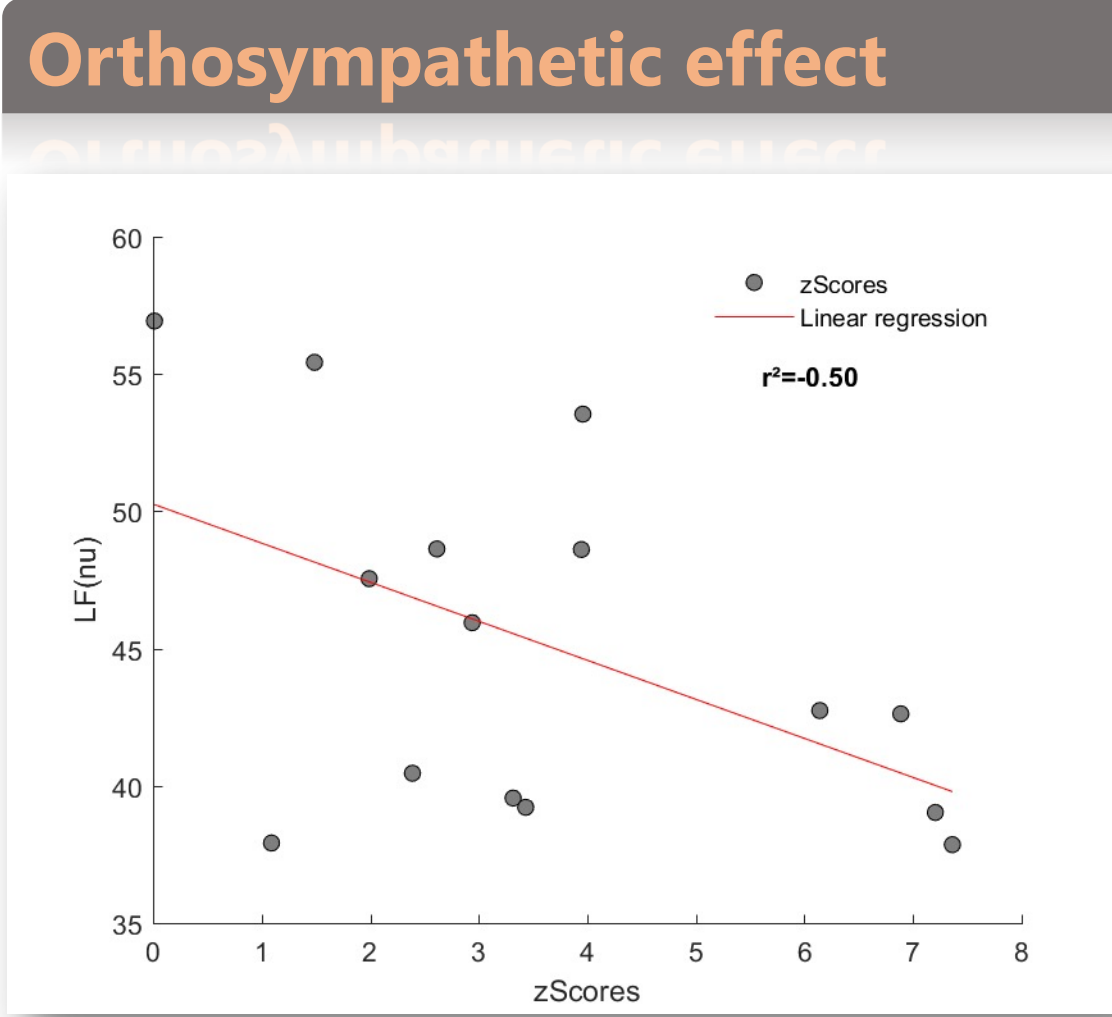
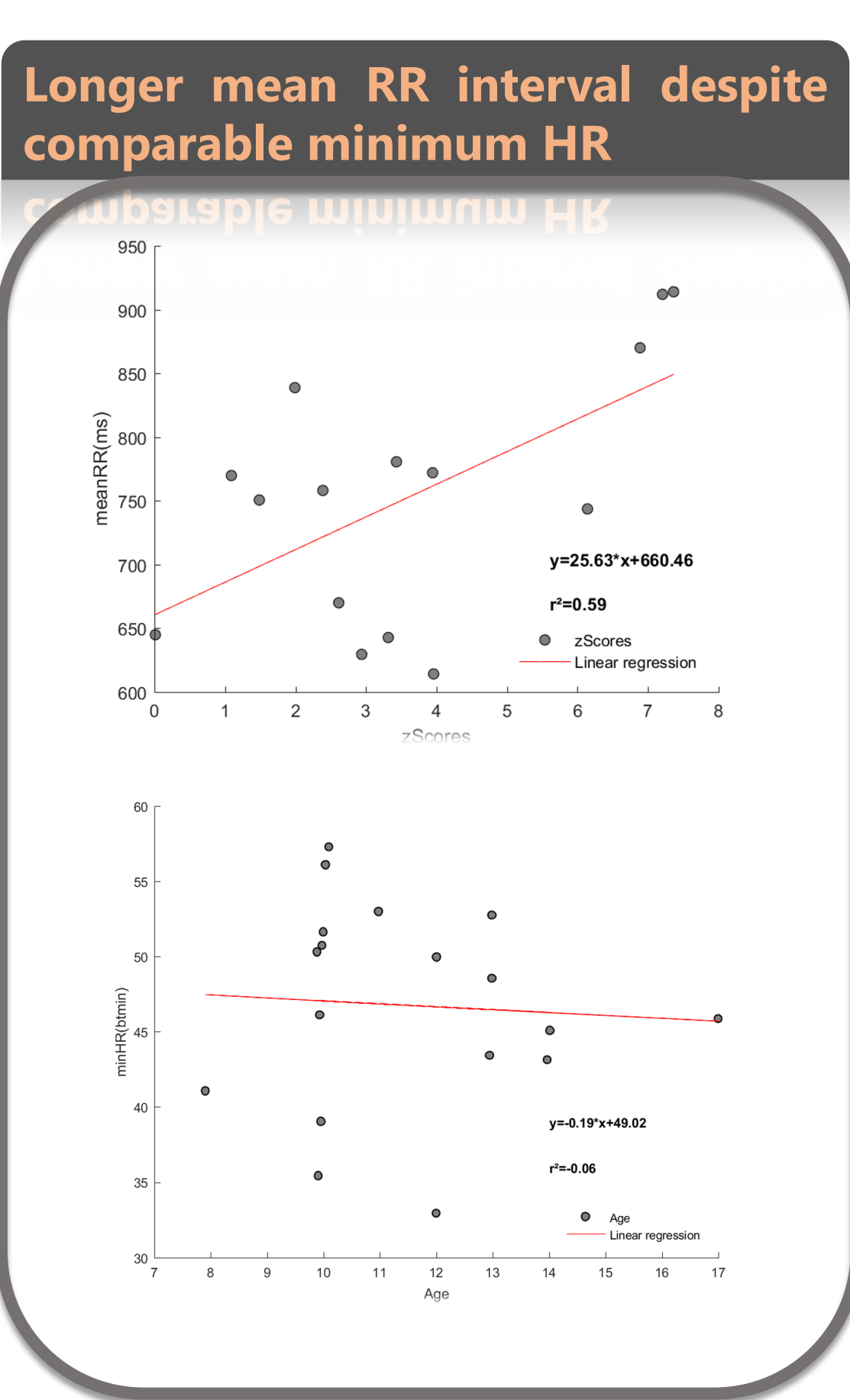
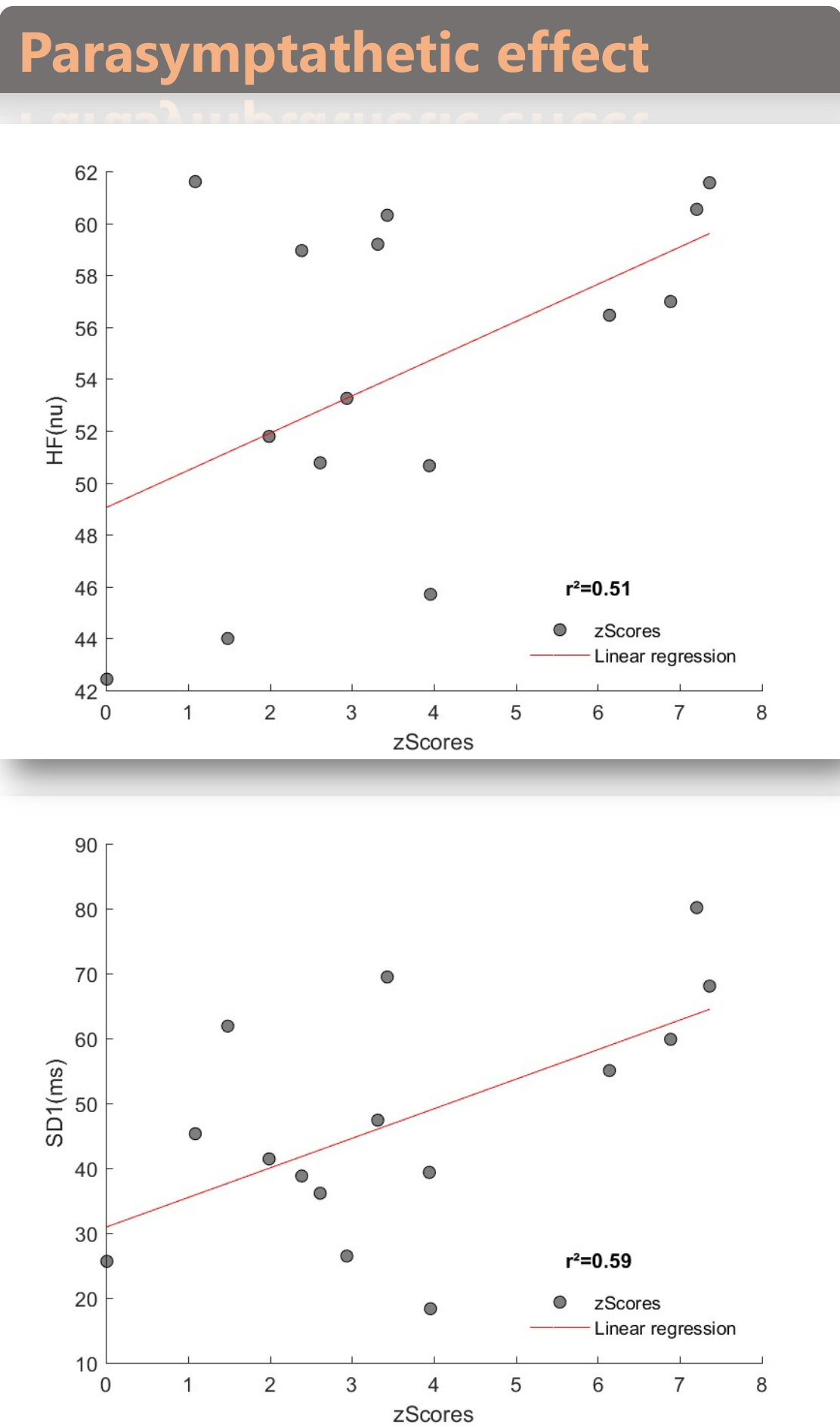
## PREVIOUS OBSERVATIONS



Compared to healthy controls, Hear Rate response to exercise is slower in KD, irrespective of the CA aneurysm status

Similarly, the Systolic and the Diastolic BP response to exercise is affected (lower BP) in KD at peak exercise and at onset of recovery from exercise, irrespective of the CA aneurysm status

[HR and BP Z-scores are derived from pediatric healthy subjects' response to exercise]



## ACKNOWLEDGMENTS

No conflict of interest to declare



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