Determinant of increased type B natriuretic peptide (BNP) in acute phase of Kawasaki disease

Department of Pediatrics and Child Health [1] and Cognitive and Molecular Research Institute of brain disease[2], Kurume University School of Medicine

Suda K, MD [1], Kishimoto S, MD [1], Kudo Y, MD [1], Nishino H, MD [1], Takahashi Y, PhD [2], Okamura H, PhD [2], Teramachi Y, MD [1], Yoshimoto H, MD, Iemura M, MD [1], Matsuishi M, MD [1)2)].

BACKGROUND

Patients with acute phase of Kawasaki disease (KD) frequently show increased type B natriuretic peptide (BNP).
We have reported that most of patients with KD showed normal range of left ventricular function compared with age-matched normal control and the level of interleukin-6 (IL-6) significantly positively correlates with BNP
(Kishimoto S, Suda K et al. Pediatr Int. 2011;53:736-41).
Critique of this study included comparison of cardiac function with normal control and lack of information concerning other inflammatory cytokines.

PURPOSE

The aim of this study was to compare the cardiac function in patient with KD with that in febrile controls and to determine possible inflammatory cytokines associated with this increased BNP.

SUBJECTS and METHODS

Subjects

56 patients with acute Kawasaki disease (KD) at presentation
21 febrile controls (FC) in whom BNP were determined at acute phase.

Multi-modal echocardiographic studies to determine functional parameters
- Left ventricular ejection fraction (LVEF,)
- Left ventricular end-diastolic dimension transformed into z-value (zLVDd)
- LV volume indexed to body surface area (LVVI)
- Tei-index
- E/e'

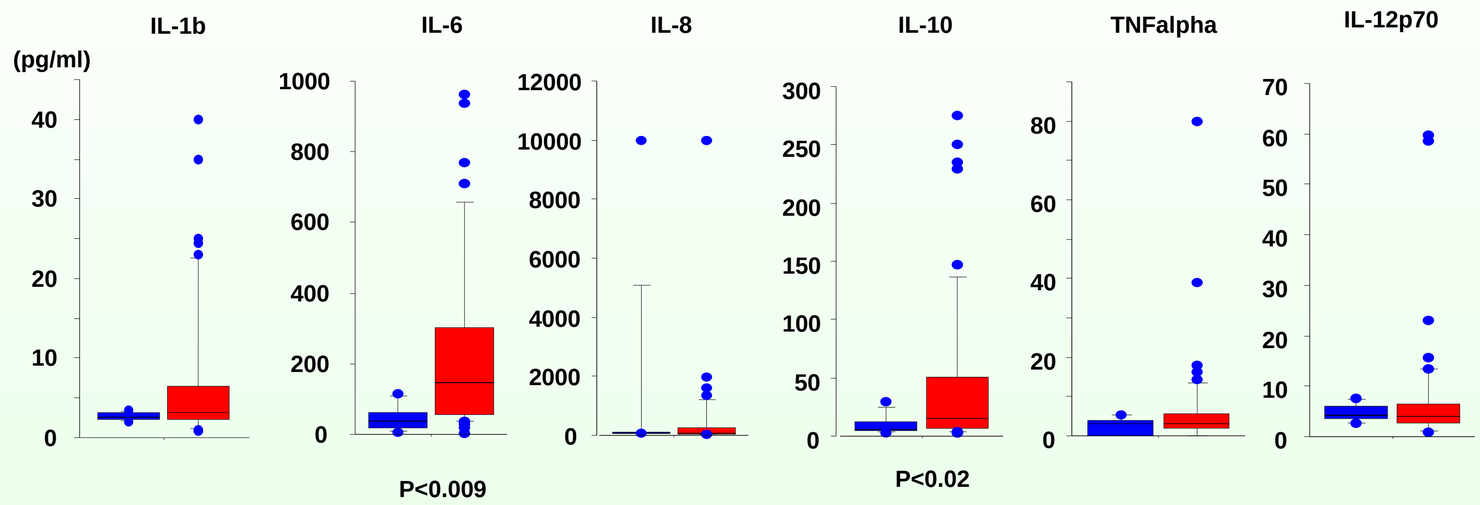
Determination of inflammatory cytokines using Cytometric beads array (BD)
- 47 KD vs. 10 FC
- IL-6
- IL-10
- tumor necrosis factor
- interleukin (IL)-1ß
- IL-8
- IL12p70

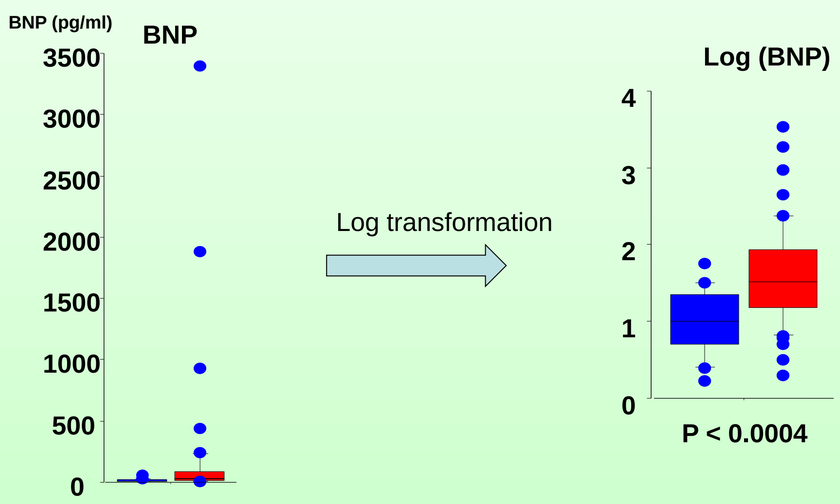
Laboratory and echocardiographic data were compared between KD and FC. Correlations between Log (BNP) and laboratory data as well as echocardiographic parameters were determined.

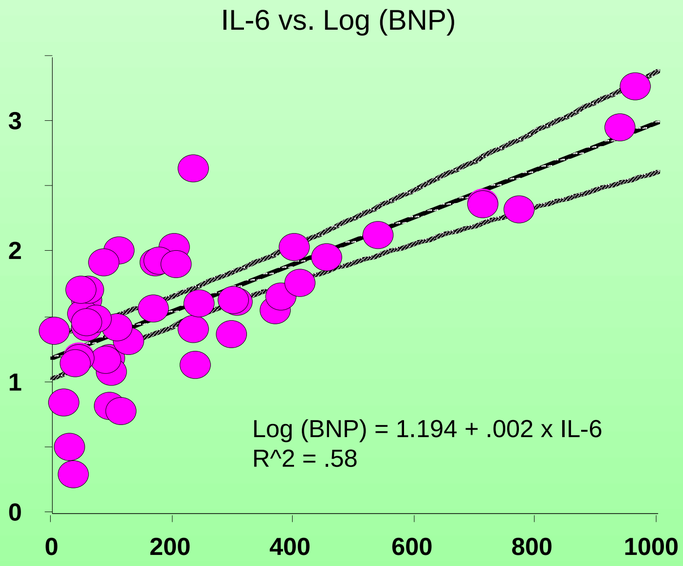
RESULTS

	KD	FC
Age (years)	2.9± 2.0	2.8 ± 1.6
Days of Illness	5.9 ± 2.7	4.6 ± 2.2
Log (BNP)	1.58 ±0.64***	1.01±0.44
WBC (/μL)	13000 ± 5700	14000 ± 7600
CRP (mg/L)	90± 55	59± 64
HR (bpm)	136 ± 22	129 ± 22
zLVDd	0.81 ± 1.00*	0.22 ± 0.74
LVVI (ml/M^2)	58 ± 22*	46±12
Ao peak velocity (cm/s)	111 ± 22	111 ± 17
Doppler Tei index	0.29 ± 0.09	0.26 ± 0.08
E velocity (cm/s)	107 ± 7	113 ± 15
A velocity (cm/s)	65 ± 17**	82 ± 20
E / A	1.7 ± 0.6	1.5 ± 0.5
S' velocity (cm/s)	8.2 ± 1.6	8.9 ± 1.8
e' velocity (cm/s)	11.8 ± 2.6**	13.7 ± 3.1
a' velocity (cm/s)	8.0 ± 2.9*	11.6 ± 9.2
e' / a'	1.7 ± 0.6	1.6± 0.8
IVA (cm/s^2)	225 ± 63***	390 ± 143
E / e'	9.6± 2.3*	8.4± 1.6

*, p<0.05 vs. FC; **, p<0.01 vs. FC; ***, p<0.001 vs. FC







Correlation with Log (BNP)

	r	p
zLVDd	**0.35**	**<0.005**
LVVI	**0.33**	**<0.004**
LVEF	**-0.27**	**<0.002**
WBC	**0.38**	**<0.01**
CRP	**0.51**	**.0003**
IL-6	**0.76**	**<0.0001**
IL-10	**NS**	

Multiple stepwise regression analysis identified IL-6 as the single most significant predictor of Log (BNP) (β=0.77, p<0.0001).

CONCLUSIONS

In patients with acute phase of KD, BNP is frequently increased despite preserved left ventricular function and this increased BNP may be associated with inflammation itself represented by increased IL-6.

DISCLOSURE

This study was partly supported by "Academic Frontier" Project, The Ministry of Education, Culture, Sports, Science, and Technology.