Plasma miR-181a as a Candidate Diagnostic Biomarker for Kawasaki Disease Patients with Coronary Artery lesions

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Abstract

Background: Kawasaki disease (KD) is an acute and systemic vasculitis, and the critical complication in KD patients is coronary artery lesions (CAL). Plasma miR-181a was found dysregulated in a variety of cardiovascular disease. The aim of this study was to define the relationship between the plasma miR-181a levels and CAL in KD. Methods: Plasma miR-181a levels were analyzed by quantitative reverse transcriptase-polymerase chain reaction in 121 patients with KD. Results: We found that plasma miR-181a levels at the acute phase were significantly elevated in KD patients with CAL than those without CAL. Correlation analysis showed that plasma miR-181a levels were positively correlated with the concentrations of CRP (r=0.363, P < 0.05) and NT-proBNP (r=0.389, P < 0.05). Receiver operating characteristic curve analyses showed that plasma miR-181a was of significant prediction value for CAL in KD, the area under receiver operating characteristic curve value for plasma miR-181a in prediction of CAL was 0.747, and the estimated sensitivity and specificity were 75.0% and 68.8%, respectively. Conclusions: Plasma miR-181a is prone to be a candidate biomarker for predicting CAL in KD. Therefore, further investigations are warranted to fully elucidate its role in KD.

Full-text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Tables

Table 1 Demographic, clinical and laboratory characteristics of patients with KD

| Parameter               | Median (Range) /No (%) |
|-------------------------|------------------------|
| Age (months)            | 19.0 (2-144)           |
| Male                    | 78 (64.5%)             |
| Incomplete KD           | 33 (27.3%)             |
| IVIG resistant          | 25 (20.7%)             |
| CAL                     | 26 (21.5%)             |
| Mucosal changes         | 107 (88.4%)            |
| Conjunctival injection  | 101 (83.5%)            |
| Rash                    | 76 (62.8%)             |
| Changes in extremities  | 51 (42.1%)             |
| Cervical lymphadenopathy| 79 (65.3%)             |
Table 2 Comparison of laboratory characteristic in KD patients with and without CAL

|                      | KD with CAL | KD without CAL | P value |
|----------------------|-------------|----------------|---------|
| Age (months)         | 18 (2,120)  | 19 (2,144)     | 0.354   |
| Male                 | 18 (69.2%)  | 56 (58.9%)     | 0.340   |
| WBC (×10⁹/l)         | 17.85±6.87  | 15.54±5.35     | 0.082   |
| Neutrophil (×10⁹/l)  | 12.70±5.77  | 10.43±4.49     | 0.043*  |
| Lymphocyte (×10⁹/l)  | 3.59±2.10   | 3.61±2.14      | 0.961   |
| Hemoglobin (g/l)     | 101.56±12.80| 103.59±10.98   | 0.362   |
| Platelet (×10⁹/l)    | 372.53±152.43| 350.56±107.05 | 0.444   |
| CRP (mg/dl)          | 118.83±65.46| 99.06±60.52    | 0.012*  |
| ESR (mm/h)           | 64.84±23.82 | 60.27±27.51    | 0.368   |
| PCT (ng/ml)          | 1.44±1.77   | 2.25±13.04     | 0.530   |
| NT-proBNP (pg/ml)    | 1393.35±1792.47| 636.57±771.91 | 0.025*  |
| SF (ng/ml)           | 288.84±311.36| 279.70±198.82 | 0.311   |

Table 3 Correlation between circulating miR-181a levels and other laboratory data in KD patients

|                  | Correlation coefficient | P value |
|------------------|-------------------------|---------|
| WBC              | 0.019                   | 0.807   |
| Neutrophil       | -0.016                  | 0.838   |
| Lymphocyte       | 0.086                   | 0.263   |
| Hemoglobin       | -0.039                  | 0.609   |
| Platelet         | -0.006                  | 0.933   |
| CRP              | 0.363                   | <0.001  |
| ESR              | 0.041                   | 0.595   |
| PCT              | -0.058                  | 0.451   |
| NT-proBNP        | 0.389                   | <0.001  |
| SF               | 0.132                   | 0.084   |

Figures
Figure 1
Circulating miR-181a expression levels in KD. A. Circulating miR-181a expression levels in KD before and two days after initial IVIG infusion. B. Circulating miR-181a expression levels in complete KD and incomplete KD. C. Circulating miR-181a expression levels in IVIG-response and IVIG-resistant patients. D. Circulating miR-181a expression levels in KD patients with and without CAL.
Figure 1

Circulating miR-181a expression levels in KD. A. Circulating miR-181a expression levels in KD before and two days after initial IVIG infusion. B. Circulating miR-181a expression levels in complete KD and incomplete KD. C. Circulating miR-181a expression levels in IVIG-response and IVIG-resistant patients. D. Circulating miR-181a expression levels in KD patients with and without CAL.
Receiver operating characteristic (ROC) curve analysis of miR-181a, CRP and NT-proBNP as predictors for CAL in KD.
Figure 2

Receiver operating characteristic (ROC) curve analysis of miR-181a, CRP and NT-proBNP as predictors for CAL in KD.