

Delphia R&D Program for Infectious & Inflammatory Diseases

# The diagnostic Kawasaki disease gene expression profiling classifier has a good performance in difficult to diagnose Kawasaki disease subgroups

Rowan Kuiper<sup>1</sup>, Chisato Shimizu<sup>2</sup>, Daphne Huigh<sup>1</sup>, Adriana H. Tremoulet<sup>2</sup>, Deniz Lehnert<sup>1</sup>, Daniëlle van Keulen<sup>1,4</sup>, Michael Levin<sup>3</sup>, Jane C. Burns <sup>2,4</sup>

<sup>1</sup>SkylineDx, Rotterdam, The Netherlands; <sup>2</sup>Department of Pediatrics, Rady Children's Hospital and University of California San Diego, La Jolla, California, <sup>3</sup>Department of Infectious Disease, Imperial College London, London, United Kingdom, <sup>4</sup>These authors contributed equally: Daniëlle van Keulen, Michael Levin, Jane C. Burns

#### Background/Aim

Delays in diagnosis and treatment of KD patients are a major risk factor for the development of coronary artery aneurysms. These delays more commonly occur in patients with incomplete KD and patients under one year of age. We therefore assessed the performance of the previously described Kawasaki disease gene expression profiling (KiDs-GEP) classifier, a blood-based 12-gene host response classifier that aids diagnosis of KD, in these specific KD subgroups. In addition, we investigated if prior antibiotic treatment affects the KiDs-GEP classifier score in KD patients, as a significant proportion of KD patients receive antibiotic treatment prior to KD diagnosis.

#### **Methods**

We performed the KiDs-GEP classifier in 81 KD patients (15% incomplete KD, 14% <1 year of age, and 43% treated with antibiotics) and 325 febrile controls who had  $\geq$ 1 clinical criterion for KD (11% <1 year, and 38% treated with antibiotics). Blood samples were obtained within the first 7 illness days and before IVIG treatment. All patients were under 18 years of age and diagnosed between 2010 and 2019 at Rady Children's Hospital in San Diego.



## Results

In the entire cohort, the KiDs-GEP classifier distinguished KD patients from febrile controls with an area under the curve (AUC) of 0.910, a sensitivity of 88.9% and a specificity of 80.6%. In the subset of incomplete KD patients, the AUC was 0.913, with a sensitivity of 91.7% and a specificity of 80.6%. In patients <1 year of age, the AUC was 0.938, with a sensitivity of 100% and a specificity of 85.7%. No significant difference in KiDs-GEP classifier score was observed between KD patients treated with or without antibiotics prior to blood draw (p=0.724).

## Conclusion

The KiDs-GEP classifier correctly identified 88.9% of all KD patients in the first week of illness and 91.7% and 100% in the difficult to diagnose subgroups of KD patients with incomplete KD and those <1 year of age, respectively. In addition, antibiotic treatment did not significantly affect the KiDs-GEP classifier score in KD patients, indicating that the classifier is effective in KD patients who have been treated with antibiotics. To conclude, the KiDs-GEP classifier can be a valuable tool to aid early diagnosis of KD, also in difficult to diagnose subgroups such as incomplete KD patients and KD patients <1 year of age.

Abstract at IKDS 2024

