Transcriptional active parvovirus B19 infection and intramyocardial inflammation predict adverse long-term mortality in a large cohort of patients with inflammatory cardiomyopathy

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Abstract

Parvovirus B19 (B19V) is the predominant cardiotropic virus found in endomyocardial biopsies (EMBs). Nevertheless, direct evidence showing a causal relationship between B19V cardiac presence and disease progression of B19V-associated dilated inflammatory cardiomyopathy (DCMi) were still missing. Parvovirus B19 NS1 and VP1/2 mRNA expression indicates viral activity.

Aim of this study:

- To established qRT-PCR to detect B19V viral RNA of capsid (VP1) and non-structural (NS1) sequences
- To analyse the influence of actively replicating B19V and inflammation upon long-term mortality in a large cohort of adult patients with inflammatory cardiomyopathy.

The study group comprised 871 consecutive B19V-positive patients (mean ejection fraction (LVEF) =48.6±20.0%) who underwent EMB after exclusion of ischemic or valvular heart disease. EMB analysis confirmed inflammation in 436 (50.1%) B19V-positive patients. The patients were followed for 60 months. Information on vital status was obtained from official resident data files. Patients with inflammation and replicative active B19V infection revealed the poorest prognosis compared to patients without/with inflammation without B19V replicative intermediates (p=0.0002/p=0.045). Viral load had no significant influence on the patient's outcome (p=0.079), contrary to inflammation (p=0.028) and replicative status (0.034).

Conclusion:

This is the first study investigating the pathogenic clinical importance of B19V in a large cohort of patients. Transcriptional active cardiotropic B19V infection with positive replication intermediates and inflammation are unfavourable prognostic triggers of adverse long term-mortality, whereas B19 virus genomes without transcriptional activity has no effect on mortality. Our findings are of high clinical relevance, as they indicate for the first time that a selection of specific characterized B19V positive patients may profit from innovative tailored anti-viral immunomodulatory treatment strategies.

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Biography:

Heinz-Peter Schultheiss is an international expert in the field of myocarditis and diagnostics of myocardial biopsies. From 1994-2014 he was the director of Department of Cardiology and Pneumology, Charité – Universitätsmedizin Berlin. He is the founder and CEO of the Institute for Cardiac Diagnostics and Therapy (IKDT) in Berlin, Germany. IKDT is one of the leading diagnostic laboratory for viral infections and inflammation of heart muscle tissue. He is member and was chairman of several national and international, scientific and clinical Societies and Principle Investigator of multiple Clinical Studies. Publications: Number of publications >550 high ranking pubmed listed, several book chapters.

Publication of Speakers:

1. Heinz-Peter Schultheiss, Alida L. Caforio, Felicitas Escher, DeLisa L. Fairweather, Ray E. Hershberger, Steven E. Lipshultz, Peter P. Liu, Akira Matsumori, Andrea Mazzanti, John McMurray, Silvia G. Priori. Dilated cardiomyopathy. Nature Reviews Dis Primers 2019 May 9;5(1):32.
2. The ESC Textbook of Cardiovascular Medicine, Third Edition, 2019. Chapter 32.21: Myocarditis - Treatment of myocarditis, Heinz-Peter Schultheiss and Felicitas Escher.
3. Pietsch, H., Escher, F., Aleshcheva, G., Lassner, D., Bock, C.T., Schultheiss, H.P. Detection of parvovirus mRNAs as markers for viral activity in endomyocardial biopsy-based diagnosis of patients with unexplained heart failure. Sci Rep. 2020;10(1):22354.

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