

WALKING POSTER PRESENTATION

Open Access

Assessment of cardiovascular physiology using magnetic resonance myocardial stress testing reveals impaired contractile reserve in patients with cirrhotic cardiomyopathy

Francisco Sampaio^{1,2}, Pablo Lamata³, Nuno Bettencourt^{1,2}, Sophie-Charlotte Alt⁴, Nuno D Ferreira¹, Johannes T Kowallick^{5,6}, Joana Pimenta², Shelby Kutty⁷, Jose Fraga⁸, Paulo Bettencourt², Vasco Gama¹, Andreas Schuster^{9,10*}

From 18th Annual SCMR Scientific Sessions
Nice, France. 4-7 February 2015

Background

Liver cirrhosis has been shown to affect cardiac performance. However cardiac dysfunction may only be revealed under stress conditions. The value of non-invasive stress tests in diagnosing cirrhotic cardiomyopathy is unclear since their ability to detect abnormalities has been inconsistent using different imaging modalities. We sought to investigate the response to pharmacological stimulation with dobutamine in patients with cirrhosis using cardiovascular magnetic resonance.

Methods

Thirty-six patients and eight controls were studied. Conventional volumetric and myocardial deformation parameter analysis using feature tracking at rest and during low to intermediate dose dobutamine stress were performed.

Results

Whilst volumetry based parameters were similar between patients and controls at rest, patients had a smaller increase in cardiac output during stress (2.2 l/min vs. 3.8 l/min, $p=0.015$). Chronotropic response was not different in the two groups (24 bpm vs 25 bpm, $p=0.44$). Ejection fraction increase was impaired in patients during 10 $\mu\text{g}/\text{Kg}/\text{min}$ dobutamine as compared to controls (6.9% vs. 16.5%, $p=0.007$), but not with 20 $\mu\text{g}/\text{Kg}/\text{min}$ (12.1% vs. 17.6%, $p=0.12$). This was paralleled by an impaired

improvement in circumferential strain with low dose (median percentual increase of 14.4% vs. 30.9%, $p=0.03$), but not with intermediate dose dobutamine (median percentual increase of 29.4% vs. 33.9%, $p=0.54$). There was an impaired longitudinal strain increase in patients as compared to controls during low (median percentual increase of 6.6% vs 28.6%, $p<0.001$) and intermediate dose dobutamine (median percentual increase of 2.6% vs. 12.6% $p=0.016$). Radial strain response to dobutamine was similar in patients and controls (median percentual increase of 7.7% (-2.4-15.2) vs 13.6% (5.7-26), $p=0.11$ with 10 $\mu\text{g}/\text{Kg}/\text{min}$ of dobutamine and 4.3% (0.6-8.1) vs 3.1% (-0.2-9.3), $p=0.82$ with 20 $\mu\text{g}/\text{Kg}/\text{min}$ of dobutamine).

Conclusions

Cirrhotic cardiomyopathy is characterized by an impaired cardiac pharmacological response that can be detected with magnetic resonance myocardial stress testing. Deformation analysis parameters may be more sensitive in identifying abnormalities in inotropic response to stress than conventional methods.

Funding

NA.

Authors' details

¹Cardiology Department, Centro Hospitalar Gaia/Espinho, VN Gaia, Portugal. ²University of Porto Medical School, Porto, Portugal. ³Biomedical Engineering, King's College London, London, UK. ⁴Department of Pediatric Cardiology and Intensive Care Medicine, Georg-August University, Göttingen, Germany. ⁵Institute for Diagnostic and Interventional Radiology, Georg-

⁹Division of Imaging Sciences and Biomedical Engineering, The Rayne Institute, Kings College London, London, UK
Full list of author information is available at the end of the article

August University, Göttingen, Germany. ⁶German Centre for Cardiovascular Research, Göttingen, Germany. ⁷Children's Hospital and Medical Center, University of Nebraska Medical Center, Omaha, NE. ⁸Gastroenterology Department, Centro Hospitalar Gaia/Espinho, VN Gaia, Portugal. ⁹Division of Imaging Sciences and Biomedical Engineering, The Rayne Institute, Kings College London, London, UK. ¹⁰Department of Cardiology and Pneumology, Georg-August University, Göttingen, Germany.

Published: 3 February 2015

doi:10.1186/1532-429X-17-S1-Q67

Cite this article as: Sampaio *et al.*: Assessment of cardiovascular physiology using magnetic resonance myocardial stress testing reveals impaired contractile reserve in patients with cirrhotic cardiomyopathy. *Journal of Cardiovascular Magnetic Resonance* 2015 **17**(Suppl 1):Q67.

**Submit your next manuscript to BioMed Central
and take full advantage of:**

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

