

Management of Heart Failure with Focus on Inflammatory Myocardial Diseases

A Comparison between Cardiac Sarcoidosis and Giant Cell Myocarditis

Akademisk avhandling

Som för avläggande av medicine doktorexamen vid Sahlgrenska akademien,
Göteborgs Universitet kommer att offentligen försvaras i Sahlgrens aula,
Sahlgrenska Universitetssjukhuset, Blå stråket 5, Göteborg,
den 14 juni 2024, kl 9:00

av **Emanuele Bobbio**

Fakultetsopponent:

Professor Massimo Imazio
University of Udine, Udine, Italy

Avhandlingen baseras på följande delarbeten

- I. **Association between central haemodynamics and renal function in advanced heart failure: a nationwide study from Sweden**
Bobbio E, Bollano E, Polte CL, Ekelund J, Rådegran G, Lundgren J, Haggård C, Gjesdal G, Braun O, Bartfay SE, Bergh N, Dahlberg P, Hjalmarsson C, Esmaily S, Haugen Löfman I, Manouras A, Melin M, Dellgren G, Karason K.
ESC Heart Failure, 2022 Aug;9(4):2654-2663
- II. **Diagnosis, management, and outcome of cardiac sarcoidosis and giant cell myocarditis: a Swedish single center experience**
Bobbio E, Hjalmarsson C, Björkenstam M, Polte CL, Oldfors A, Lindström U, Dahlberg P, Bartfay SE, Szamlewski P, Taha A, Sakiniene E, Karason K, Bergh N, Bollano E.
BMC Cardiovascular Disorders, 2022 Apr 26;22(1):192
- III. **Short- and long-term outcomes after heart transplantation in cardiac sarcoidosis and giant-cell myocarditis: A systematic review and meta-analysis**
Bobbio E, Björkenstam M, Nwaru BI, Giallauria F, Hessman E, Bergh N, Polte CL, Lehtonen J, Karason K, Bollano E.
Clinical Research in Cardiology, 2022 Feb;111(2):125-140
- IV. **Phenotyping of giant cell myocarditis versus cardiac sarcoidosis using cardiovascular magnetic resonance**
Bobbio E, Bollano E, Oldfors A, Hedner H, Björkenstam M, Svedlund S, Karason K, Bergh N, Polte CL.
International Journal of Cardiology, 2023 Sep 15;387:131143

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ABSTRACT

Background: The prevalence of advanced heart failure (HF) is rising, a condition portrayed by hemodynamic disturbances and poor prognosis. Heart transplantation (HTx) is a valid treatment option once other alternatives have been exhausted. It is crucial to identify the underlying HF etiology to predict prognosis and guide management. Cardiac sarcoidosis (CS) and giant cell myocarditis (GCM) are two rare disease entities characterized by myocardial inflammation, leading to ventricular remodelling and advanced HF. We aimed to investigate the relationship between hemodynamic abnormalities and renal function and assess the potential of a multimodal diagnostic approach in improving diagnostic algorithms and developing better treatment options for subjects with CS and GCM.

Methods: Paper I is a nationwide study using information from the Scandiatransplant organ-exchange organization database. Individuals with advanced HF referred for HTx work-up in Sweden were included and data on hemodynamic and renal function were collected retrospectively. In Paper II and IV, information on subjects diagnosed with CS or GCM that had undergone a diagnostic work-up at our institution during the last 30 years was reviewed retrospectively. In Paper III a systematic review and meta-analysis examined the post-HTx outcomes in subjects with CS and GCM.

Results: Paper I found that among all hemodynamic variables, elevated right atrial pressure showed the strongest association with renal dysfunction. Also, elevated renal perfusion pressure was strongly linked to superior kidney function, regardless of the level of cardiac output. In our studies on inflammatory myocardial diseases, we revealed that GCM is a more aggressive disorder than CS, often developing a fulminant course with severe biventricular failure and a need for advanced treatments. Post-HTx outcomes in people with CS and GCM resemble those in subjects with HF from other etiologies. The differential diagnosis between CS and GCM based solely on cardiac magnetic resonance (CMR) poses challenges since their imaging phenotypes overlap.

Conclusions: Considering the link between hemodynamics and renal function in HF, an approach to manage fluid overload could involve decreasing central venous pressure and/or raising mean arterial pressure to maintain renal perfusion pressure, thereby increasing renal blood flow and improving GFR. CMR features of both CS and GCM exhibit striking similarity, posing a challenge in distinguishing between these two rare conditions using imaging alone. In contrast, differences are observed in their clinical presentation, as subjects with GCM experience more symptoms and have a more fulminant course than individuals with CS. HTx is a safe and effective treatment option for people suffering from advanced HF due to inflammatory myocardial diseases.

Keywords: heart failure, sarcoidosis, myocarditis, heart transplantation, cardiac magnetic resonance, renal function, mortality