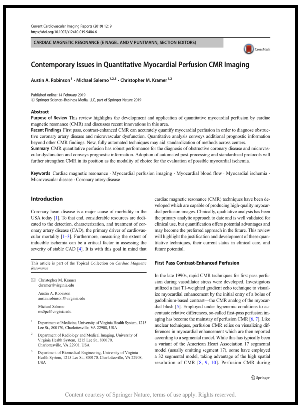
Clinical application of current techniques and treatment in cardiology

S. Karger - Point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CARDIAC MAGNETIC RESONANCE (E NAGEL AND V PUNTMANN, SECTION EDITORS)

Contemporary Issues in Quantitative Myocardial Perfusion CMR Imaging

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Abstract
Purpose of Review This review highlights the development and application of quantitative myocardial perfusion by cardiac magnetic resonance (CMR) and discusses recent innovations in this area.
Recent Findings First pass, contrast-enhanced CMR can accurately quantify myocardial perfusion in order to diagnose obstructive coronary artery disease and microvascular dysfunction. Quantitative analysis conveys additional prognostic information beyond other CMR findings. New, fully automated techniques may aid standardization of methods across centers.
Summary CMR quantitative perfusion has robust performance for the diagnosis of obstructive coronary disease and microvascular dysfunction and conveys prognostic information. Adoption of automated post-processing and standardized protocols will further strengthen CMR in its position as the modality of choice for the evaluation of possible myocardial ischemia.

Keywords Cardiac magnetic resonance · Myocardial perfusion imaging · Myocardial blood flow · Myocardial ischemia · Microvascular disease · Coronary artery disease

Introduction

Coronary heart disease is a major cause of morbidity in the USA today [1]. To that end, considerable resources are dedicated to the detection, characterization, and treatment of coronary artery disease (CAD), the primary driver of cardiovascular mortality [1–3]. Furthermore, measuring the extent of inducible ischemia can be a critical factor in assessing the severity of stable CAD [4]. It is with this goal in mind that cardiac magnetic resonance (CMR) techniques have been developed which are capable of producing high-quality myocardial perfusion images. Clinically, qualitative analysis has been the primary analytic approach to date and is well validated for clinical use, but quantification offers potential advantages and may become the preferred approach in the future. This review will highlight the justification and development of these quantitative techniques, their current status in clinical care, and future potential.

This article is part of the Topical Collection on *Cardiac Magnetic Resonance*

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First Pass Contrast-Enhanced Perfusion

In the late 1990s, rapid CMR techniques for first pass perfusion during vasodilator stress were developed. Investigators utilized a fast T1-weighted gradient echo technique to visualize myocardial enhancement by the initial entry of a bolus of gadolinium-based contrast—the CMR analog of the myocardial blush [5]. Employed under hyperemic conditions to accentuate relative differences, so-called first-pass perfusion imaging has become the mainstay of perfusion CMR [6, 7]. Like nuclear techniques, perfusion CMR relies on visualizing differences in myocardial enhancement which are then reported according to a segmental model. While this has typically been a variant of the American Heart Association 17 segmental model (usually omitting segment 17), some have employed a 32 segmental model, taking advantage of the high spatial resolution of CMR [8, 9, 10]. Perfusion CMR during

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Heart -- Surgery -- Congresses.
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v. 17
Advances in cardiology ;Clinical application of current techniques and treatment in cardiology
Notes: Includes bibliographies and index to v. 1-16 of the series.
This edition was published in 1976

Tags: #Current #and #new #clinical #applications #for #CMR: #myocardial #tissue #characterisation

Pharmacy

Cardiovascular Regenerative Medicine is an essential resource for physicians, residents, fellows, and medical students in cardiology and cardiovascular regeneration as well as clinical and basic researchers in bioengineering, nanomaterial and technology, and cardiovascular biology. Increased right ventricular mechanical dispersion above 29 msec is associated with increased risk for malignant arrhythmias in patients with arrhythmogenic right ventricular cardiomyopathy Figure 5. The installation of a new Cath lab system offering the integrations of different imaging modalities in one image underlines this importance.

Point

The laser illumination is grouped into 3 categories of applied power: low, medium and high.

Percutaneous Valve Interventions

Two PhD students are now working on the regional programs. Subsequent chapters explore the clinical applications and translational potential of current technologies such as cardiac patch-based treatments, cell-based regenerative therapies, and injectable hydrogels. The book incorporates recent advances in the biology, biomaterial design, and manufacturing of bioengineered cardiovascular tissue with their clinical applications to bridge the basic sciences to current and future cardiovascular treatment.

Current and new clinical applications for CMR: myocardial tissue characterisation

Late outcome studies of the surgical treatment of functional mitral regurgitation are being finalized. With the introduction of the percutaneous aortic valve program, the percutaneous treatment of mitral valve disease and in the coming years the tricuspid program it will become possible to treat high risk patients and to improve survival and quality of life.

Artificial intelligence in cardiology

Recommendations for the evaluation of left ventricular diastolic function by echocardiography. Calculations of cardiovascular shunts and regurgitation using magnetic resonance ventricular volume and aortic and pulmonary flow measurements.

Percutaneous Valve Interventions

As these techniques are less invasive, they will be potentially performed in an earlier stage of valve disease, when the clinical benefits are more probable. The program is strongly embedded in the Vascular and Regenerative Medicine Profile of the LUMC and in the inter national network with participation in several larger program consortia. Stereotactic ablative radiotherapy for the treatment of refractory cardiac ventricular arrhythmia.

[Laser therapy application in invasive cardiology. Current state and future trends]

Recent, evolving technological advances enable the development of novel POCT instruments. While these results are encouraging, the impact of PCSK9 inhibitors on Lp a is fairly modest, and additional analysis is needed before PCSK9-inhibitors can be recommended as Lp a -targeted therapy. It provides a much-needed review of the rapid development and evolution of bio-fabrication techniques to engineer cardiovascular tissues as well as their use in clinical settings.

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