

Early detection of fibrotic areas in anterior STEMI by echocardiography

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Summary. We describe the case of a patient admitted to our ward for dyspnea and chest pain. Acutely performed electrocardiogram confirms the clinical suspect of myocardial infarction by showing ST-elevation in the anterior leads (STEMI). Primary percutaneous coronary intervention (PCI) was performed, with normal final coronary artery flow. At 6-month cardiac magnetic resonance (CMR) late Gadolinium enhancement (CMR-LGE) was present in the entire left anterior descending coronary artery territory. We also performed a standard echocardiogram on day 1 after primary angioplasty, as expected showing akinesia in the STEMI territory. Interesting, using a new echocardiographic setting, we have been able to very early detect fibrotic tissue in an easy and cost-effective way. (www.actabiomedica.it)

Key Words: eScar; Myocardial Infarction; Angioplasty, Myocardial Fibrosis

Introduction

Management and prognosis in patients affected by an acute cardiac event are strongly related to the development of fibrotic myocardial areas in the culprit territory. The detection of such scar areas represents not only a diagnostic tool, but importantly impacts patients outcome and prognosis. Myocardial fibrotic areas are at this time best recognized through cardiac magnetic resonance imaging, through the presence of areas with late gadolinium enhancement (CMR-LGE). The major limitation of this method is its cost and that it is unfit for patients with claustrophobia or an implanted cardiac device. For some years now, there has been a growing interest in new diagnostic techniques to detect cardiac fibrotic areas. Several studies suggest a role for echocardiography in this setting, thanks to the enhancement of the myocardial signal in the infarcted myocardial segments⁽¹⁻³⁾. On this basis, recent studies have demonstrated that echocardiography is able to detect myocardial fibrosis thanks to a pulse cancellation ultrasound technique (eSCAR), able to differentiate normal from scarred myocardium⁽⁴⁾

Case Report

We describe the case of a patient admitted for dyspnea and typical chest pain. The electrocardiogram confirmed the clinical suspect of myocardial infarction, showing ST-elevation in the anterior precordial leads (Figure 1A). Primary percutaneous coronary intervention (PCI) with stenting was successfully performed, with a normal final coronary artery flow (Figure 1B). At 6-month cardiac magnetic resonance (CMR), late Gadolinium enhancement (CMR-LGE) was present in the entire left anterior descending coronary artery territory (Figure 1C shows the 4-chamber equivalent view). Interestingly, we also performed a standard echocardiogram on day 1 after primary angioplasty, showing, as expected, akinesia in the STEMI territory (Figure 1D). Figure E shows the same 4-chamber view acquired few seconds later using a newly devised setting called “eScar”⁽⁴⁾. Using this setting fibrotic tissue is enhanced early after STEMI. In Figure 1E hyperechoic signal perfectly matches the hypo-perfused region of myocardium, which persisted until few days later, when assessed again with contrast-echo (Figure 1F).

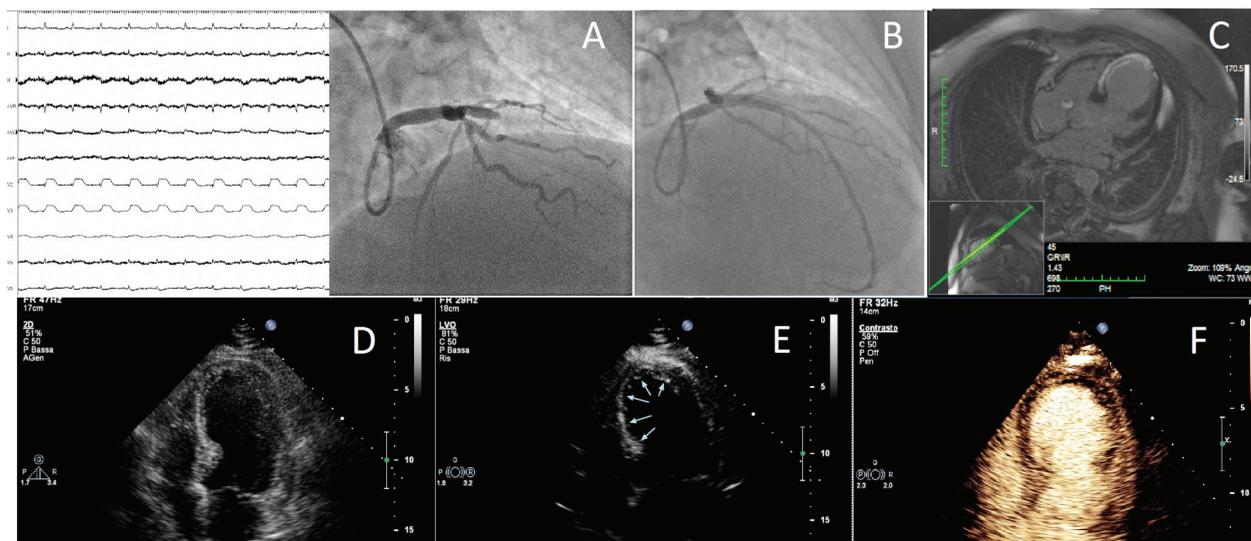


Figure 1. Panel

Discussion

In summary, the so-called “eSCAR” setting, reduces the ultrasound signals from normally healthy myocardium through a standard ultrasound multi-pulse scheme, usually utilized for contrast-echocardiography. By so doing the normal, non-fibrotic tissue is cancelled out, while each highly fibrotic or calcified structure, such as scar, pericardium, valves or ribs appear as hyperechoic.

In this case, the use of echocardiographic eScar setting was useful to detect fibrosis early after STEMI. The use of “eSCAR” setting can potentially expand the role of fibrosis detection out of its current technical boundaries, being probably capable to detect fibrosis or pre-fibrotic tissue reaction very early after a STEMI, earlier than previously thought feasible. However the role of echocardiographic “eSCAR” in the early detection of fibrosis in acute coronary syndromes must be confirmed by independent studies or case series. If confirmed this could offer an easy and cost-effective strategy to rapidly detect myocardial SCAR.

Conflict of interest: Dr. Carmine Siniscalchi received speaker’s fee for congress presentation by MediK. Dr. Nicola Gaibazzi received speaker’s fee for congress presentation by Bracco Imaging.

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Received: 10 February 2019

Accepted: 18 February 2019

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