

Feasibility of CMR Imaging during Biventricular Pacing: Comparison with Invasive Measurements as a Pathway towards a Novel Optimization Strategy

Luuk H.G.A. Hopman¹, Msc; Alwin Zweerink¹, MD, PhD; Anne-Lotte C.J. van der Lingen¹, MD; Marthe J. Huntelaar¹, Msc; Mark J. Mulder¹, MD; Lourens F. H. J. Robbers¹, MD, PhD; Albert C. van Rossum¹, MD, PhD; Vokko P. van Halm¹, MD, PhD; Marco J.W. Götte¹, MD, PhD; Cornelis P. Allaart¹, MD, PhD

¹Department of Cardiology, Amsterdam UMC, Amsterdam, The Netherlands

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Table S1. Post-device implantation CMR scan quality.

CMR cine image quality after CRT-D implantation																
Segment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Reader 1</i>																
Mean value	2.2	1.4	1	1	1.1	1.7	2	1.2	1	1	1	1.4	1.1	1	1	1
#1 (no artefacts)	4	8	10	10	9	7	5	9	10	10	10	8	9	10	10	10
#2 (limited artefacts)	3	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0
#3 (substantial artefacts)	0	2	0	0	0	2	3	1	0	0	0	2	0	0	0	0
#4 (extensive artefacts)	3	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
<i>Reader 2</i>																
Mean value	2.1	1.1	1.1	1	1	1.7	1.7	1.1	1	1	1	1.1	1.2	1.2	1	1
#1 (no artefacts)	5	9	9	10	10	6	5	9	10	10	10	9	8	8	10	10
#2 (limited artefacts)	2	1	1	0	0	2	3	1	0	0	0	1	2	2	0	0
#3 (substantial artefacts)	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0
#4 (extensive artefacts)	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Overall cine image score of both readers	2.2	1.3	1.1	1	1.1	1.7	1.9	1.2	1	1	1	1.3	1.2	1.1	1	1
CMR LGE image quality after CRT-D implantation																
Segment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Reader 1</i>																
Mean value	3	2.5	1	1	1.2	2.3	3.6	2.9	1	1	1.2	2.9	2.4	1.7	1	1.6
#1 (no artefacts)	2	3	10	10	9	4	1	2	10	10	9	2	4	7	10	7
#2 (limited artefacts)	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
#3 (substantial artefacts)	2	4	0	0	1	3	1	5	0	0	1	5	2	2	0	3
#4 (extensive artefacts)	5	2	0	0	0	2	8	3	0	0	0	3	3	1	0	0
<i>Reader 2</i>																
Mean value	2.9	1.9	1.2	1	1.1	2	3.5	2.4	1.2	1.1	1.1	2.5	3.3	2	1	1.6
#1 (no artefacts)	2	5	9	10	9	5	1	2	9	9	9	2	1	3	10	5
#2 (limited artefacts)	2	2	0	0	1	1	0	4	0	1	1	3	1	5	0	4
#3 (substantial artefacts)	1	2	1	0	0	3	2	2	1	0	0	3	2	1	0	1

#4 (extensive artefacts)	5	1	0	0	0	1	7	2	0	0	0	2	6	1	0	0
Overall LGE image score of both readers	3.0	2.2	1.1	1	1.2	2.2	3.6	2.7	1.1	1.1	1.2	2.7	2.9	1.9	1	1.6

Figure S1: PICARIA-CRT CMR scan protocol.

MRI Scan Protocol PICARIA-CRT

Pre-implantation MRI protocol

1.	LV Function
	SSFP Cine long axis 3 standard views (4ch, 3ch, 2ch). <i>ADMINISTER 0.15MMOL/KG CONTRAST AGENT</i>
2. LV Function	
	SSFP Cine short axis stack LV coverage; 5mm/100% gap, temp resolution 20ms.
3. Late Gadolinium Enhancement Segmented	
	10-15 min after contrast administration, long/short axis LV coverage; copy cine orientation.

Post-implantation MRI protocol

1.	LV Function
	Cine long axis 3 standard views (4ch, 3ch, 2ch) and short axis LV stack coverage; 5mm/100% gap, temp resolution 20ms <i>TURN OFF CRT</i>
2. LV Function	
	Cine long axis 3 standard views (4ch, 3ch, 2ch). <i>ADMINISTER 0.15MMOL/KG CONTRAST AGENT</i>
3. LV Function	
	Cine short axis LV slack coverage; 5mm/100% gap, temp resolution 20ms.
4. Late Gadolinium Enhancement Segmented	
	10-15 min after contrast administration, long/short axis LV coverage; copy cine orientation.



Figure S2: CMR image quality score form.

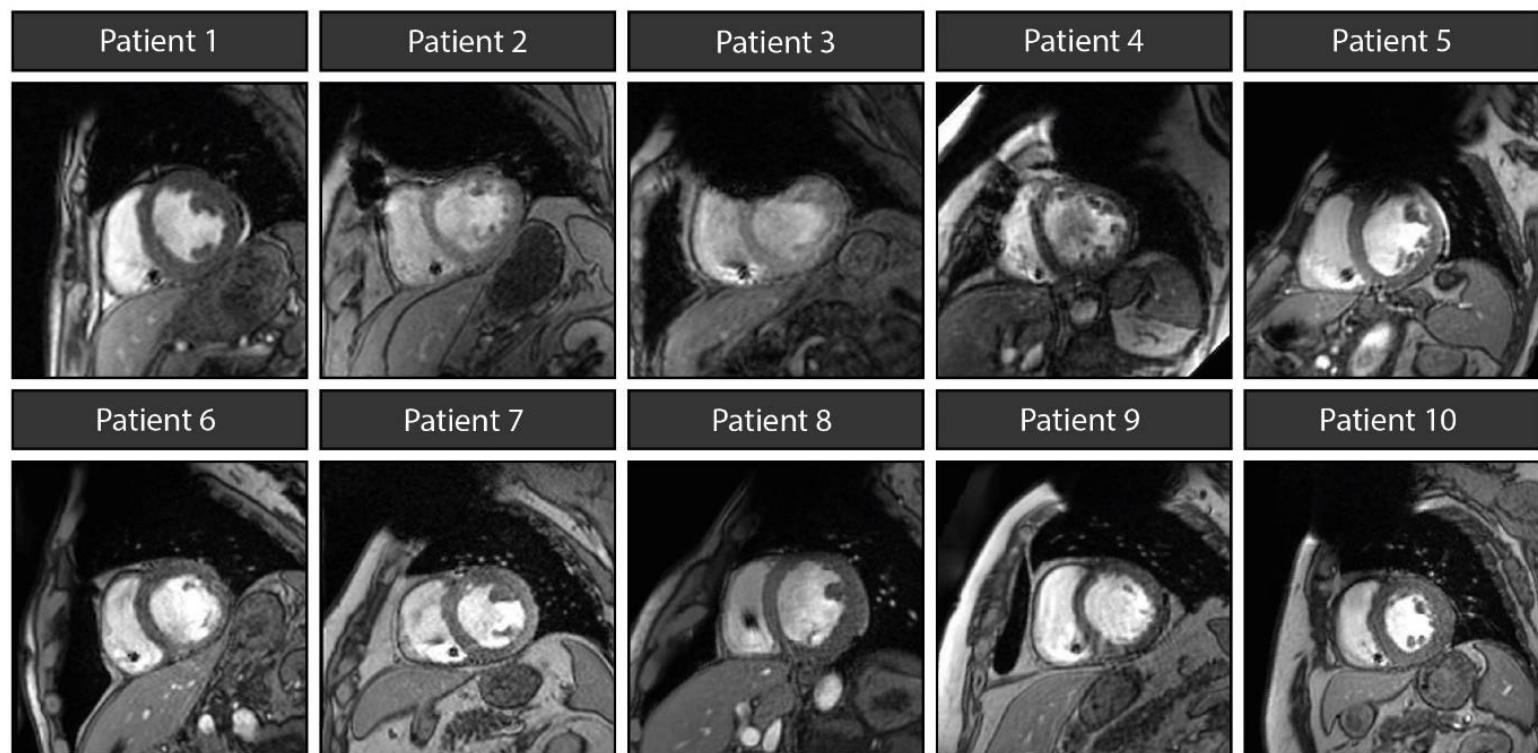
CMR image quality in CRT-D patients																
<p>1 = No image artefact at all and no limitation in image interpretation.</p> <p>2 = Good image quality with limited artefacts (affecting less than 25% of the ventricles or the defined segment).</p> <p>3 = Poor image quality with substantial artefacts (affecting more than 25% but less than 75% of the ventricles or the defined segment).</p> <p>4 = Meaningful image assessment impossible due to extensive artefacts (affecting more than 75% of the ventricles or the defined segment).</p>																
Segment	SHORT AXIS CINE:				LGE:											
1	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
2	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
3	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
6	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
7	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
8	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
9	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
10	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
11	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
12	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
13	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
14	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
15	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								
16	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4								

Evaluated by: _____

Study ID: _____

Remark:

Figure S3: Post-device implantation mid-short axis cine image of all patients.



Mid-slice spoiled gradient echo cine images (post-CRT implantation) in end-diastole of all 10 study patients. Device artefact is sometimes present in the anterior wall region of the left ventricle (most prominent in patient 3 and 4).