

POSTER PRESENTATION

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# Myocardial fibrosis by CMR LGE in a large cohort of pediatric thalassemia major patients

Antonella Meloni<sup>1\*</sup>, Maddalena Casale<sup>2</sup>, Aldo Filosa<sup>2</sup>, Blandina Pagano<sup>3</sup>, Vincenzo Positano<sup>1</sup>, Antonino Vallone<sup>4</sup>, Gianluca Valeri<sup>5</sup>, Daniele De Marchi<sup>1</sup>, Massimo Lombardi<sup>1</sup>, Alessia Pepe<sup>1</sup>

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## Background

Cardiovascular Magnetic Resonance (CMR) by late gadolinium enhancement (LGE) allows to detect myocardial fibrosis. Myocardial fibrosis was shown to be a relative common finding in large cohort of Italian thalassemia major (TM) patients mainly related to HCV infection, but specific studies involving only pediatric patients are not available. Our aim was to investigate the prevalence and clinical-instrumental correlates of myocardial fibrosis in pediatric TM patients.

## Methods

We studied retrospectively 76 pediatric patients with TM (44 boys, 4.2 -17.9 years old, mean age  $13.6 \pm 3.4$  years) enrolled in the MIOT (Myocardial Iron Overload in

Thalassemia) Network. All patients were well transfused and chelated since the early childhood. LGE images were acquired to detect myocardial fibrosis. Myocardial iron overload (MIO) was measured by T2\* multislice multiecho technique. Biventricular function parameters were quantitatively evaluated by cine images.

## Results

Myocardial fibrosis was detected in 12 (15.8%) patients. In all patients the location of the fibrosis was epi-mesocardial, with no ischemic pattern. The youngest patient showing myocardial fibrosis had 13 years of age. Table 1 shows the comparison between patients with and without myocardial fibrosis. A significant higher MIO was detected in patients with myocardial fibrosis. The left atrial area, all the left

**Table 1 Clinical and instrumental correlates in the fibrosis and no-fibrosis group.**

	Fibrosis group (N = 12)	No-fibrosis group (N = 64)	P-value
Sex (M/F)	10/2	34/30	0.062
Age (years)	$15.4 \pm 1.8$	$13.3 \pm 3.5$	0.073
Transfusions starting age (years)	$1.2 \pm 0.9$	$1.3 \pm 0.8$	0.691
Chelation starting age (years)	$3.1 \pm 1.8$	$3.1 \pm 2.3$	0.705
HCV antibodies, N (%)	0	3 (4.8%)	0.437
Hb pre-transfusion (g/dl)	$9.7 \pm 0.3$	$9.5 \pm 0.7$	0.757
Ferritin levels (ng/l)	$3012 \pm 2167$	$2225 \pm 1396$	0.226
ALT (u/l)	$41.6 \pm 12.5$	$38.6 \pm 32.6$	0.268
AST (u/l)	$46.6 \pm 41.2$	$33.4 \pm 25.9$	0.207
Global Heart T2* (ms)	$20.9 \pm 13.9$	$30.6 \pm 9.7$	0.022

<sup>1</sup>CMR Unit, Fondazione G.Monasterio CNR-Regione Toscana and Institute of Clinical Physiology, Pisa, Italy

Full list of author information is available at the end of the article

**Table 1 Clinical and instrumental correlates in the fibrosis and no-fibrosis group. (Continued)**

MRI CIC (mg/g dry weight)	2.0 ± 1.7	0.8 ± 0.6	0.022
Patients with global heart T2* < 20 ms, N (%)	7 (58.3)	12 (18.8)	0.008
N. of seg. with abnormal T2*	9.0 ± 7.0	3.8 ± 5.2	0.030
Left atrial area (cm <sup>2</sup> )	18.3 ± 3.1	15.9 ± 3.9	0.050
Right atrial area (cm <sup>2</sup> )	16.9 ± 4.3	14.9 ± 3.5	0.169
Left ventricular end-diastolic volume index (ml/m <sup>2</sup> )	102.9 ± 23.5	87.0 ± 16.3	0.005
Left ventricular end-systolic volume index (ml/m <sup>2</sup> )	42.0 ± 12.1	35.1 ± 8.9	0.022
Left ventricular stroke volume index (ml/m <sup>2</sup> )	60.7 ± 12.4	51.8 ± 10.7	0.012
Left ventricular mass index (g/m <sup>2</sup> )	65.3 ± 11.4	53.8 ± 11.4	0.003
Left ventricular ejection fraction (%)	59.2 ± 4.4	59.7 ± 5.9	0.368
Right ventricular end-diastolic volume index (ml/m <sup>2</sup> )	96.9 ± 25.6	81.6 ± 17.1	0.089
Right ventricular end-systolic volume index (ml/m <sup>2</sup> )	36.9 ± 13.7	32.3 ± 8.3	0.458
Right ventricular stroke volume index (ml/m <sup>2</sup> )	61.5 ± 11.6	48.9 ± 14.1	0.005
Right ventricular ejection fraction (%)	62.6 ± 4.4	60.2 ± 7.1	0.175

ventricular (LV) indexed volumes, the LV mass index and the bi-ventricular stroke volume indexes were significantly higher in the fibrosis group than in the no-fibrosis group.

## Conclusions

In pediatric TM patients myocardial fibrosis is not a rare finding to keep in mind in the cardiological management. When appropriate treatment has been administered since early childhood, CMR LGE can be postponed until 13 years of age. By the natural history of this large cohort of pediatric patients where HCV infection has been appropriately prevented, myocardial fibrosis seem to be associated with MIO and high cardiac output.

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## Authors' details

<sup>1</sup>CMR Unit, Fondazione G.Monasterio CNR-Regione Toscana and Institute of Clinical Physiology, Pisa, Italy. <sup>2</sup>Centro per le Microcitemie, AORN Cardarelli, Napoli, Italy. <sup>3</sup>Centro Microcitemico, U.O. di Pediatria e Neonatologia. Presidio Ospedaliero Locri - A.S.L. n. 9, Locri, Italy. <sup>4</sup>Istituto di Radiologia, Az. Osp. “Garibaldi” Presidio Ospedaliero Nesima, Catania, Italy. <sup>5</sup>Dipartimento di Radiologia, Azienda Ospedaliero-Universitaria Ospedali Riuniti “Umberto I-Lancisi-Salesi”, Ancona, Italy.

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