A T2* MRI Prospective Survey on Pancreatic Iron in Thalassemia Major Patients Treated with Deferasirox, Deferiprone and Desferrioxamine

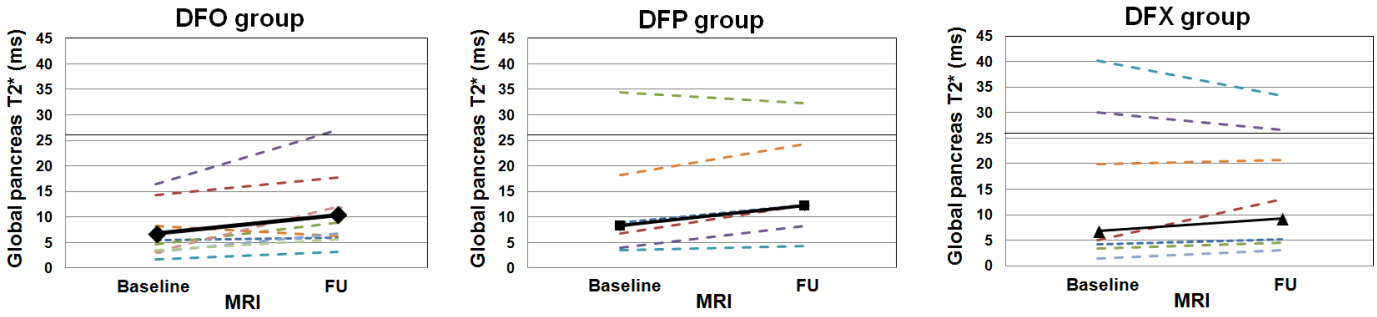
Antonella Meloni[1], Gennaro Restaino[2], Stefania Renne[3], Massimiliano Missere[2], Maria Chiara Resta[4], Vincenzo Positano[1], Daniele De Marchi[1], Gaetano Roccamo[5], Nicola Romano[6], Maria Giovanna Neri[1], and Alessia Pepe[1]

[1]CMR Unit, Fondazione G. Monasterio CNR-Regione Toscana, Pisa, Italy, [2]Dipartimento di Radiologia, Università Cattolica del Sacro Cuore, Campobasso, Italy, [3]Struttura Complessa di Cardioradiologia-UTIC, P.O. "Giovanni Paolo II", Lamezia Terme, Italy, [4]Struttura Complessa di Radiologia, OSP. SS. Annunziata ASL Taranto, Taranto, Italy, [5]Unità di Prevenzione e Cura delle Mictrocitemie, PO di S. Agata di Militello (ASP-ME), S. Agata di Militello (ME), Italy, [6]S.C. Medicina Trasfusionale, AO Arcispedale "S. Maria Nuova", Reggio Emilia, Italy

Introduction. Impairment of the endocrine and exocrine function of the pancreas is a common complication in thalassemia major (TM). Multiecho T2* Magnetic Resonance Imaging (MRI) allows the reproducible and noninvasive assessement of pancreatic iron overload.[1,2] However, there are no prospective studies describing the changes of pancreatic T2* values. So, our aim was to describe the changes in pancreatic T2* values over a follow-up (FU) of 18 months and to evaluate prospectively the effectiveness of the three iron chelators in monotherapy.

Methods. We selected 22 TM patients consecutively enrolled in the Myocardial Iron Overload in Thalassemia (MIOT) Network[3] who had received only one chelator in monotherapy between the two MRI scans. Pancreatic iron burden was measured using a T2* gradient-echo multiecho sequence.[2] The images were analyzed using a previously validated, custom-written software (HIPPO-MIOT®). T2* measurements were performed in pancreatic head, body and tail. The global value was calculated as the mean.

Results. Three groups of patients were identified: 9 patients (5 females, mean age 32.8±8.6 years) treated with desferioxamine (DFO – mean dosage 44.8±3.8 mg/kg/die), 6 patients (2 females, mean age 36.3±6.5 years) treated with deferiprone (DFP– dosage 75mg/kg/die) and 7 patients (6 females, mean age 30.4±9.1 years) treated with deferasirox (DFX – mean dosage 28.2±4.6 mg/kg/die). The percentage of patients with a excellent/good compliance was comparable among the groups.
All patients under DFO therapy showed at the baseline MRI pancreatic iron overload (T2*<26 ms) and at the FU only one had a normal pancreas T2* value (Figure 1, left). Globally there was a significant increment in the pancreatic T2* values (mean difference: 3.66±3.94; P=0.021).
In the DFP group at baseline 5 patients showed pancreatic iron and none recovered at the follow up (Figure 1, center). The patient with a normal baseline pancreatic T2* value, maintained it at the FU. For the subgroup with pancreatic iron at the baseline, there was a significant increment in the pancreatic T2* values (mean difference: 3.99±2.05; P=0.043).
In the DFX group 5 patients showed at the baseline pancreatic iron and although the pancreatic T2* increased for all of them, the normal value was not reached at the follow up (Figure 1, right). Both the patients who showed no pancreatic iron overload at the baseline maintained at the FU the same status. For the subgroup with pancreatic iron at the baseline, there was a significant increment in the pancreatic T2* values (mean difference: 2.48±3.06; P=0.043).



Conclusions. Prospectively in TM patients at the dosages used in the clinical practice all three chelators in monotherapy allowed a significant reduction in pancreatic iron. Further prospective studies involving more patients are needed to establish which is the most effective drug.

References. [1] Noetzli LJ et al. Blood. 2009;114:4021-6. [2] Restaino G et al. Magn Reson Med. 2011;65:764-9. [3] Meloni A et al. Int J Med Inform 2009;78:503-12.