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### **Multicenter Validation of the Magnetic Resonance T2\* Technique for Quantification of Pancreatic Iron**

**Laura Pistoia<sup>1</sup>, Antonella Meloni<sup>1</sup>, Angelo Peluso<sup>2</sup>, Calogera Gerardi<sup>3</sup>, Roberto Lisi<sup>4</sup>, Stefano Pulini<sup>5</sup>, Liana Cuccia<sup>6</sup>, Maria Paola Smacchia<sup>7</sup>, Nicola Dello Iacono<sup>8</sup>, Elena Facchini<sup>9</sup>, Giuseppe Peritore<sup>6</sup>, Alessia Pepe<sup>1</sup>**

<sup>1</sup>Fondazione G. Monasterio CNR-Regione Toscana, Pisa, Italia; <sup>2</sup>Ospedale "SS. Annunziata" ASL Taranto, Taranto, Italia; <sup>3</sup>Presidio Ospedaliero "Giovanni Paolo II" - Distretto AG2 di Sciacca, Sciacca (AG), Italia; <sup>4</sup>ARNAS Garibaldi P.O. Garibaldi-Centro, Catania, Italia; <sup>5</sup>Ospedale Civile "Spirito Santo", Pescara, Italia; <sup>6</sup>ARNAS Civico "Benfratelli-Di Cristina", Palermo, Italia; <sup>7</sup>Policlinico Umberto 1, Roma, Italia; <sup>8</sup>Ospedale Casa Sollievo della Sofferenza IRCCS, San Giovanni Rotondo (FG), Italia; <sup>9</sup>Azienda Ospedaliero-Universitaria di Bologna - Policlinico "S. Orsola-Malpighi", Bologna, Italia; [miot@ftgm.it](mailto:miot@ftgm.it)

**Introduction.** The gradient echo multiecho T2\* MRI technique is the most robust method for the non invasive, sensitive, and fast quantification of organ-specific iron overload. A crucial aspect is the transferability of the T2\* technique among different MRI scanners, in order to expand the availability of high-quality monitoring of iron accumulation to a large population. The transferability of the MRI multislice multiecho T2\* technique for pancreatic iron overload assessment has not been evaluated. Thus, the aim of our study was to assess the transferability of this approach among ten MRI sites.

**Methods.** All subjects underwent MRI using conventional clinical 1.5T scanners of three main vendors. Fifty healthy subjects, five for each site, including the reference centre, were scanned. Five patients with thalassemia were scanned locally at each site and were rescanned at the reference site in Pisa within 1 month.

T2\* image analysis was performed using custom-written, previously validated software (HIPPO MIOT®). T2\* values over pancreatic head, body and tail were calculated and the global pancreatic T2\* value was obtained as the mean. The lowest threshold of normal T2\* value was 26 ms.

**Results.** On healthy subjects the global pancreas T2\* values ranged from 28.93 to 48.89 ms (mean 37.88 ms, SD 5.08 ms). No significant difference was detected among the sites (P=0.334).

The global pancreas T2\* values for patients ranged from 2.08 to 38.39 ms. There was not a significant difference between the T2\* values measured in the MRI sites and the correspondent values observed in the reference center (12.02±10.20 ms vs 11.98±10.47 ms; P=0.808). All patients categorized as having pancreatic iron overload in the MRI sites, fell in the same category after the MRI executed in the reference center.

There was a strong correlation between the global pancreas T2\* values calculated from images obtained in the reference center and at the other MRI sites (R=0.978, P<0.0001).

The coefficient of variation (CoV) for all MRI sites ranged from 4.22 to 9.77%. The CoV for all the T2\* values independently from the sites was 8.55%.

The intraclass correlation coefficient (ICC) considering all the T2\* values, independently from the sites, was 0.995. The ICC for each MRI was always excellent.

The comparison between in the reference center and the other MRI sites by Bland-Altman analysis (see Figure) showed a mean absolute difference of  $-0.04 \pm 1.47$  ms for the global pancreas T2\* values. No bias was present and no greater differences for higher T2\* values were detected.

The mean absolute difference in patients with pancreatic iron (N=39) was  $-0.15 \pm 1.38$  ms.

**Conclusion.** The gradient-echo T2\* MRI technique is an accurate and reproducible means for the calculation of pancreatic iron and may be transferred between MRI scanners in different centers from different manufacturers.