



Cardiac iron loading and diastolic dysfunction in patients with b- thalassemia major

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β – Thalassemia

- **Monogenic disorder of hemoglobin synthesis causing chronic hemolytic anemia.**
- **Characterized by ineffective erythropoiesis, iron intestinal hyperabsorption and iron deposition in the tissues.**

Iron Overload Toxicity

- The nontransferin plasma iron has a high toxicity through the formation of hydroxy radicals.
- Imbalance between production of oxygen free radicals and antioxidant defense mechanisms can result in oxidative stress and myocardial cell damage.

Halliwell B Haemostasis 2003;23:118
Kukreja RC Cardiovasc Res 2002;26:641

EARLY DIASTOLIC DYSFUNCTION

- **B-thalassemia major is a unique disease characterized by early diastolic dysfunction, related exclusively to iron myocardial deposition.**

Kremastinos D, Hamodraka E, Parissis J, et al Am Heart Journal 2009

Kremastinos D, Tsiapras D, Hamodraka E, et al

Eur J Heart Fail 2007

MRI

- **Iron accumulation at heart can be measured by multislice T2* Magnetic Resonance Imaging (MRI) technique.**

Purpose:

- **The aim of our study was the assessment of diastolic function by echocardiography in relation to iron load as measured by MRI.**

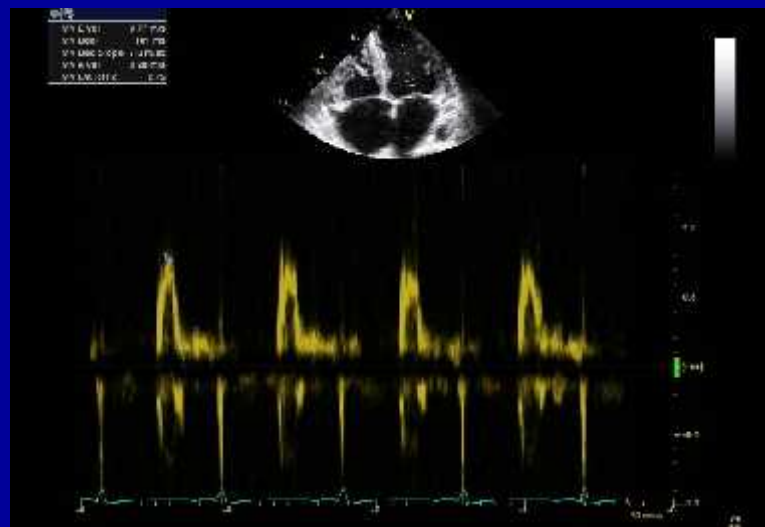
Methods:

50 β -thalassemia major patients (mean age 27.2 ± 12.5 years) with normal LV systolic function (mean LV EF = $59 \pm 6.8\%$) were included



Methods:

All subjects were studied thoroughly by tissue-Doppler- echocardiography . The pulsed Doppler sample for tissue Doppler echocardiography was placed to the lateral mitral annulus in order to measure diastolic and systolic annular velocities.



Methods:

Patients were divided in three groups according to Global heart T2* values.

- **Group A (n=19)– patients with mild myocardial load : $T2^* > 20$,**
- **group B(n=17) -patients with moderate myocardial load : $T2^* : 10-20$,**
 - **group C - patients with severe myocardial load(n=14): $T2^* < 10$**

RESULTS

E/E' ratio was increased in a statistically significant way in group C of patients with severe iron myocardial load

	Group A (mild myocardial load : T2*>20)	Group B (moderate myocardial load : T2*=0-20)	Group C (severe myocardial load : T2*<10)	P Anova
Ferritin (ng/mL)	1467 ± 756	2033 ± 844	2372 ± 780	0.025
E/Ea	9,4 ± 3,3	10,5 ± 2,6*	10,6 ± 6,3*	<0.001

* A vs C p<0.05, B vs C p<0.05



CONCLUSION

- The prevalence of diastolic dysfunction in patients with b- thalassemia is correlated to a higher cardiac iron burden as this is assessed by MRI T2* .
- The combination of the two techniques is useful for the management of b- thalassemia patients

THANK YOU

