

Lipids in the Interventricular septum (SEP) as promising indicators of cardiovascular (CV) events in hyperglycemic (HG) patients: an in vivo ¹H-MRS study

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Proton magnetic resonance spectroscopy (¹H-MRS) can detect and quantify lipid accumulation in specific myocardial or peri-myocardial districts.

Thirty-three patients (20M/13F; BMI 26±4 kg/m²; 64±10 yrs) with suspect of CV diseases underwent 1.5-T ¹H-MRS using a water-suppressed chemical-shift imaging sequence to quantify the lipid profile of SEP, epicardial (EAT), pericardial (PAT), and subcutaneous (SAT) adipose tissues. The integral of the lipid peaks at 0.9, 1.3, 2.0, 5.3 ppm was measured as percentage over the total amount of lipids (Table). A subgroup of 15 subjects were identified as hyperglycemic (HG = 12 impaired-fasting-glucose + 3 diabetics: 121±26 mg/dL). Bulk methylene (1.3 ppm) of SEP was higher in HG vs other patients (P=0.047). In HG patients, SEP was positively correlated to glucose, visceral fat, C-reactive protein (Spearman $\rho > 0.63$, P<0.018); EAT was positively correlated to visceral fat, age, body weight, and inversely to muscular-, fat free-, bone mass (Pearson $\rho < |0.53|$, P<0.039). In all subjects, the main lipid peaks correlated with metabolic parameters.

¹H-MRS allowed to measure lipid peaks in different adipose compartments with cardiometabolic relevance. SEP resulted a myocardial site associated with biomarkers of secondary heart events in pre/diabetic patients at higher risk of CV episodes. High SEP fat may be proposed as a marker of future CV events.

Table. Integral of the main lipid peaks in the four analyzed compartments in non-hyperglycemic (Non-HG) and hyperglycemic (HG) patients suspected for being affected with CV disease

	0.9-ppm Peak		1.3-ppm Peak		2.0-ppm Peak		5.3-ppm Peak	
	Non-HG	HG	Non-HG	HG	Non-HG	HG	Non-HG	HG
SEP	13 ± 17	8 ± 6	65 ± 20	70* ± 15	15 ± 9	13 ± 9	15 ± 11	10 ± 8
EAT	14 ± 11	14 ± 9	71 ± 12	66 ± 11	11 ± 7	14 ± 9	10 ± 5	11 ± 9
PAT	11 ± 7	8 ± 4	70 ± 11	68 ± 13	17 ± 8	14 ± 8	7 ± 4	12 ± 7
SAT	13 ± 8	11 ± 6	64 ± 20	60 ± 13	18 ± 10	20 ± 6	16 ± 10	20 ± 7

Data are percentages over the total amount of fat and are shown as mean ± SD

** P=0.047 in HG patients vs non-HG patients at 1.3 ppm*

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