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Correlation of MRI PDFF calculated fat mass in liver and liver fat fraction, with possible steatosis factors: eGFR, glucose, cholesterol, triglyceride and BMI

Koussis P.[1], Toulas P. [2], Thiveos G.[1] , Lamprou E.[3], Pappa G.[1] , Meritsi A.[4], Thanopoulou A.[4], Manesis E. [5]

[1] BIOIATRIKI Health Care Group/Medical Physics, Athens, Greece

[2] BIOIATRIKI Health Care Group/MRI, Athens, Greece

[3] 2nd General Lyceum Vrilissia/Mathematics dep., Athens, Greece

[4] Diabetic Center, Medical School, National and Kapodistrian University of Athens, Athens, Greece

[5] Liver Unit, Euroclinic, Athens, Greece

Declarations

The scientific team declares that:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

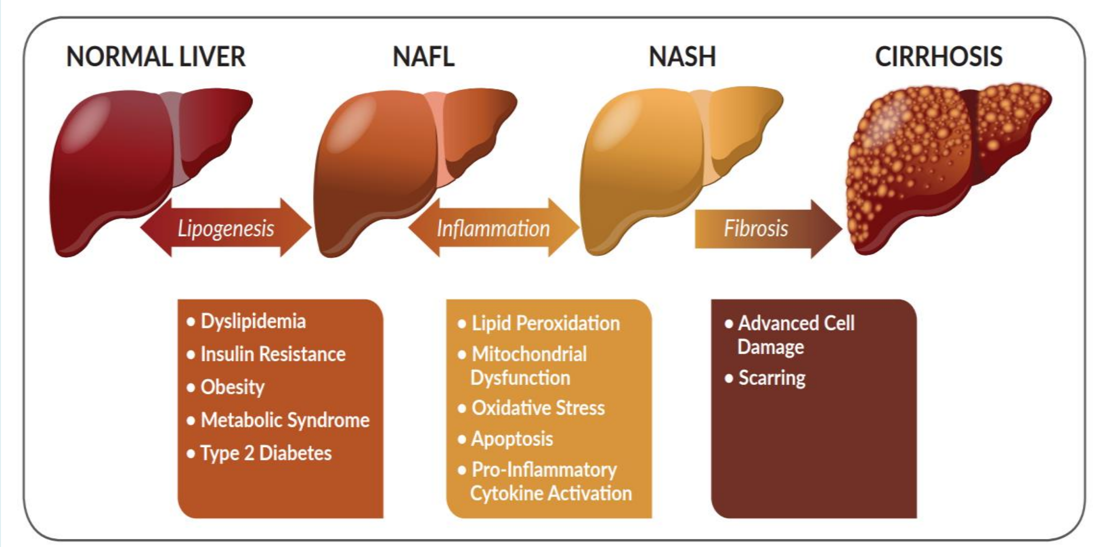
There is no potential financial conflict-of-interest.

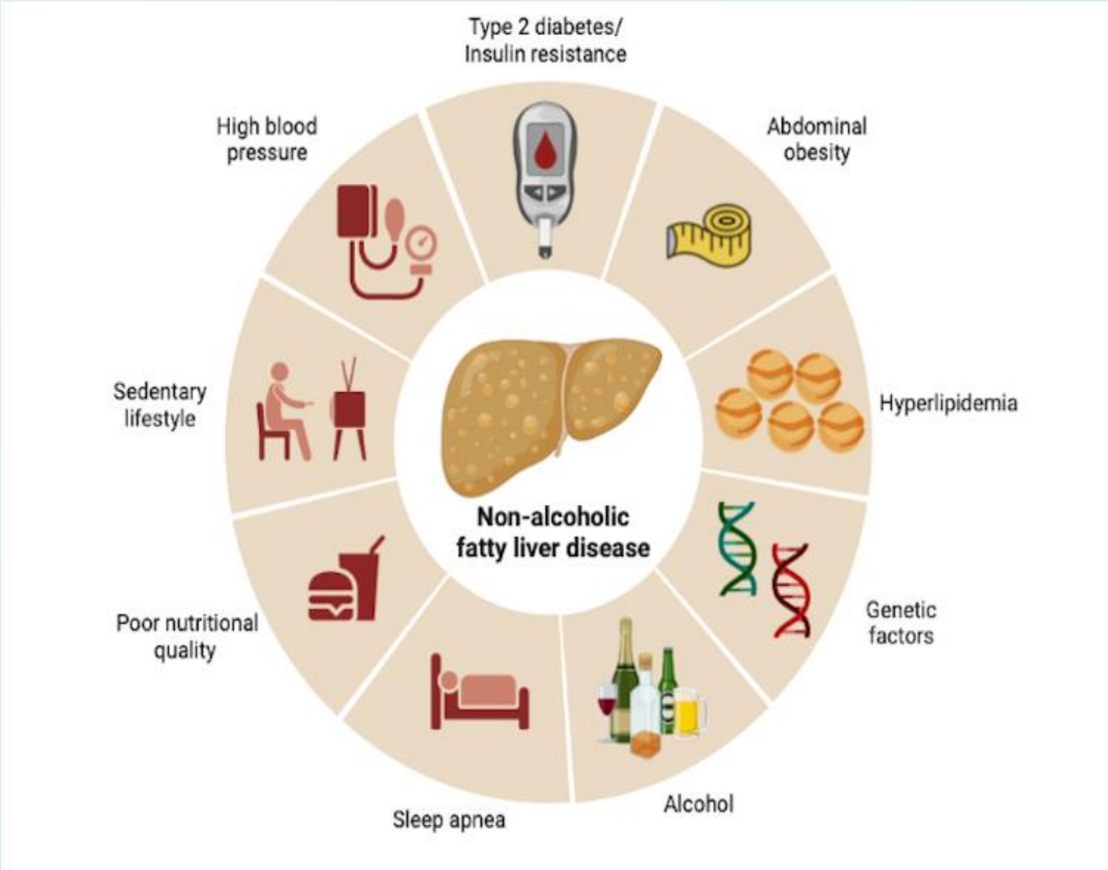
All participants were fully informed about the study.

All patient data treated anonymously.

Privacy and data protection were ensured according to the applicable General Data Protection Regulation protocols.

1. Background-Aim





Steatosis affects 30% of the global population, a growing global health concern with high risk factors like obesity, t2 diabetes, renal function, cholesterol and triglyceride.

In previous studies we proved the linear regression of liver volume with fat mass and steatosis grade, with PDFF MRI. And the relation of PNPLA3 with steatosis grade and fat fraction.

This is a post-processed analysis, from that initial data aiming to investigate any possible correlation of fat mass in liver and fat fraction, with renal function, cholesterol, triglycerides, BMI and glucose. Factors that considered to have strong relation with steatosis.

2. Materials & Methods

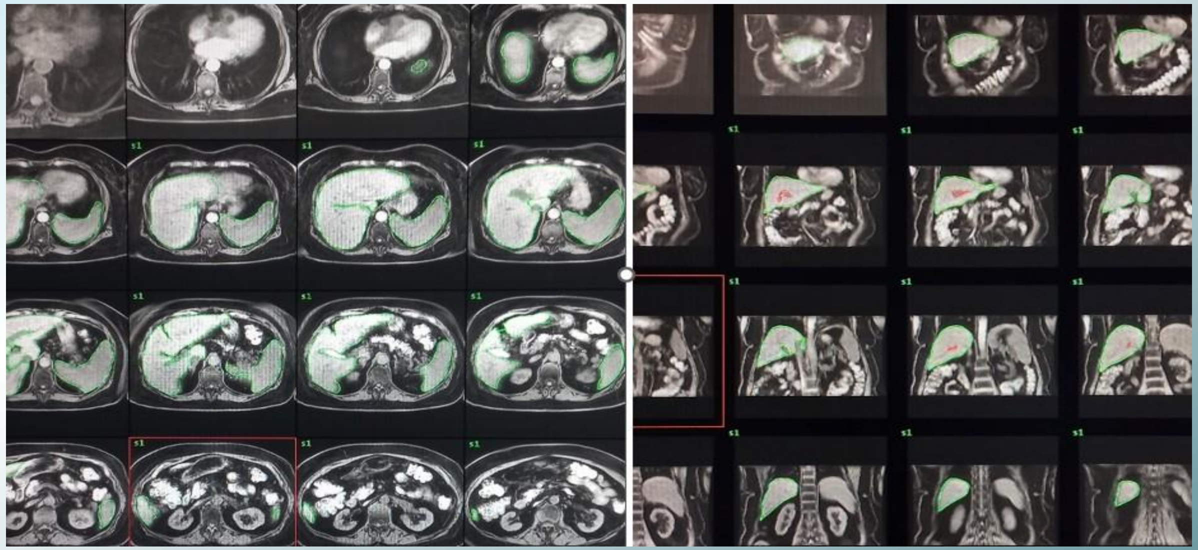
A sample of 121 NAFLD patients (75 M/ 46 F), with average age 60y,

had liver MRI in our lab at BIOIATRIKI Ampelokipon (MR GE Discovery 3.0T)

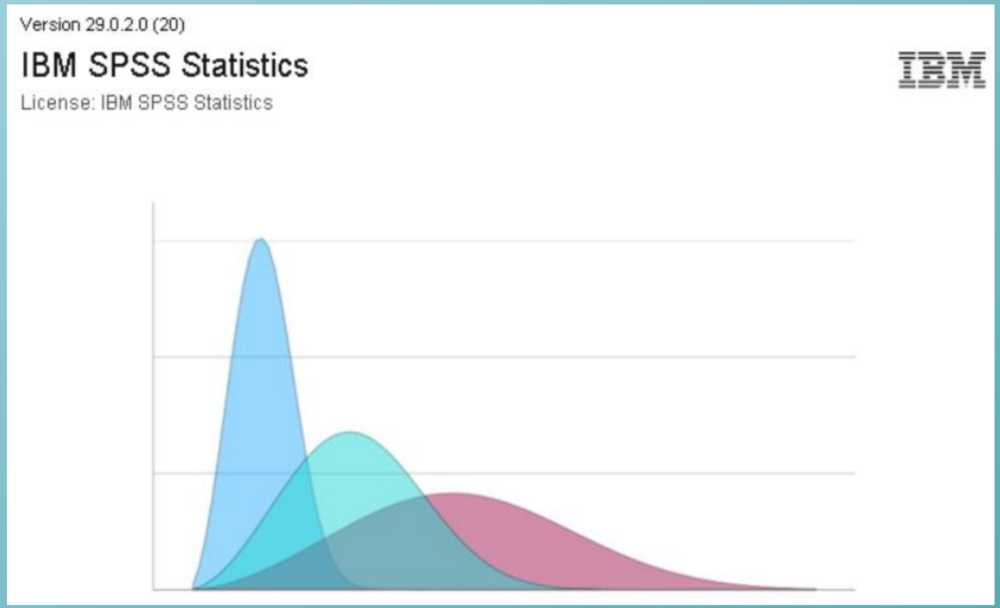
The protocol included GE IQ IDEAL for liver fat fraction measurements and 3DLAVA seq. for liver volume calculation.

Blood tests for creatine (GFR calculation), cholesterol, triglycerides and glucose also performed.

From age, gender, height and mass information, BMI was calculated.



2. Materials & Methods



- Multivariate regression analysis of variant performed to evaluate the blood tests results (independent variables)
- with fat mass in liver and fat fraction (depended variables) that calculated by PDFF.
- For the analysis IBM SPSS statistical software used. Coefficients with t-value >0 are significant.

3. Results

In the total population, regression analysis showed an ***exponential correlation*** of **fat mass** in liver and BMI (R^2=0.2)

For the fat mass in liver: **GFR** and **choline** are ***not significant*** (t<0). The ***most significant value*** **was BMI** (t=3.35, p<0.05) and **triglycerides** (t=1.59, p=0.11).

Glucose had ***low significance*** (t=0.79, p=0.43).

For the liver fat fraction: eGFR, glucose and choline are insignificant (t<0). The ***most significant value*** **was BMI** (t=2.14, p<0.05). **Triglycerides** ***had lower significance*** (t=0.23, p=0.82).

3. Results

Coefficients[a]

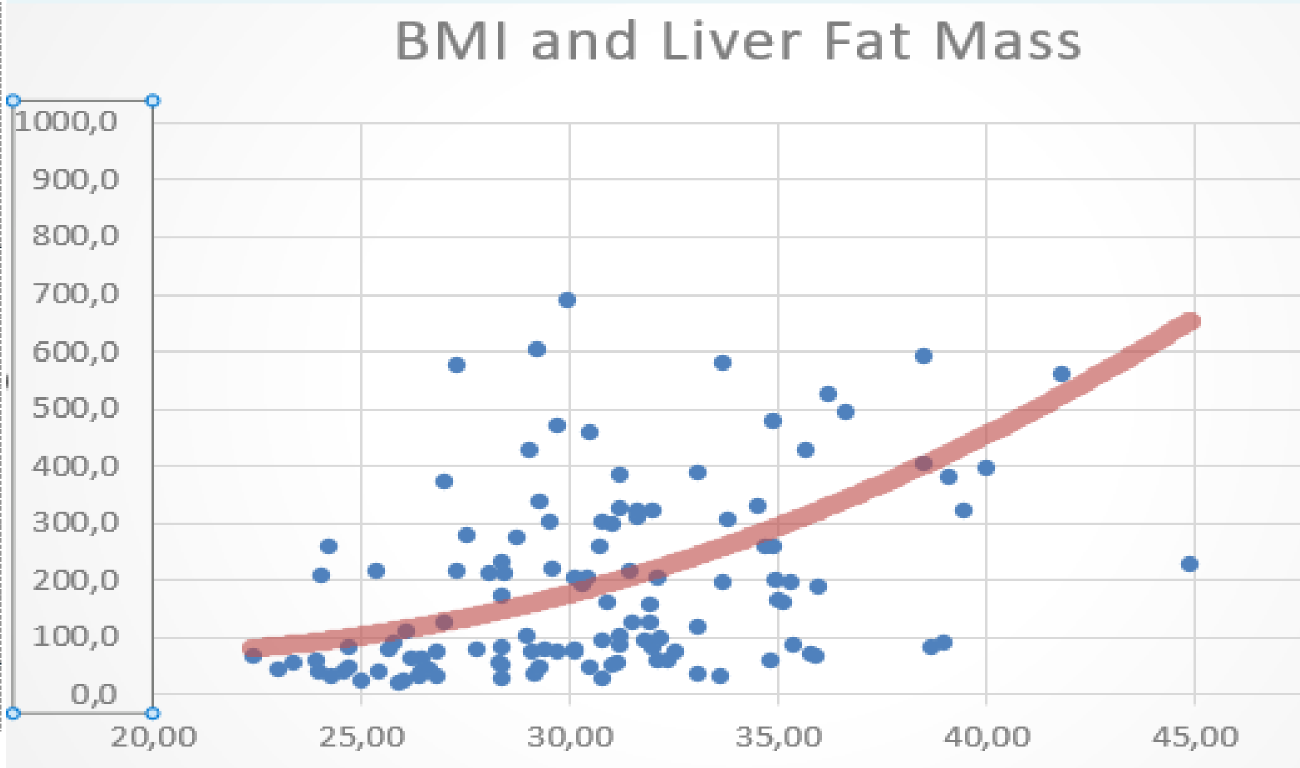
Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95,0% Confidence Interval for B Lower Bound	Upper Bound
1	(Constant)	2,201	17,418		,126	,900	-32,300	36,702
	BMI	,670	,387	,167	1,732	,086	-,096	1,436
	Glu	-,027	,050	-,053	-,544	,587	-,125	,071
	TG	,014	,024	,056	,557	,579	-,035	,062
	1/GFR	-683,277	516,676	-,122	-1,322	,189	-1706,712	340,158
	Chol	-4,332e-5	,046	,000	-,001	,999	-,092	,092

a. Dependent Variable: average **FAT FRACTION**

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	95,0% Confidence Interval for B Lower Bound	Upper Bound
1	(Constant)	-,577	,834		-,691	,491	-2,230	1,076
	1/GFR	-40,673	24,753	-,144	-1,643	,103	-89,703	8,357
	Chol	,000	,002	-,013	-,144	,886	-,005	,004
	BMI	,059	,019	,289	3,158	,002	,022	,095
	Glu	,002	,002	,078	,852	,396	-,003	,007
	TG	,002	,001	,171	1,799	,075	,000	,004

a. Dependent Variable: **FAT MASS in liver**



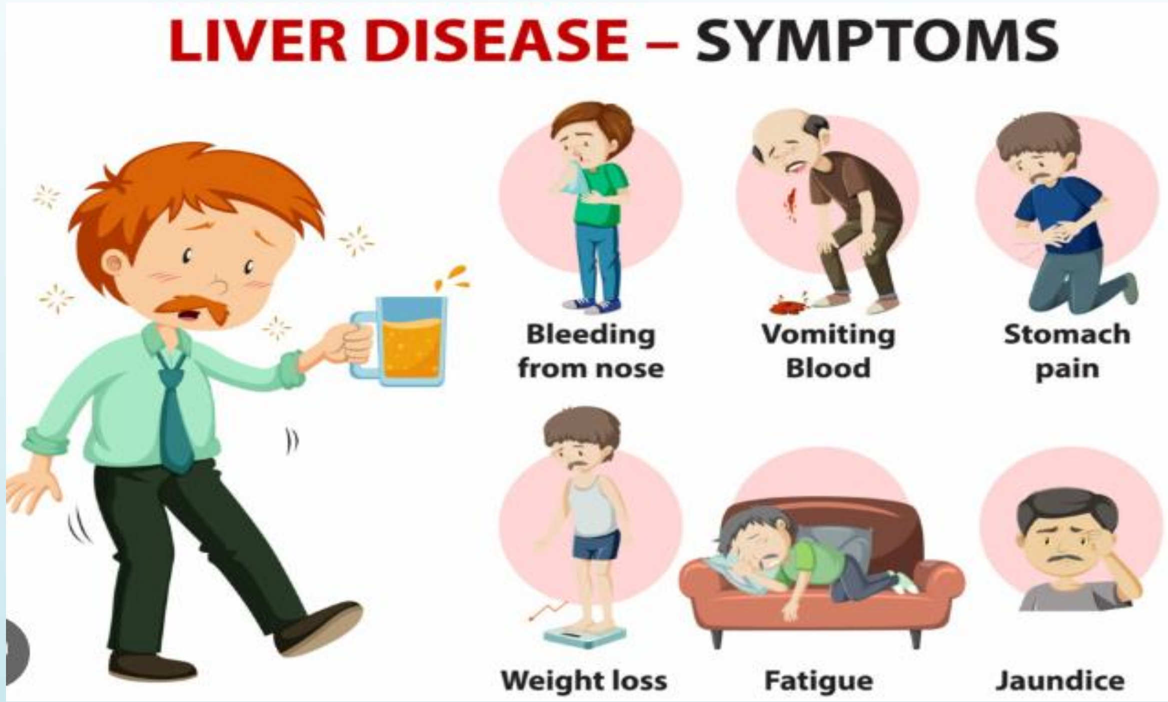
Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-12,300	11,255		-1,093	,277
	BMI	,786	,368	,196	2,138	,035
	TG	,005	,022	,021	,228	,820

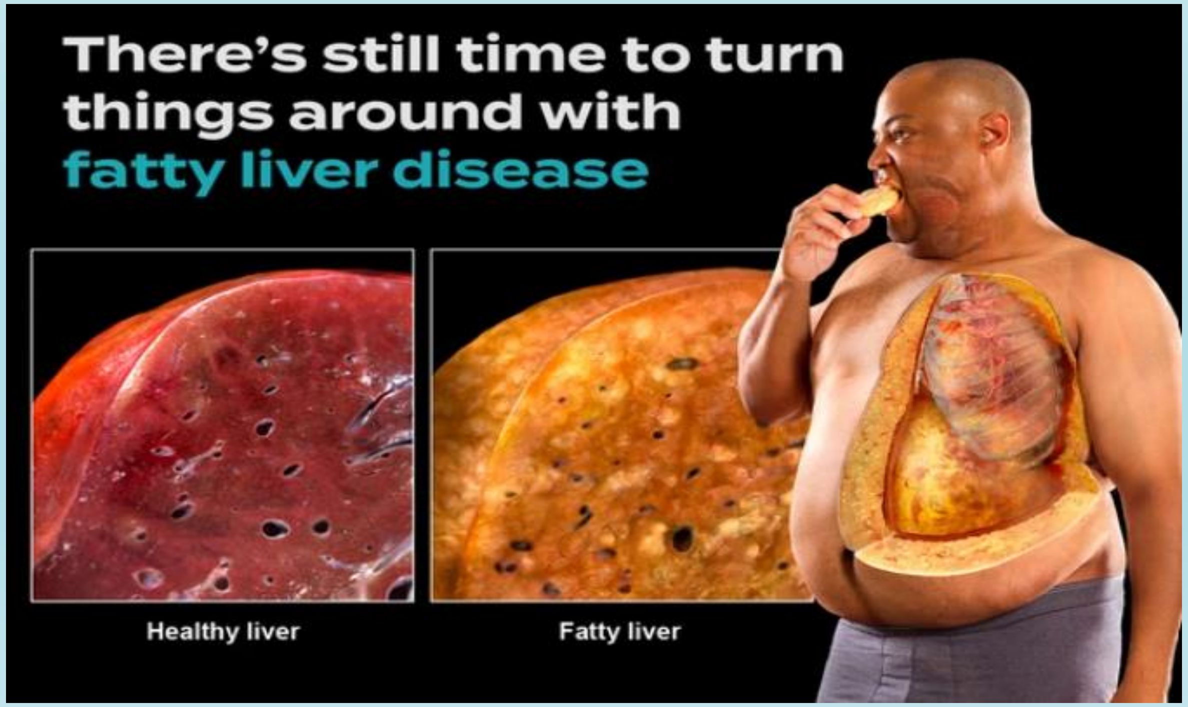
a. Dependent Variable: av ff

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-1,184	,684		-1,730	,086
	BMI	,062	,018	,305	3,349	,001
	Glu	,002	,002	,073	,794	,429
	TG	,002	,001	,146	1,593	,114

a. Dependent Variable: MRfatLBx

4. Conclusions





Renal function, choline and glucose were found not to be insignificant factors for steatosis.

The most important factor for raised fat mass and fat fraction, was **BMI.**

This proves that obesity and life-style play a key role in steatosis.

5. References

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