

Magnesium deficiency and minimal hepatic encephalopathy among patients with compensated liver cirrhosis

Keren Cohen-Hagai MD¹, Dan Feldman MD²,
Tirza Turani-Feldman BOT³, Ruth Hadary MD^{2,4,5},
Shilo Lotan^{2,5}, Yona Kitay-Cohen MD^{2,4,5}

¹Department of Nephrology and Hypertension, ²Department of Internal Medicine C,
³Department of Occupational Therapy, ⁴Liver Unit, Meir Medical Center, Kfar Saba, Israel;
⁵Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel



Background

- ❖ Magnesium (Mg) is an essential intracellular cation
- ❖ Correlation between serum level and total body content is poor, since most Mg is intracellular
- ❖ Mg deficiency is common in the general population
- ❖ Its prevalence among patients with cirrhosis is even higher



Cont. - Background

- Minimal hepatic encephalopathy (MHE) is a subclinical phase of hepatic encephalopathy in which there are no overt symptoms
- Cognitive exams can reveal minor changes in coordination, attention and visual motor function, whereas language and verbal intelligence are usually relatively spared



- To assess the correlation between intracellular and serum Mg levels and MHE
- To assess the benefit of Mg supplements in this population

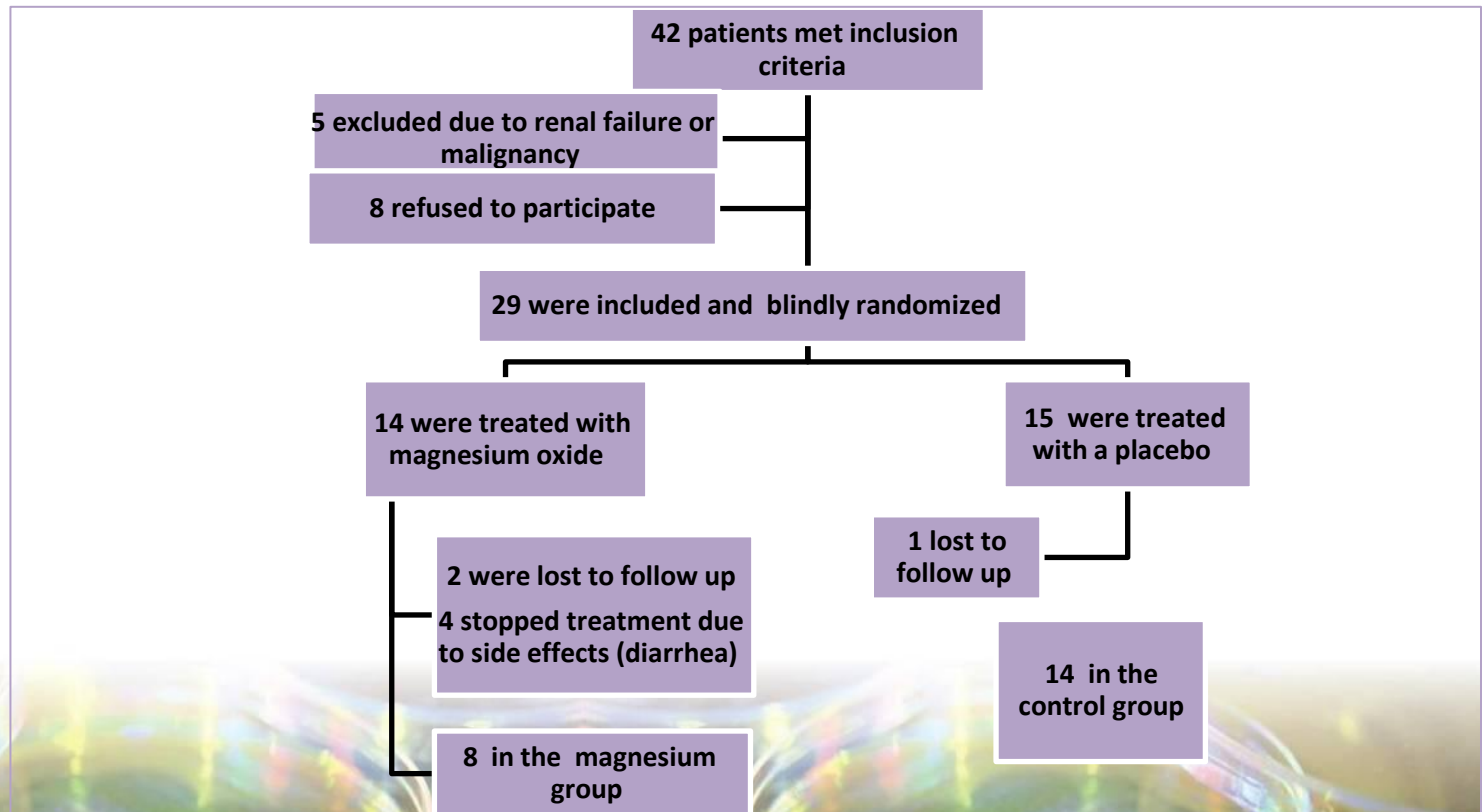


Methods

- ❖ Outpatients with a diagnosis of compensated liver cirrhosis were enrolled
- ❖ Randomized, double-blinded study
- ❖ Serum and intracellular magnesium levels were measured
- ❖ Cognitive function was assessed by a specialized occupational therapist



- Patients were randomly divided to control (placebo) and interventional (treated with magnesium oxide) arms



Results

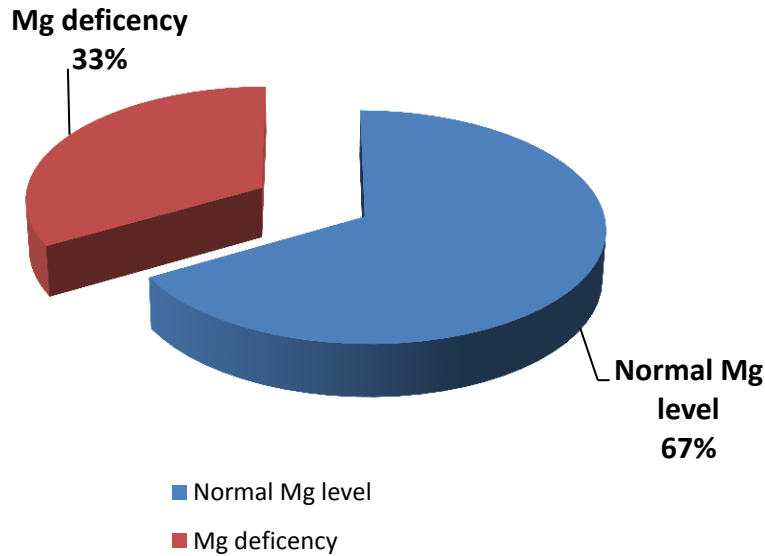
- ❖ 29 patients met the inclusion criteria
- ❖ 65.5% male , 34.5% female

<u>Table 1 (N=29)</u>	
Age (years)	62.8±10.7
DM	48.3%
Hypertension	41.4%
Dislipidemia	31.0%
AF	0.0%
IHD	10.3%
CHF	3.4%
PVD	3.4%
Active smoking	10.3%
HIV	3.4%

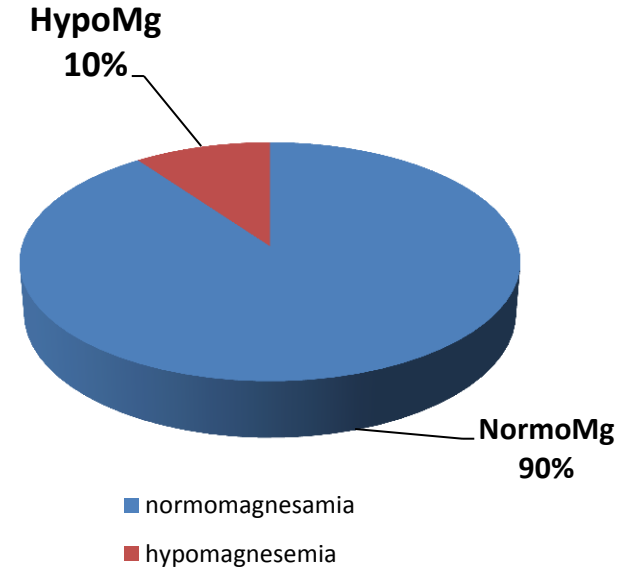
<u>Liver disease</u>	
HBV	20.7%
HCV	34.5%
PSC/PBC	3.4%
NAFLD	24.1%
AUTOIMMUNE HEPATITIS	3.4%
Other	13.8%

Prevalence of magnesium deficiency among study population

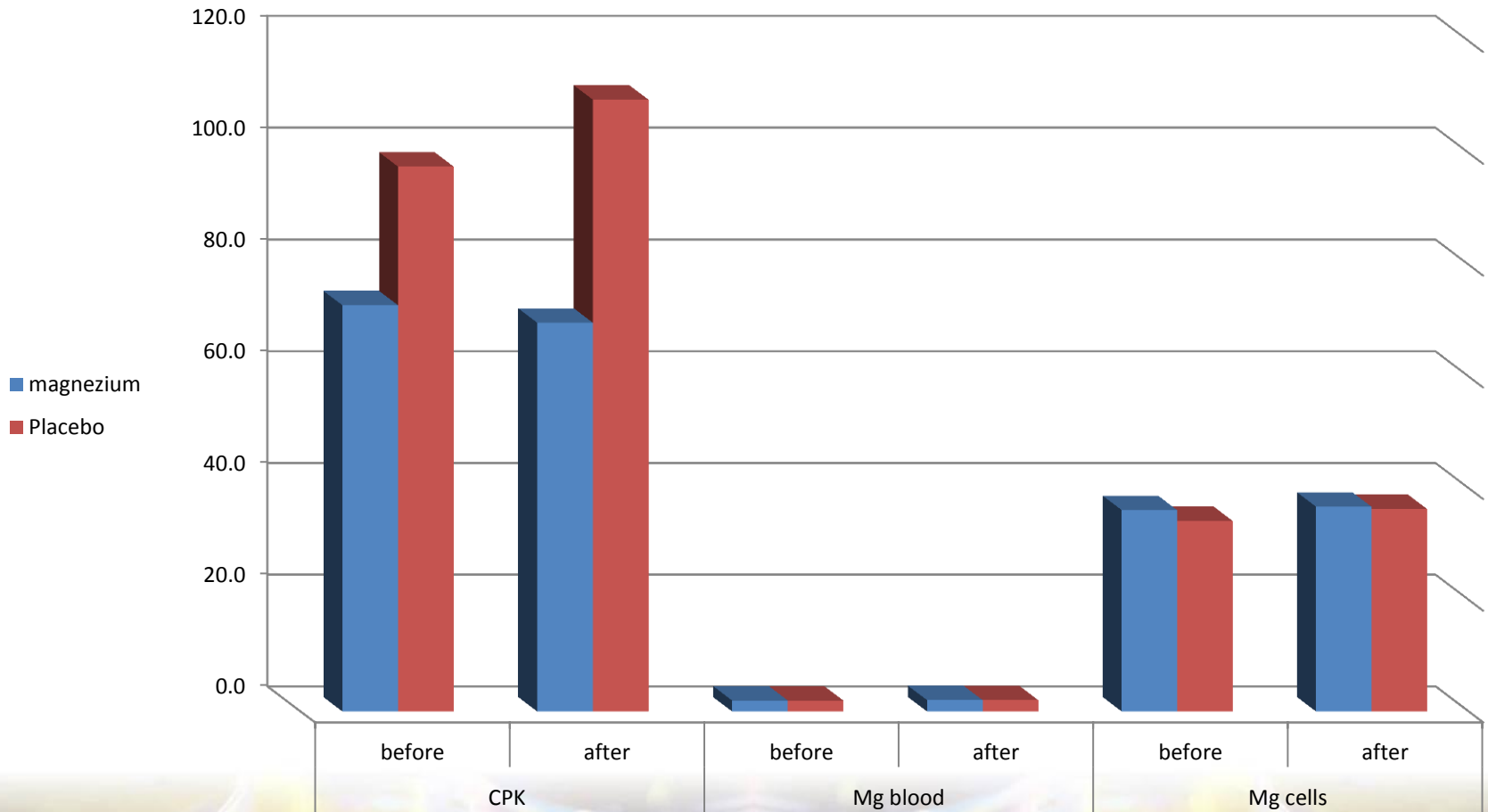
Intracellular magnesium



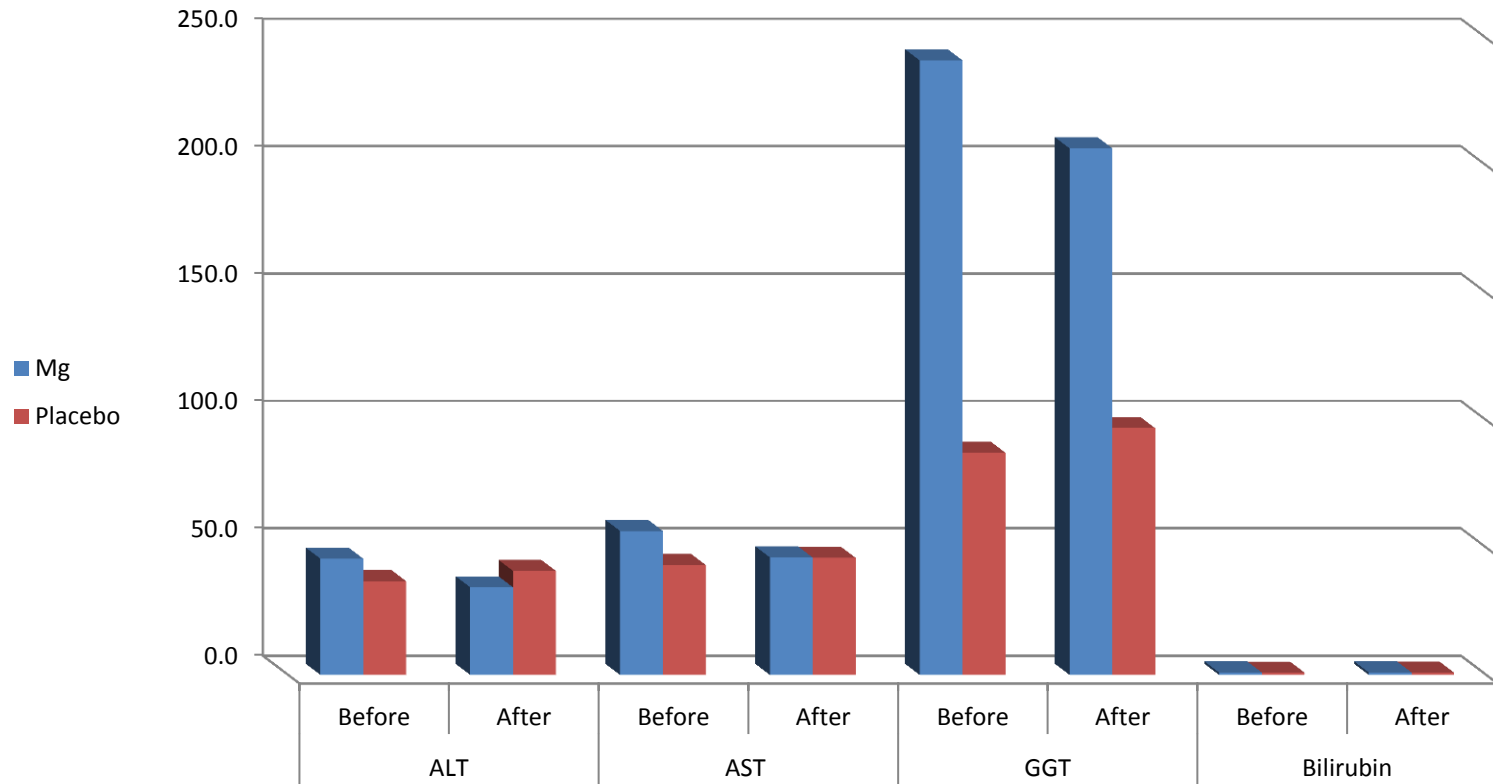
Serum magnesium



CPK, Mg level before and after treatment

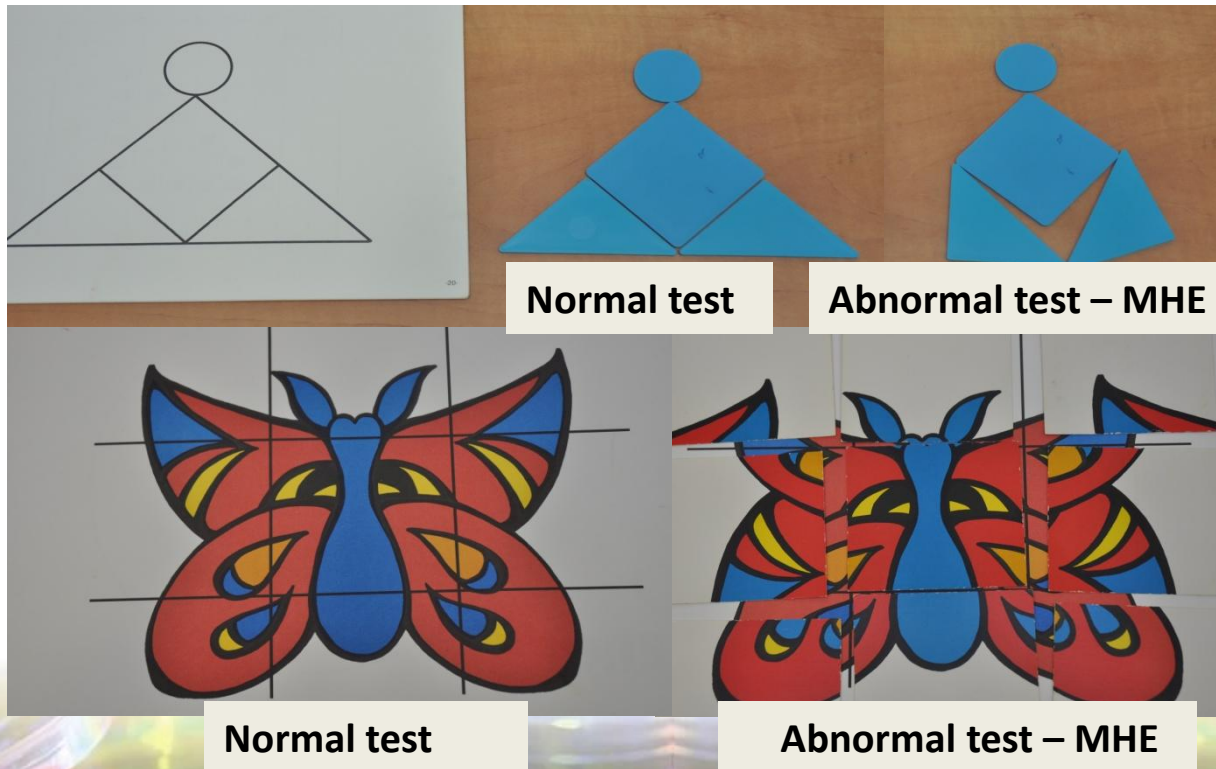


Hepatocellular enzyme levels before and after treatment



Cont. - Results

- ❖ 83% of the patients had abnormal cognitive exam compatible with MHE



- Initial Mg levels (both intracellular and serum levels) were positively correlated to cognitive performance

LAB before		ציר שעות	כיון שעות	MOCA	זיכרון לטווח ארוך	חשיבה מופשטת	פאזל	חזרה
ALTb	Correlation	014.-	050.-	030.	115.	265.	104.	383.
	Sig.	959.	848.	910.	659.	305.	691.	129.
ASTb	Correlation	088.	050.	040.	044.	191.	154.	480.
	Sig.	737.	848.	880.	866.	463.	555.	051.
GGTb	Correlation	173.-	239.-	226.-	035.-	427.	327.-	227.
	Sig.	506.	356.	383.	895.	087.	200.	380.
CPKb	Correlation	027.-	126.-	151.-	160.-	252.-	178.-	172.-
	Sig.	918.	631.	564.	540.	328.	494.	509.
amonia b	Correlation	021.	314.	143.-	122.-	108.-	110.-	164.
	Sig.	937.	219.	585.	642.	681.	676.	528.
Mgblood	Correlation	484.-	315.-	082.-	119.	344.	*589.-	231.-
	Sig.	058.	235.	763.	661.	192.	016.	389.
Mgcells b	Correlation	065.-	164.-	323.	215.	038.-	118.	**628.
	Sig.	805.	530.	206.	408.	886.	652.	007.



Conclusion

- ❖ Mg deficiency is common among patients with compensated liver cirrhosis
- ❖ We found an association between Mg deficiency and impairment in several cognitive function tests that might indicate involvement of Mg in the pathophysiology of MHE



Acknowledgment

- **Dr. Yona Kitay-Cohen** - Department of Internal Medicine C ,
Liver Unit
- **Tirza Turani-Feldman** - Department of Occupational Therapy
- **Dr. Dan Feldman** - Department of Internal Medicine C
- **Dr. Ruth Hadary** - Department of Internal Medicine C, Liver
Unit
- **Department of Internal Medicine C**
- **Liver Unit**
- **Naveh pharma**

