Managing and Monitoring NAFLD: Comparison of Fibroscan Changes in GLP-1RA Users vs Nonusers

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Background

- Non-alcoholic fatty liver disease (NAFLD) is defined as the presence of macrovesicular steatosis in ≥ 5% of hepatocytes in the absence of secondary causes such as alcohol abuse or steatogenic drugs.
- NAFLD has increased in global prevalence to 20-30% and is projected to become the leading cause of liver transplantation in the United States.
- Management focuses on lifestyle modifications, bariatric surgery, and pharmacologic management of co-morbidities.
- Recent guidelines published by the American Association of Clinical Endocrinology have recommended the use of Glucagon-Like Peptide 1 Receptor Agonists (GLP-1RAs) in the treatment of NAFLD, especially in diabetics.
- This study retrospectively compared changes in Fibroscan™ in GLP-1RA users vs nonusers in a real-world clinical scenario.

Methods

- A retrospective analysis was performed of patients with NAFLD from the UCHealth Endocrinology or Hepatology Clinic who completed two Fibroscans™ separated by 6 months
- Males ≥21 drinks/week or females ≥14 drinks/week were excluded from the study.
- Changes in Controlled Attenuation Parameter (CAP), Liver Stiffness Measurement (LSM), and metabolic parameters (weight, BMI, blood pressure, liver enzymes, A1c, lipid values) were compared between GLP-1RA Users (N=48) and Non-Users (N=42).
- Changes in these parameters were also compared between Responders (N=51) and Non-Responders (N=39) (based on CAP change of > 38 dB/m).
- Laboratory studies and anthropomorphic data were collected within 3 months of the initial and follow up Fibroscan™.
- Fibroscan™ M or XL probes were used based upon manufacturer's recommendations.
- Statistical analysis was conducted using two sample t-tests, Wilcoxon rank sum tests, and simple linear regression models.
- This study was approved by the Colorado Multiple Institutional Review Board (COMIRB).

Results

Table 1. GLP-1 Users vs. Non-Users

Measure	*GLP1 Users Pre*	*GLP1 Users Post*	*GLP1 Users Change*	*GLP1 Non-Users Pre*	*GLP1 Non-Users Post*	*GLP1 Non-Users Change*	*p-value*
Weight (kg)	93.9 (18.0)	86.3 (16.1)	-7.5 (9.1)	93.0 (16.9)	89.8 (17.8)	-3.1 (6.9)	0.011
BMI (kg/m2)	33.0 (5.4)	30.3 (4.7)	-2.7 (3.2)	32.3 (5.0)	31.2 (5.1)	-1.1 (2.5)	0.013
Systolic Blood Pressure	126.2 (15.4)	121.4 (14.5)	-4.8 (18.1)	135.4 (18.8)	124.2 (18.3)	-11.1 (19.7)	0.132
Diastolic Blood Pressure	74.5 (8.8)	71.8 (10.4)	-2.6 (12.7)	76.7 (8.5)	72.5 (9.4)	-4.4 (9.4)	0.461
ALT	40.0 (26.0, 68.0)	22.0 (17.0, 31.0)	-15.0 (-33.0, -2.0)	45.0 (25.5, 64.0)	32.0 (24.0, 55.0)	-3.0 (-18.0, 4.0)	0.019*
AST	28.0 (21.0, 40.0)	21.0 (18.0, 25.0)	-4.0 (-17.0, -1.0)	33.5 (22.0, 40.5)	29.0 (21.0, 37.0)	1.0 (-10.0, 6.0)	0.025*
Total Cholesterol	170.5 (43.1)	147.8 (39.0)	-22.6 (39.5)	175.2 (48.6)	147.3 (40.7)	-27.9 (43.0)	0.696
LDL Cholesterol	91.0 (59.0, 120.5)	79.0 (49.5, 102.5)	-3.0 (-42.0, 14.0)	92.0 (58.0, 134.0)	75.0 (53.0, 108.0)	-17.0 (-48.0, 11.0)	0.555*
Triglycerides	192.1 (98.2)	147.6 (84.2)	-48.1 (107.5)	217.3 (149.7)	175.0 (57.9)	-35.0 (145.5)	0.762
HDL Cholesterol	41.4 (8.9)	44.5 (10.5)	3.1 (8.3)	38.1 (12.4)	41.0 (12.0)	2.9 (6.7)	0.919
Non-HDL	128.5 (40.3)	103.3 (38.6)	-25.2 (36.5)	137.1 (48.7)	106.3 (36.1)	-30.8 (41.7)	0.664
Hemoglobin A1c	7.0 (5.9, 8.8)	6.0 (5.6, 7.0)	-0.7 (-1.3, -0.2)	6.7 (6.3, 7.9)	6.9 (6.2, 7.3)	0.0 (-1.0, 0.6)	0.026*
LSM	6.9 (4.8, 9.3)	5.8 (4.4, 7.4)	-0.6 (-3.8, 0.7)	7.7 (5.5, 10.4)	6.7 (5.2, 8.5)	-0.5 (-2.2, 1.5)	0.493*
CAP	336.0 (37.8)	274.1 (63.0)	-61.6 (57.9)	333.0 (39.8)	303.9 (56.3)	-28.8 (62.7)	0.012

Figure 1. Percent Weight Change in GLP-1RA Users vs Non-Users

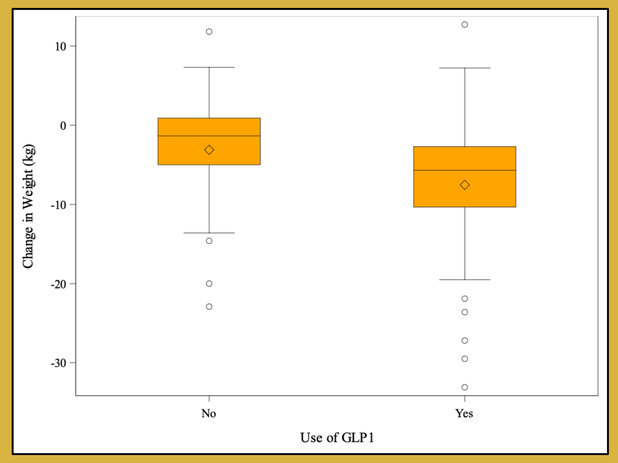


Figure 3. Association between Percent Weight Change and GLP-1RA Use with CAP Score Change

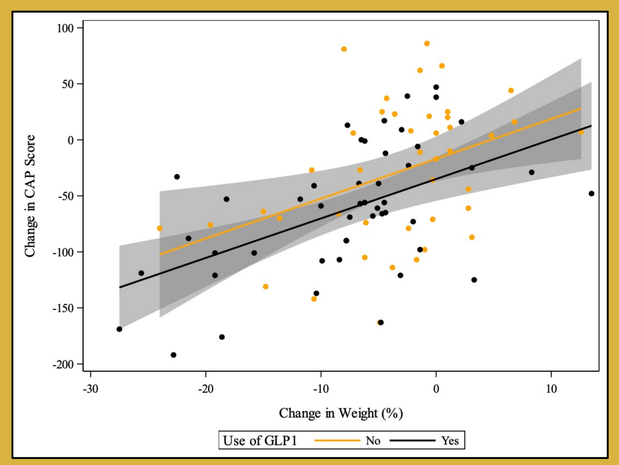


Table 2. Responders vs. Non-Responders

Measure	*Responders Pre*	*Responders Post*	*Responders Change*	*Non-Responders Pre*	*Non-Responders Post*	*Non-Responders Change*	*p-value*
Weight (kg)	92.2 (17.0)	83.9 (15.4)	-8.4 (8.6)	95.1 (18.0)	93.4 (17.5)	-1.7 (6.5)	<.001
BMI (kg/m2)	32.4 (4.9)	29.5 (4.0)	-3.0 (3.0)	33.0 (5.7)	32.4 (5.5)	-0.6 (2.3)	<.001
Systolic Blood Pressure	129.5 (18.6)	119.5 (17.0)	-10.0 (19.3)	131.9 (16.3)	127.3 (14.5)	-4.6 (18.4)	0.196
Diastolic Blood Pressure	75.1 (8.4)	69.9 (11.2)	-5.2 (11.8)	76.2 (9.1)	75.3 (6.7)	-0.9 (10.0)	0.075
ALT	39.5 (25.0, 65.0)	24.0 (17.0, 32.0)	-9.0 (-38.0, 1.0)	45.0 (26.0, 68.0)	44.0 (24.0, 61.0)	-2.0 (-20.0, 1.0)	0.078*
AST	27.0 (21.0, 40.0)	21.0 (18.0, 25.0)	-4.0 (-15.0, 2.0)	35.0 (23.0, 45.0)	29.0 (20.0, 40.0)	-2.0 (-16.0, 4.0)	0.316*
Total Cholesterol	171.6 (44.6)	140.7 (41.7)	-30.9 (36.7)	173.1 (45.8)	159.4 (32.1)	-13.7 (44.9)	0.206
LDL Cholesterol	92.0 (58.0, 130.0)	68.0 (46.0, 93.0)	-16.0 (-48.0, 1.0)	85.5 (63.0, 118.5)	94.5 (78.0, 108.5)	11.0 (-31.0, 26.0)	0.042*
Triglycerides	188.0 (81.6)	139.1 (70.2)	-48.8 (90.5)	222.8 (162.3)	187.6 (79.0)	-34.6 (162.3)	0.750
HDL Cholesterol	41.9 (9.7)	44.6 (11.2)	2.7 (8.0)	37.6 (10.9)	41.1 (10.8)	3.6 (7.3)	0.722
Non-HDL	129.1 (39.8)	96.1 (39.8)	-33.0 (32.1)	135.5 (49.2)	118.3 (28.7)	-17.3 (45.7)	0.237
Hemoglobin A1c	7.0 (6.2, 8.7)	6.0 (5.6, 7.1)	-0.8 (-1.3, -0.3)	6.7 (6.2, 8.0)	6.9 (6.2, 7.3)	0.3 (-0.9, 0.6)	0.001*
LSM	7.6 (5.0, 9.4)	5.4 (4.1, 7.2)	-1.3 (-4.2, 0.1)	6.8 (5.2, 9.5)	7.2 (5.7, 9.3)	0.3 (-0.6, 2.4)	<.001*
CAP	341.7 (35.7)	250.5 (44.5)	-91.0 (38.1)	325.3 (40.7)	337.1 (43.4)	12.0 (30.6)	<.001

Figure 2. Percent Weight Change in Responders vs Non-Responders

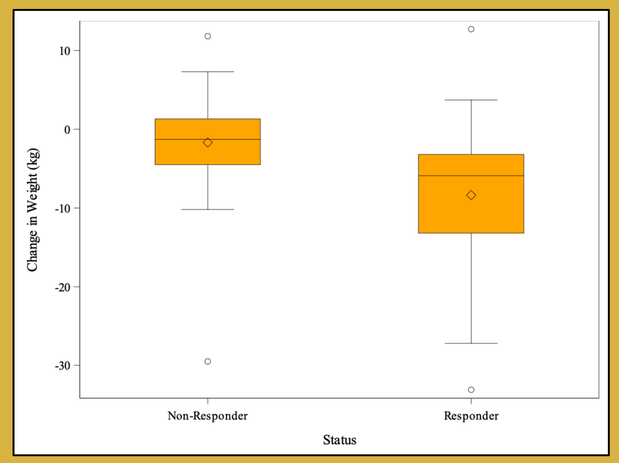
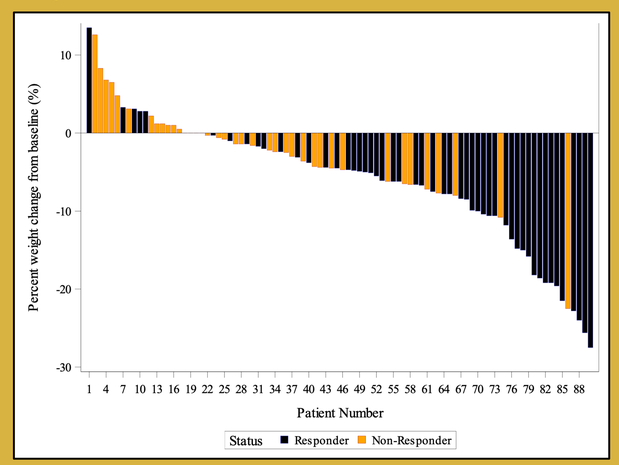


Figure 4. Percent Weight Change of Patients Based on Responder Status



- There was a significant improvement in CAP (-61.6% vs -28.8% p=0.012) in GLP-1RA users vs nonusers, although LSM was not significantly different (-0.6 kPa vs -0.5 kPa p=0.493).
- Weight (-7.5% vs -3.1% p=0.011), BMI (-2.7% vs -1.1% p=0.013), ALT (-15 U/L vs -3.0 U/L p=0.019), AST (-4.0 U/L vs 1.0 U/L p=0.025), and A1c (-0.7 vs 0.0 p=0.026) were significantly better in GLP-1RA users than nonusers.
- Weight (-8.4% vs -1.7% p<0.001), BMI (-3.0% vs -0.6% p<0.001), LDL (-16.0 vs 11.0 p=0.042), and A1c (-0.8 vs 0.3 p=0.001) were significantly better in responders than non-responders.
- % weight change and GLP-1RA use were significantly associated with changes in CAP score. In the single variable models, CAP score increased by 3.82 units (95% CI: 2.42, 5.22) for every 1% increase in percent weight change. Additionally, GLP-1RA users averaged a 32.81 unit (95% CI: -58.01, -7.55) decrease in CAP score compared to nonusers.
- However, in the full model that included % weight change and GLP-1RA use, GLP-1RA use was no longer significantly associated with changes in CAP score (p=0.132).

Conclusions

- GLP-1RA use is associated with improvements in CAP score, weight, liver enzymes, and A1c.
- Weight loss with GLP-1RA use appears to be the likely mechanism for liver improvement.
- The CAP change cutoff of >38 dB/m is linked to weight loss as well as improvements in LSM and metabolic parameters, suggesting the utility of Fibroscan in the surveillance of fatty liver disease.

References

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