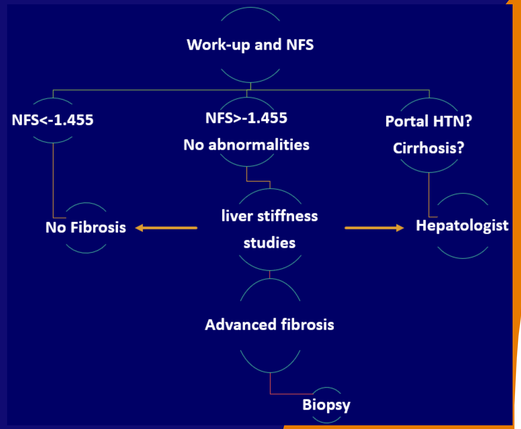
NAFLD In Bariatric Patients: The Value Of NAFLD Fibrosis Score In Determining Who Needs Liver Biopsy

Amir Bashiri, MD, Sri Senepathi, MD, Raeva Mulloth, Bruce D Askey, Mustafa Aman, MD, MHA, FACS, FASMBS
Guthrie Robert Packer Hospital, Sayre, PA, USA

INTRODUCTION

NAFLD and NASH can affect the perioperative management of bariatric patients. Recently, in a position statement, ASMBS proposed using NAFLD fibrosis score (NFS) to screen for liver fibrosis in patients undergoing metabolic bariatric surgery (MBS). In this study, we set out to validate this algorithm in a cohort of bariatric patients.



METHODS

Retrospective, single center analysis of 384 patients undergoing RYGB and LSG with liver biopsy. Patient data included age, gender, BMI, HgA1C, comorbidities (HTN, HPL, SA), AST, ALT, albumin, biopsy results, and platelets. R studio software program was used for data analysis.

RESULTS

Preoperative parameters		RYGB	LSG	p
Age	Median (IQR)	44.0 (36.0 to 52.0)	43.0 (34.0 to 51.5)	0.755
Sex	F	137 (77.0)	149 (78.0)	0.908
	M	41 (23.0)	42 (22.0)	
BMI	Median (IQR)	43.1 (39.2 to 47.9)	42.1 (38.7 to 46.8)	0.274
Albumin	Median (IQR)	4.3 (4.1 to 4.4)	4.3 (4.1 to 4.4)	0.868
AST	Median (IQR)	30.0 (24.0 to 36.0)	29.0 (23.5 to 34.0)	0.089
ALT	Median (IQR)	35.0 (29.0 to 45.0)	34.0 (27.0 to 44.0)	0.227
HgA1C	Median (IQR)	5.7 (5.4 to 6.1)	5.6 (5.3 to 6.0)	0.034
TIIDM	No	148 (83.1)	172 (90.1)	0.072
	Yes	30 (16.9)	19 (9.9)	
Platelet	Median (IQR)	257.0 (219.0 to 289.8)	258.0 (228.0 to 296.5)	0.363
NFS	Median (IQR)	2.2 (1.5 to 3.0)	2.1 (1.5 to 2.8)	0.194
Fibrosis	No fibrosis	163 (91.6)	173 (90.6)	0.934
	Stage 1-2	12 (6.7)	14 (7.3)	
	Stage 3-4	3 (1.7)	4 (2.1)	
HTN	No	107 (60.1)	109 (57.1)	0.626
	Yes	71 (39.9)	82 (42.9)	
HPL	No	106 (59.6)	108 (56.5)	0.632
	Yes	72 (40.4)	83 (43.5)	
Sleep Apnea	No	91 (51.1)	104 (54.5)	0.592
	Yes	87 (48.9)	87 (45.5)	
Post Operative Parameters				
ΔHgA1C	Mean (SD)	0.6 (0.9)	0.3 (0.6)	0.003
ΔBMI	Mean (SD)	10.2 (5.1)	8.4 (5.9)	0.002

Table 1. Demographic of patients undergoing RYGB and LSG

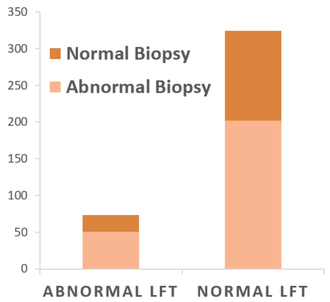


Figure 1. Proportion of patients with normal LFTs and abnormal liver biopsy results

		Normal Path	Abnormal Path	OR (univariable)	OR (multivariable)
Age	Mean (SD)	43.0 (11.6)	43.9 (11.1)	1.01 (0.99-1.03, p=0.470)	1.00 (0.97-1.02, p=0.738)
Sex	F	106 (37.1)	180 (62.9)	-	-
	M	21 (25.3)	62 (74.7)	1.74 (1.02-3.07, p=0.049)	1.00 (0.52-1.94, p=0.995)
BMI	Mean (SD)	42.2 (6.8)	44.5 (6.9)	1.06 (1.02-1.10, p=0.002)	1.05 (1.01-1.09, p=0.014)
Albumin	Mean (SD)	4.2 (0.2)	4.3 (0.2)	3.35 (1.37-8.41, p=0.009)	2.95 (1.10-8.11, p=0.033)
AST	Mean (SD)	29.2 (14.8)	33.9 (15.7)	1.03 (1.01-1.05, p=0.008)	1.00 (0.98-1.03, p=0.847)
ALT	Mean (SD)	35.7 (23.1)	42.6 (20.3)	1.02 (1.01-1.04, p=0.005)	1.01 (0.99-1.03, p=0.247)
HgA1C	Mean (SD)	5.6 (0.8)	6.0 (1.1)	2.03 (1.47-2.97, p<0.001)	1.82 (1.29-2.76, p=0.002)
HTN	No	80 (37.0)	136 (63.0)	-	-
	Yes	47 (30.7)	106 (69.3)	1.33 (0.86-2.07, p=0.209)	0.91 (0.55-1.53, p=0.735)
Hyperlipidemia	No	77 (36.0)	137 (64.0)	-	-
	Yes	50 (32.3)	105 (67.7)	1.18 (0.76-1.83, p=0.458)	1.01 (0.62-1.66, p=0.957)
Sleep Apnea	No	79 (40.5)	116 (59.5)	-	-
	Yes	48 (27.6)	126 (72.4)	1.79 (1.16-2.78, p=0.009)	1.51 (0.91-2.51, p=0.111)
Platelet	Mean (SD)	258.4 (59.9)	259.4 (56.2)	1.00 (1.00-1.00, p=0.875)	1.00 (1.00-1.00, p=0.941)

Table 2. Univariate and multivariate analysis of NFS equation variables correlation with any abnormal liver pathologies. NFS=1.675+0.037*age+0.094*BMI+1.13*Diabetes+0.99*AST/ALT-0.013*PLT*(10^9/L)-0.66*albumin

DISCUSSION

- Lipid and cholesterol metabolism plays an important role in progression of NAFLD to NASH, and ultimately cirrhosis at the cellular level.[1]
- Despite obesity being a major driver of NAFLD progression to NASH and fibrosis, NAFLD is still not a widely accepted indication for MBS.[2-6]
- Malabsorptive MBS resolve NAFLD/NASH and prevent fibrosis better than restrictive surgeries.[2,7-8]
- NFS was developed in 2007 in a cohort with average BMI of 32, while bariatric patients have an average BMI of 40+.[9]
- In our study, both BMI and HgA1C had a substantial effect on NFS score.
- BMI and HgA1C also correlate substantially with abnormal liver pathology in multivariate analysis, while the other components of NFS have weaker correlations
- Our study demonstrated that more than 50% of patients with abnormal liver biopsy results had normal preop LFTs

CONCLUSION

- The presence of NAFLD/NASH substantially affects the perioperative management of patients undergoing MBS
- To use NFS as a measure for liver biopsy requirement, new coefficients need to be calculated

REFERENCES

1. Bashiri A, Nesan D, Tavallaee G, et al. Cellular cholesterol accumulation modulates high fat high sucrose (HFHS) diet-induced ER stress and hepatic inflammasome activation in the development of non-alcoholic steatohepatitis. Biochim Biophys Acta Mol Cell Biol Lipids. 2016;1861(7):594-605.
2. Rinella ME, Neuschwander-Tetri BA, Siddiqui MS, et al. AASLD practice guidance on the clinical assessment and management of nonalcoholic fatty liver disease. Hepatology. Published online February 3, 2023.
3. Uehara D, Seki Y, Kakizaki S, et al. Long-term Results of Bariatric Surgery for Non-alcoholic Fatty Liver Disease/Non-alcoholic Steatohepatitis Treatment in Morbidly Obese Japanese Patients. Obes Surg. 2019;29(4):1195-1201.
4. Lassailly G, Caiazzo R, Buob D, et al. Bariatric Surgery Reduces Features of Nonalcoholic Steatohepatitis in Morbidly Obese Patients. Gastroenterology. 2015;149(2):379-388.
5. Bower G, Toma T, Harling L, et al. Bariatric Surgery and Non-Alcoholic Fatty Liver Disease: a Systematic Review of Liver Biochemistry and Histology. Obesity Surgery 2015 25:12. 2015;25(12):2280-2289.
6. Mazzini GS, Augustin T, Noria S, et al. ASMBS Position Statement on the Impact of Metabolic and Bariatric Surgery on Nonalcoholic Steatohepatitis. Surg Obes Relat Dis. 2022;18(3):314-325.
7. Lee Y, Doumouras AG, Yu J, et al. Complete Resolution of Nonalcoholic Fatty Liver Disease After Bariatric Surgery: A Systematic Review and Meta-analysis. Clinical Gastroenterology and Hepatology. 2019;17(6):1040-1060.e11.
8. Jirapinyo P, McCarty TR, Dolan RD, Shah R, Thompson CC. Effect of Endoscopic Bariatric and Metabolic Therapies on Nonalcoholic Fatty Liver Disease: A Systematic Review and Meta-analysis. Clinical Gastroenterology and Hepatology. 2022;20(3):511-524.e1.
9. Angulo P, Hui JM, Marchesini G, et al. The NAFLD fibrosis score: A noninvasive system that identifies liver fibrosis in patients with NAFLD. Hepatology. 2007;45(4):846-854.