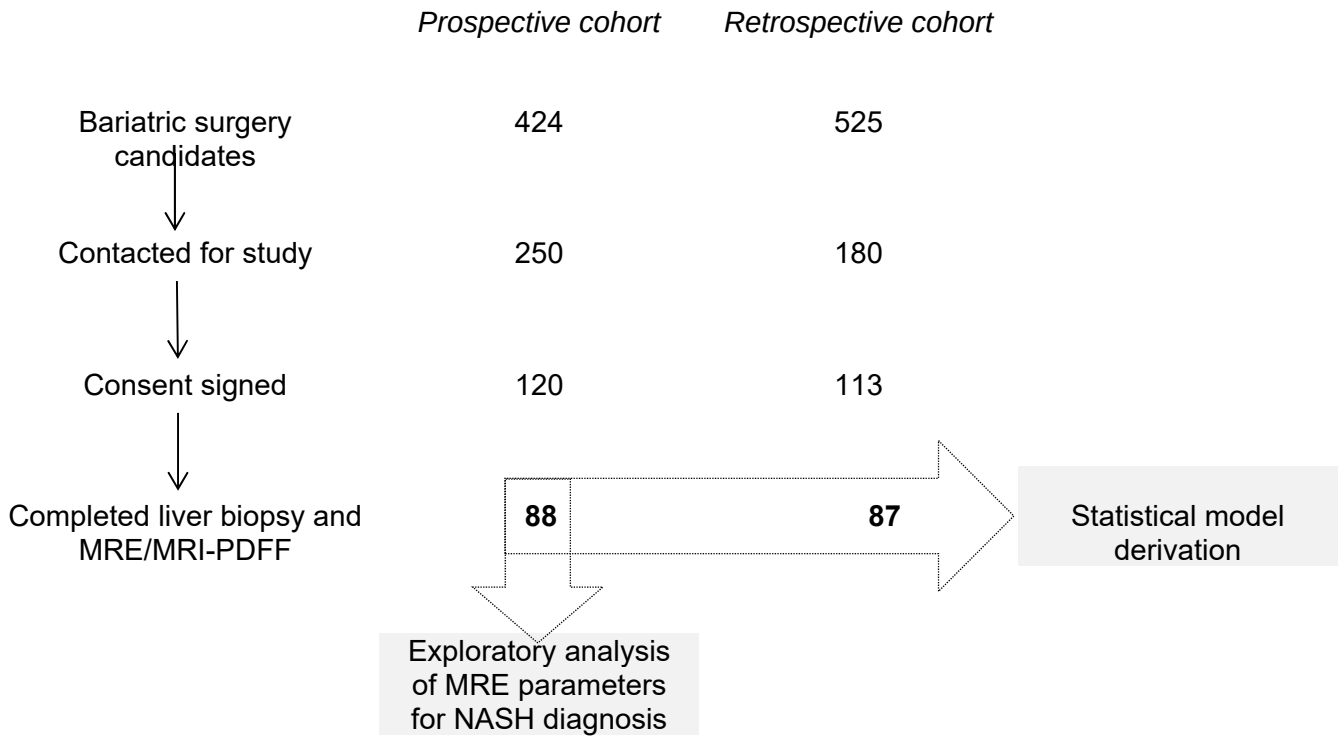
Supplemental Table 1. Study cohort derivation.



Supplemental Table 2. Characteristics of the prospective cohort of bariatric surgery candidates.

		NASH N=37	Not NASH N=51	*p* value
Age – median, years		47	45	0.65
Female – n (%)		26 (72%)	44 (88%)	0.11
Race – n (%)				0.37
White		35 (97%)	44 (90%)	
Black		0	3 (6%)	
Other		0	3 (6%)	
BMI – median (IQR), kg/m^2		46 (41-57)	45 (42-49)	0.39
Diabetes mellitus		15 (41%)	10 (20%)	<0.001
ALT – median, U/L		37	22	<0.001
AST – median, U/L		28	22	<0.001
HOMA IR – median		8.3	3.5	0.003
Total cholesterol – median, mg/dl		165	172	0.99
LDL cholesterol – median, mg/dl		97	91	0.44
Triglycerides – median, mg/dl		175	138	0.05
Histologic parameters				
Steatosis grade	0	1 (3%)	25 (49%)	<0.001
	1	22 (59%)	24 (47%)	
	2	10 (27%)	2 (4%)	
	3	4 (11%)	0	
Lobular inflammation grade	0	2 (5%)	37 (71%)	<0.001
	1	30 (81%)	13 (27%)	
	2	4 (11%)	1 (2%)	
	3	1 (3%)	0	
Hepatocyte ballooning grade	0	3 (11%)	49 (96%)	<0.001
	1	31 (81%)	2 (4%)	
	2	3 (8%)	0	
Fibrosis stage	0	7 (19%)	49 (96%)	<0.001
	1	20 (54%)	2 (4%)	
	2	7 (19%)	--	
	3	2 (5%)	--	
	4	1 (3%)	--	

Supplemental Methods

Testing for multicollinearity between parameters included in the models

The fact that storage modulus (G') and loss modulus (G'') are both included in the calculation of damping ratio (defined as G''/2G') and shear stiffness (defined as |G*| where G* = G' + iG'') may raise concern for collinearity between the parameters included in the regression models of NASH and NAS prediction. However, in both models, the damping ratio and shear stiffness are calculated from the storage modulus and the loss modulus obtained at two different frequencies (40Hz and 60Hz, respectively). Given that mechanical responses of soft tissue are frequency dependent, it is unlikely that these two parameters are mechanically dependent. Moreover, we used the variance inflation factor (VIF) to quantify the extent of correlation between predictors in a model (VIF>2 reflects multicollinearity).

In the prospective cohort, the VIF for each of the predictors were: FF=1.03, DR-40 Hz=1.69, SS-60Hz=1.66.

In the combined cohort, the VIF for each of the predictors were: FF=1.03, DR-40 Hz=1.03, SS=1.01.

Therefore, none of the imaging parameters had VIF of 2 or more, which excludes the concern of collinearity between the parameters.

Parameter selection and testing for variance

The use of a prospective cohort for both selection of variables and model development could impact the validity of the model. This can occur by allowing unobserved variance derived from correlations between the variables included in the analysis. In order to test if this can occur in this dataset, we used factor analysis to identify such potential unobservable factors in the dataset of variables. A preliminary factor analysis using all of the possible measures (mean, standard deviation, minimum and maximum, of each of the following variables: damping ratio,

storage modulus, loss modulus, shear stiffness, attenuation and strain, at each of the frequencies of 30, 40, and 60 Hz; along with fat fraction) showed that the 3 independent terms used in the model have the highest dimension (illustrated by high eigenvalues to the left of the x-axis and bottom of the y-axis of the scree plot), whereas all other variables have low variance. This confirms that the 3 variables used in the model are the only useful dimensions in the multivariate data, and this allows the use of a larger cohort to derive the model coefficients without overfitting the model.

S Figure 1. Factor analysis showing that the 3 parameters used in the models have the highest variance.