Steatohepatitis: Differential Features on Quantitative Liver-Spleen Scan

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INTRODUCTION

The QLSS is a unique non-invasive test precisely measuring hepatic function by perfused hepatic mass (PHM), portal hypertension from spleen volume (fSV) and hepatic volumes (fHV) that could be useful in differentiation of non-steatotic CLD (NSCLD) from steatotic CLD [alcoholic (ASH) and non-alcoholic fatty liver disease (NAFLD)] since liver volume increases with fatty infiltration. PHM < 95 and fSV > 2.5 cc/lb IBW are measures of hepatic severity correlating closely with clinical outcomes at 2 year or 8 year intervals in the HALT-C trial (2012 Hepat;55:1019), but fHV (N 7 ><12 cc/lb IBW) has not been assessed in steatohepatitis. fSV and fHV correlate with volumes by anatomic imaging (2013 Liv Transp 19:292). Steatohepatitis due to alcohol (ASH) and NAFLD should have larger volumes than non-steatotic CLD (NSCLD) (HCV, HBV, ACAH, PBC, PSC, A1AT, hemochromatosis).

METHODS

1. QLSS: Standard meal, IV Tc 99m Sulfur Colloid followed by SPECT.
2. Volume and PHM calculations processed by HEPATIQ automatically.

PATIENTS

1. 1. 408 patients with CLD studied by Quantitative liver spleen scan (QLSS).
2. Liver Disease: Normals – 19, NSCLD - 184 (HCV, HBV, ACAH, PBC, PSC, A1AT, hemochromatosis) and SCLD (alcohol – 18 and NAFLD – 187).
3. Severity based on PHM <95 (A = advanced CLD), >95 (GF = good function)

The patients were divided into clinical group dependent on hepatic function (PHM): good function > 95 and advanced CLD < 95. Previous studies have shown that NASH can occur in patients with normal body weight (low body wt NASH). The clinical categories are in the table below. No clinical outcomes occurred with a PHM > 95 in any clinical category. Ascites or variceal bleeding occurred with advanced CLD A-NAFLD 82% and A-NSCLD 79 %. Death or transplant was found in 10 and 12 % respectively, all with PHM < 60.

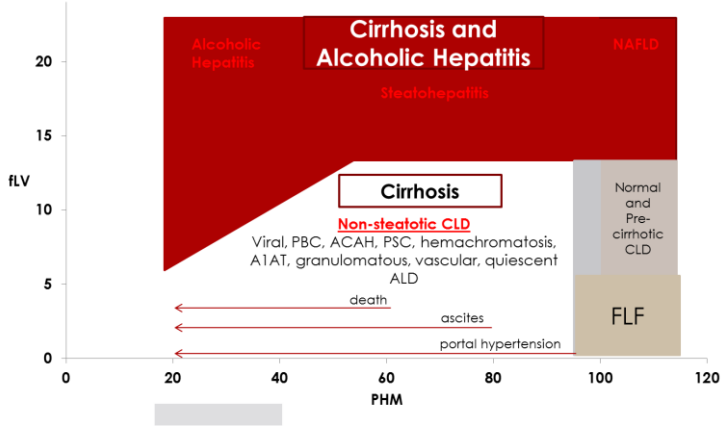
Normal	N	19
Non-steatotic CLD	GF-NSCLD	156
Non-steatotic CLD	A-NSCLD	28
NASH - N wt/IBW	LBW-NAFLD	10
NASH pre-cirrhosis	GF-NAFLD	155
NASH cirrhosis	A-NAFLD	22
AH - first value	ASH	18
	total	**408**

RESULTS

The PHM was lower in advanced CLD by definition. The fSV was significantly ($p < .01$) different in categories of advanced CLD compared to early liver disease. SCLD showed significantly ($p < .001$) larger fLV than NSCLD

	#	PHM	SD	fLV	SD	fSV	SD
N	19	102.4	2.1	9.2	1.6	1.2	0.7
GF-NSCLD	156	101.9	2.9	9.6	2.6	1.4	0.9
A-NSCLD	28	81.8	17.0	8.2	3.0	4.6	3.3
LBW-NAFLD	10	101.0	4.0	11.3	2.6	2.2	1.4
GF-NAFLD	155	104.2	3.8	14.7	3.8	2.3	1.3
A-NAFLD	22	75.2	17.0	13.1	4.4	6.5	3.1
ASH	18	58.1	15.3	13.0	4.4	4.4	2.5
total	408						

The QLSS is a powerful clinical tool in differentiating CLD due to fatty liver from those unrelated to fatty liver.



CONCLUSIONS

1. An increased fHV helps differentiate fatty liver disease (AH and NAFLD) from NSCLD.
2. An increased fHV in patients with NSCLD reflects an additional component of fatty liver as the cause of enlargement.
3. PHM identifies patients at risk for outcomes in both NSCLD and SCLD.
4. Increased fSV reflecting portal hypertension correlates inversely with liver function.
5. The QLSS is effective in separating the major causes of CLD in addition to measuring hepatic function and predicting clinical disease.