Cirrhosis: A Modified Caudate-to-Right-Lobe Ratio

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Introduction

We have noted that the right portal vein bifurcation more accurately divides the hypertrophied caudate and central liver from the atrophied right lobe than does the main portal vein. Therefore, we evaluated whether a modified caudate-to-right-lobe (C/RL) ratio using this more lateral boundary for the caudate lobe on MR images was useful for diagnosing cirrhosis.

Methods

236 consecutive patients had MR imaging (121pathologically proved cirrhosis and 115 without history of chronic liver diseases). We set a new lateral boundary of the C/RL margin as the bifurcation of the right portal vein, and compared the resulting C/RL ratio (C/RL-r) to the previously published ratio using the main portal vein as the boundary (C/RL-m) (Figure 1). MR images were evaluated blindly by two independent observers. The portal-phase of an axial contrast material-enhanced T1 weighted dynamic opposed phase gradient-echo imaging with a phased array torso coil were used for the measurements in most cases.

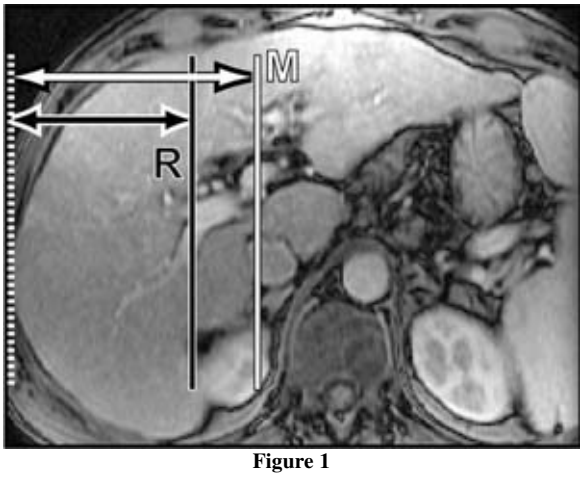

Figure 1

Method of obtaining the caudate-to-right-lobe ratio. The M line is drawn through the right lateral wall of the main portal vein. The R line is drawn through the right lateral wall of the bifurcationof of the right portal vein.

Results

The mean C/RL-m was 0.43 +/- 0.11 for noncirrhotic livers and 0.64+/- 0.14 for cirrhotic livers ($p < .0001$). The mean C/RL-r was 0.77 +/- 0.22 for noncirrhotic livers and 1.04 +/- 0.25 for cirrhotic livers ($p < .0001$). Az values was 0.7307 for C/RL-m and 0.7966 for C/RL-r ; this difference was statically significant ($p = .0395$) (Figure 2). Using a C/RL-r greater than 0.9, the sensitivity, specificity and accuracy for the MRI diagnosis of cirrhosis were 71%, 77% and 74%, respectively. Using the previously published C/RL-m greater than 0.65, the sensitivity, specificity and accuracy were 24%, 97% and 59%, respectively. The C/RL-r was more sensitive ($p < .0001$) and accurate ($p = .0006$), but slightly less specific ($p < .0001$) than the C/RL-m (Table 1).

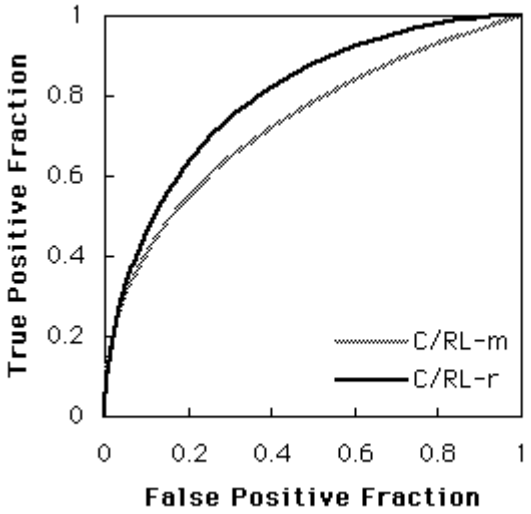

Figure 2

ROC curves for confidence of diagnosis of cirrhosis for the two ratios.

Conclusuion

The C/RL-r better represents the division between hypertrophied and atrophied liver, and is more sensitive and accurate for diagnosing cirrhosis, than is the C/RL-m.

References

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Table 1

	Sensitivity	Specificity	Accuracy	PPV	NPV
C/RL-m					
0.45	74.3%	55.7%	65.3%	63.8%	67.4%
0.55	46.3%	86.1%	65.7%	77.8%	60.4%
0.65	24.0%	96.5%	59.3%	87.9%	54.7%
0.75	7.4%	100.0%	52.5%	100.0%	50.7%
C/RL-r					
0.9	71.7%	77.4%	74.2%	76.8%	71.8%
1.0	53.7%	86.1%	69.5%	80.2%	63.9%
1.1	39.7%	92.2%	65.3%	84.2%	59.2%
1.2	19.0%	95.7%	56.4%	82.1%	52.9%
1.3	13.2%	98.2%	54.7%	88.9%	51.8%
1.4	6.6%	99.1%	51.7%	88.9%	50.2%