

CT MR 1

.

CT T1, T2

MR 가 . 79 155

(52 , 36 , 35 , 27 , 5)

CT MR CT MR

4 CT ()

, MR T1, T2 . CT MR

CT MR 81%(42/52),

94%(49/52), 75%(27/36), 100%(36/36), 80%(28/35), 100%(35/35),

67%(18/27), 100%(27/27), 100%(5/5), 100%(5/5) ,

MR CT (p

< .05).

CT MR

52%(27/52), 71%(37/52), 67%(24/36), 100%(36/36), 63%(22/35),

100%(35/35), 37%(10/27), 100%(27/27), 40%(2/5), 80%(4/5)

MR CT

($p < .05$).

T2 , MR T1,

CT 가 가

(magnetic resonance imaging, 가

MR)

(1-3).

MR

96 1 99 6 가 302

(4-7), CT MR

(gold standard)

(8).

CT

4 60 79 155

(52 , 36 , 5)

35 , 27 , 5)

(Table 1). 7 가 4

MR 가 가

가 가

, 1 , 1

, 1

(n = 52)

3 CT (n = 39), (n = 1) fetoprotein) 1,000 (n = 36) , CT, MR , SPECT 가 가 , (n = 35) CT, MR 6 가 (n = 27) (n = 4), (n = 23) (n = 5) 55:24 35 74 (;57) CT Hispeed Advantage (GE Medical Systems, Milwaukee, U.S.A.) 120 - 130 ml (Ultravist , Schering, Germany) CT 9,000 Digital Injection System (Liebel - Flarsheim Company, Cincinnati, U.S.A.) 3 ml/sec (n = 44) 30 60 - 70 (n = 35) 3 - 5 7 mm, 7 mm/sec MR 1.5T Signa Horizon Echospeed (GE Medical Systems, Milwaukee, U.S.A.) (Torso coil , GE Medical Systems, Milwaukee, U.S.A.) . T1 (repetition time, TR) 500 msec, (echo time, TE) 8 msec, (number of excitation, NEX) 2 , (matrix number) 256 × 192, (respiratory compensation) . T2 (respiratory triggered) TR 7,000 - 8,000 msec, TE 100 msec, NEX 2 , (echo train length) 12 , 256 × 192, (bandwidth) 16 kHz, 7 - 8 mm, 2 - 3 mm, (field of view) 32 × 24 cm . (fast multiplanar spoiled gradient recalled echo) TR 100 msec, TE 1.6 msec,

Table 1. Distribution of Patients in Focal Hepatic Masses

Diagnosis	No. of Patients	No. of Masses
Hepatocellular carcinoma	35	52
Hemangioma	19	36
Cyst	15	35
Metastasis	12	27
Cholangiocarcinoma	5	5
Total	79	155

: CT MR (flip angle) 60 °, 256 × 192, 7 - 8 mm, 2 - 3 mm, 32 × 24 cm Gd - DTPA (Magnevist , Schering, Germany) MRI - injector XD 7,000 (ulrich GmbH & CO. KG., Ulm, Germany) 0.2 ml/kg 2 ml/sec (breath - hold) 30 , 60 , 90 , 3 , 5 . CT MR 3 2 CT , , 4 MR CT MR (9). , CT, lipiodol CT, MR , CT MR , CT, MR , CT MR CT MR CT MR

Table 2. Detection Rate of Mass Using by Spiral CT and MR Imaging

Diagnosis	No. of Cases	Technique	
		Spiral CT	MR imaging
Hepatocellular carcinoma	52	42 (81)	49 (94)*
Hemangioma	36	27 (75)	36 (100)*
Cyst	35	28 (80)	35 (100)*
Metastasis	27	18 (67)	27 (100)*
Cholangiocarcinoma	5	5 (100)	5 (100)
Total	155	120 (77)	152 (98)

Numbers in the parentheses are percentage.

* $p < .05$

Table 3. Characterization Rate of Mass Using by Spiral CT and MR Imaging

Diagnosis	No. of Cases	Technique	
		Spiral CT	MR imaging
Hepatocellular carcinoma	52	27 (52)	37 (71)*
Hemangioma	36	24 (67)	36 (100)*
Cyst	35	22 (63)	35 (100)*
Metastasis	27	10 (37)	27 (100)*
Cholangiocarcinoma	5	2 (40)	4 (80)
Total	155	85 (55)	139 (90)

Numbers in the parentheses are percentage.

* $p < .05$

90%(139/155)

Table 2 Table 3

$p < .05$ (10).

MR
(p)

CT
< .05) (Fig. 1).

가

MR

CT

(Fig. 2).

MR

CT

($p < .05$).

,

CT MR

CT MR

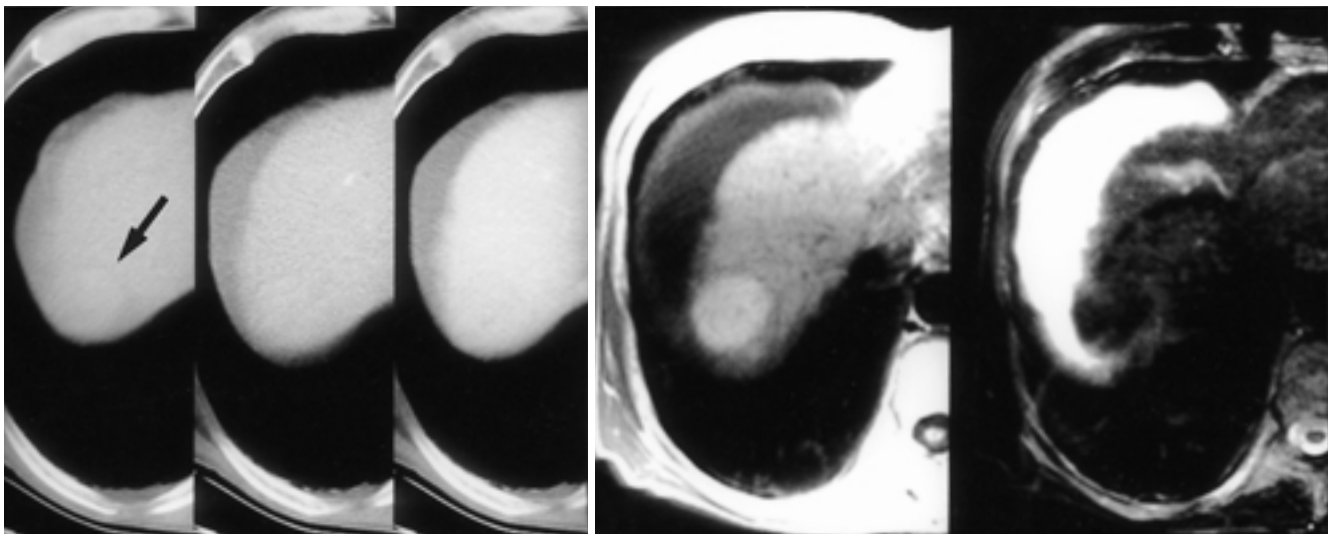
77%(120/155),

55%(85/155),

CT

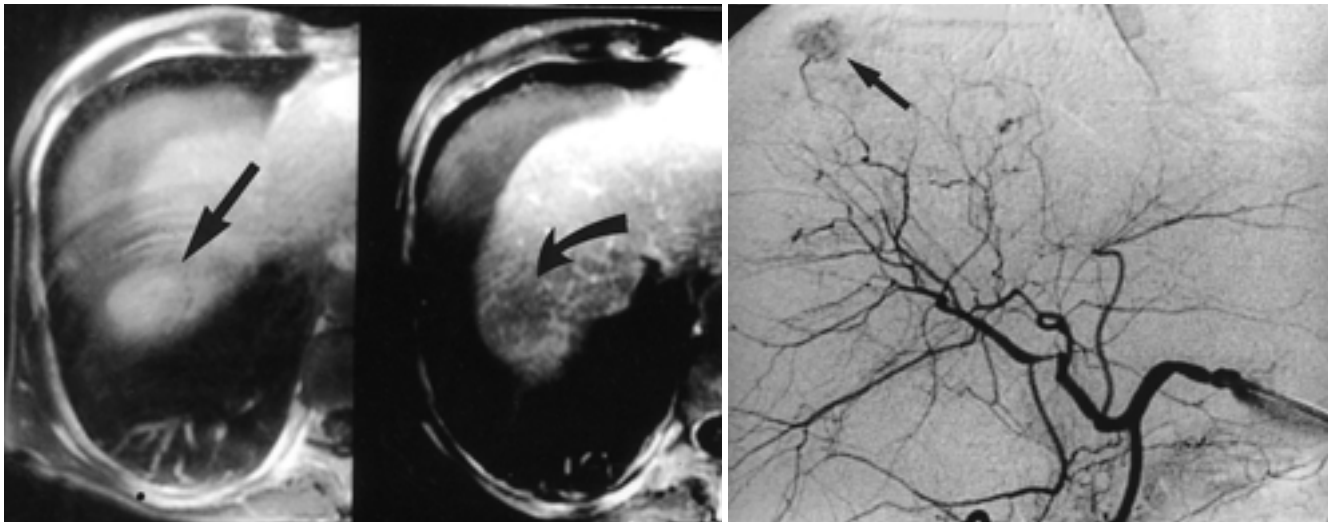
98%(152/155)

,



A

B



C

D

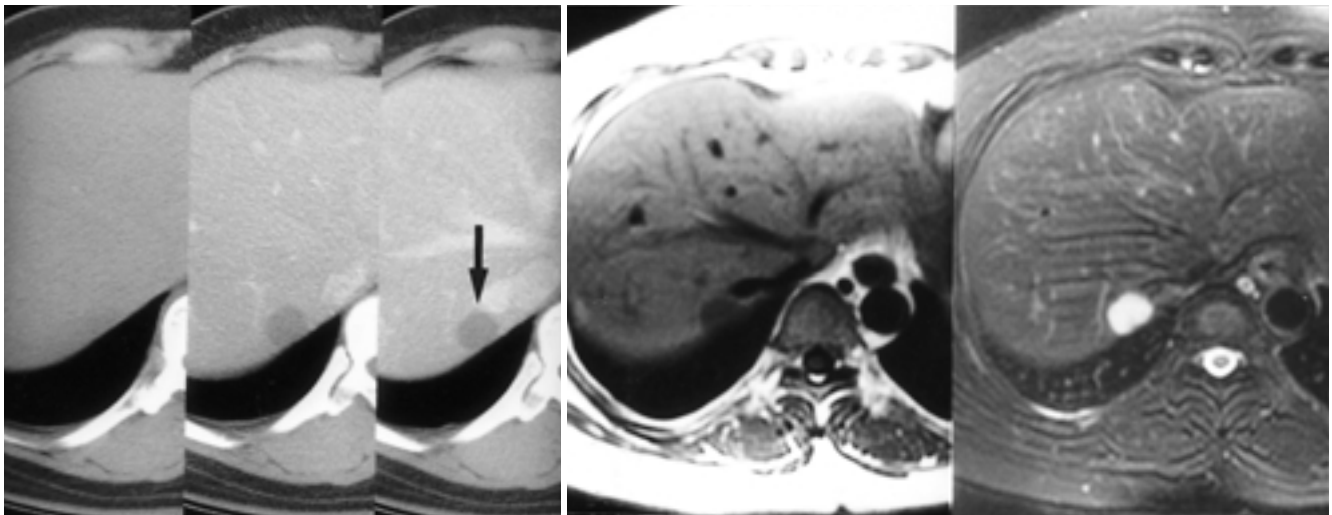
Fig. 1. A hepatocellular carcinoma in a 68-year-old male.

A. Dynamic two-phase contrast-enhanced CT scans (preenhanced scan, arterial phase, and portal venous phase; from left to right) show a questionable nodular lesion (arrow) in hepatic dome.

B. MR images show a definite mass lesion in the hepatic dome with high signal intensity on T1-weighted image (left) and iso-signal intensity on T2-weighted image (right).

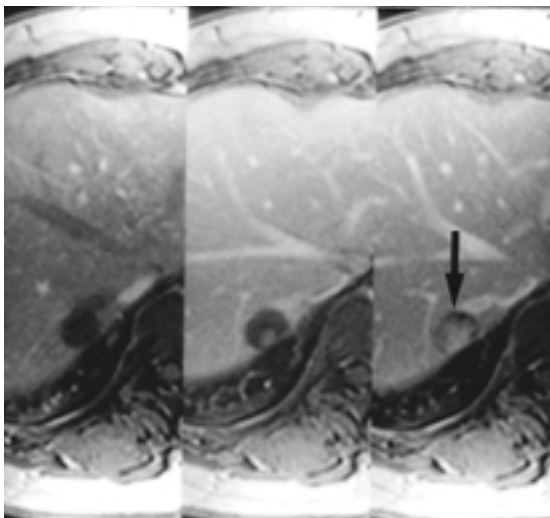
C. Dynamic contrast-enhanced MR images (left; 30 sec, right; 60 sec) show mass (arrow) on arterial phase and wash-out of contrast media in the mass (curved arrow) on portal venous phase.

D. Digital subtraction angiogram shows that the mass is hypervascular tumor (arrow), compatible with hepatocellular carcinoma.



A

B



C

Fig. 2. A small hepatic hemangioma in a 43-year-old female.

A. Dynamic two-phase contrast-enhanced CT scans (preenhanced scan, arterial phase, and portal venous phase; from left to right) show a hypoattenuated mass (arrow) with no definite evidence of contrast-enhancement, which suggests cyst.

B. MR images show a mass lesion with low signal intensity on T1-weighted image (left) and high signal intensity on T2-weighted image (right).

C. Dynamic contrast-enhanced MR images (30 sec, 1 min, and 3 min; from left to right) show gradual central fill-in of contrast-media in the mass (arrow).

MR
(Fig. 3).
MR
(Fig. 4).
CT
(3, 5, 8).
CT
,
가
가 (4). (dome)
CT CT
(misregistration)가
가
1 (sin -
20
gle - breath hold)
가
(1, 5, 6).
MR 가
가
(artifact)

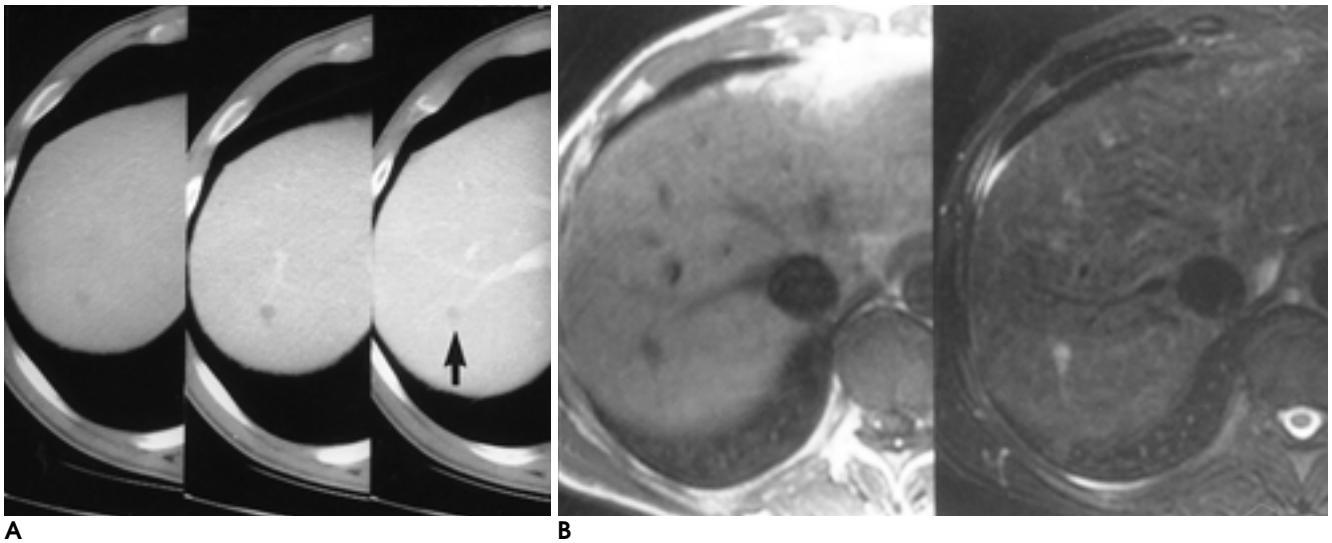


Fig. 3. A cyst in a 61-year-old male with colon cancer.
A. Dynamic two-phase contrast-enhanced CT scans (preenhanced scan, arterial phase, and portal venous phase; from left to right) show a small low attenuated lesion (arrow) with suspicious peripheral enhancement, suggesting the possibility of metastasis.
B. MR images show a mass lesion with low signal intensity on T1-weighted image (left) and bright signal intensity on T2-weighted image (right).
C. Dynamic contrast-enhanced MR images (30 sec, 1 min, and 3 min; from left to right) show no definite evidence of contrast-enhancement in the mass.

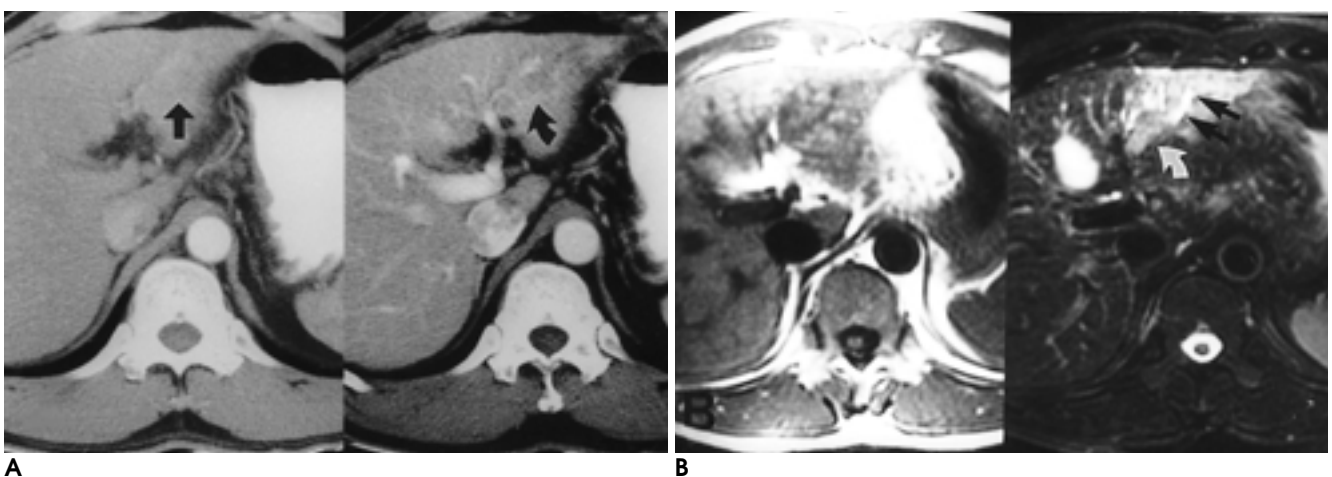
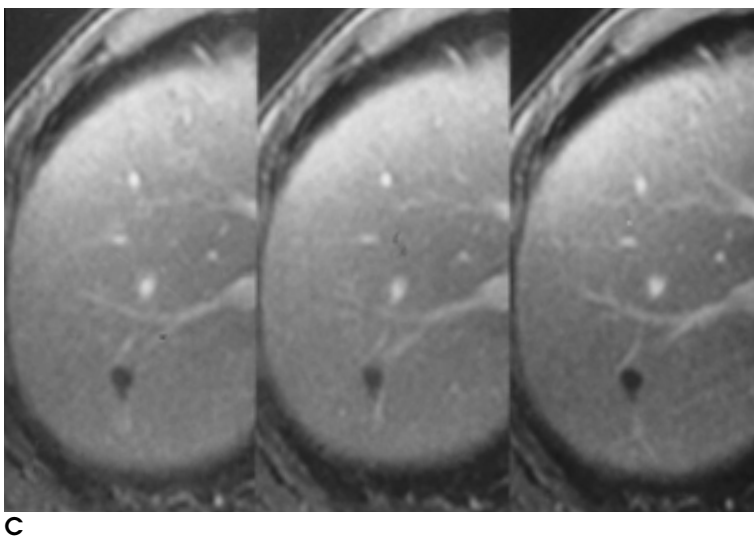


Fig. 4. A small intrahepatic cholangiocarcinoma in a 49-year-old male.
A. Dynamic two-phase contrast-enhanced CT scans (left; arterial phase, right; portal venous phase) show subtle enhanced lesion (arrow) on arterial phase and subtle wash-out of contrast media in the lesion (curved arrow) on portal venous phase.
B. MR images show a definite mass lesion with subtle low signal intensity on precontrast T1-weighted image (left) and high signal intensity (curved arrow) on T2-weighted image (right). T2-weighted image shows focal intrahepatic biliary ductal dilatation (double arrows) around the mass.

CT MR

(signal - to - noise)

가 ,
CT MR

가 (2, 3, 11, 12).
1980 CT가 MR
(4), 1990 CT가
MR

(5 - 7). ,
가 (tissue - specific) MR

CT MR
(13, 14).
Yamashita (15) 2 cm
가 MR
85% CT 52%
1 cm
MR
CT
MR CT가 CT
MR CT가
(fibrotic capsule),
CT
(16, 17).
CT MR 95%(18/19),
100%(19/19), 80%(15/19), 89%
(17/19) 가 가 (11).
MR CT
CT 가 MR
CT MR
MR CT
가 2 cm CT
MR - T2 (heavily - T2WI)
가 가
(18 - 20). , 6 cm
CT
가 CT MR T2
CT
(21).
MR 1 cm
CT 가
CT 가
MR

가 MR
T2 가
Semelka (22)
MR CT가 86%, 47%
MR MR CT
MR CT
(peripheral washout sign)가 MR
MR CT
가 , MR
CT
(6, 22).
CT
가
T2
가 (3).
(23) 11
MR 11 CT 10
MR
MR 1 , CT가 4 CT가
가
CT 가 2
MR
가 , , CT
MR T1,
가 , MR
CT
가 , MR
CT
가
가
T1,
MR
CT
CT가 ,
가 ,
가
CT
MR

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Comparison between Spiral CT and MR Imaging in Evaluation of Focal Hepatic Masses¹

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Purpose: The main aim of this study was to compare spiral CT and MR imaging in the detection and characterization of focal hepatic masses.

Materials and Methods: Seventy-nine patients with 155 focal hepatic masses confirmed pathologically, or radiologically and clinically [hepatocellular carcinoma(HCC) (n = 52), hemangioma (n = 36), cysts (n = 35), metastasis (n = 27), intrahepatic cholangiocarcinoma (n = 5)], underwent two- or three-phase spiral CT, and T1-, T2-weighted, and dynamic contrast-enhanced MR imaging. The detection and characterization of focal hepatic masses by these modalities were evaluated and compared.

Results: The detection rates of spiral CT and MR imaging, respectively, were as follows: HCC, 81%(42/52) and 94%(49/52); hemangioma, 75%(27/36) and 100%(36/36); cysts, 80%(28/35) and 100%(35/35); metastasis, 67%(18/27) and 100%(27/27); and intrahepatic cholangiocarcinoma, 100%(5/5) and 100%(5/5). MR imaging was superior to spiral CT in mass detection of HCC, hemangioma, cysts, and metastasis ($p < .05$). The characterization rates of spiral CT and MR imaging, respectively, were as follows: HCC, 52%(27/52) and 71%(37/52); hemangioma, 67%(24/36) and 100%(36/36); cysts, 63%(22/35) and 100%(35/35); metastasis, 37%(10/27) and 100%(27/27); and intrahepatic cholangiocarcinoma, 40%(2/5) and 80%(4/5). In the mass characterization of HCC, hemangioma, cysts, and metastasis, MR imaging was superior to spiral CT ($p < .05$).

Conclusion: In the detection and characterization of focal hepatic masses, including hepatocellular carcinoma, hemangioma, hepatic cyst and metastasis, MR imaging is superior to spiral CT.

Index words : Liver neoplasms, diagnosis
Liver neoplasms, CT
Liver neoplasms, MR

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