

CT 1

CT
 CT 114 153
 가
 10.4% (16/153)
 (11/16, 69%) (5/16, 31%)
 (9/16, 56%)
 (11/16, 69%)
 (n=1), (n=1), 4 CT
 가 (n=46),
 CT
 가 49 , 가 65
 (n=50) 가 49
 24-78 49
 Somatom plus S (Siemens medical systems, Erlangen, Germany) Somatom Plus 4 (Siemens ,medical systems, Erlangen, Germany) , 120mL
 (Ultravist 300, Schering, Berlin, Germany) 18
 3mL
 10mm, pitch 1:1
 (12, 13). 30-35 , 60 , 3-
 5 , 7-8 mm .
 0.7cm 15cm , 2.8cm
 153
 1994 11 1998 2 3 가
 (n=84) (n=30) CT
 114 153
 MRI (n=11), Tc-
 99m RBC SPECT (n=5), MRI+Tc 99m RBC SPECT

가 1999 1 5 1999 1 19 4

가 가
 가 가
 Wilcoxon rank sum test
 p 0.05 가
 153 16 (10.4%) 가 3 (19%),
 9 (56%), 가
 4 (25%)
 11 (69%), 5 (31%)

11 (69%)
 5 (31%)
 (Fig. 1, 2),
 (Fig. 3).

(Table 1).
 16

Table 1. Enhancement Patterns of Hemangiomas in Arterial Phase

Enhancement patterns	Numbers	Early increased attenuation of the liver adjacent to the hemangioma
Homogeneous high	25	11
Peripheral high	108	5
Low	19	
Central high	1	
Total	153	16

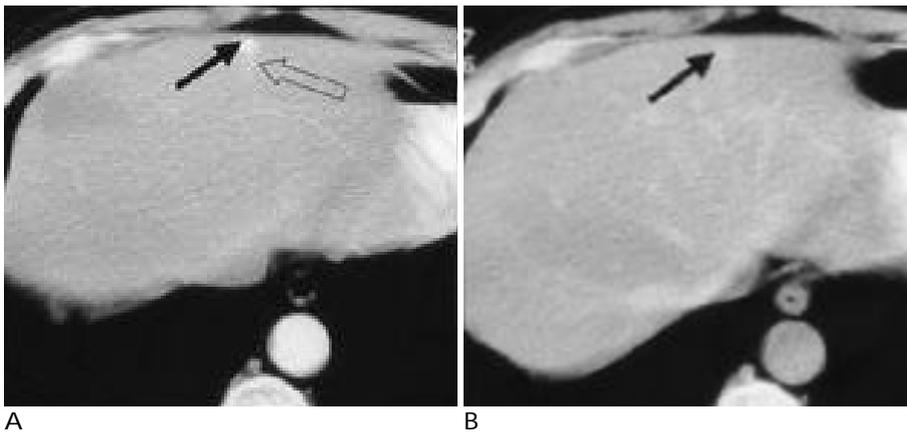


Fig. 1. CT scans obtained in a 47-year-old man with hemangioma.
 A. Arterial phase image shows a homogeneously enhancing mass (arrow) in medial segment of the left hepatic lobe. Tubular shaped parenchymal enhancement adjacent to the mass (open arrow) is noted.
 B. Delayed phase image shows homogeneously hyperdense mass (arrow). Parenchymal enhancement is disappeared.

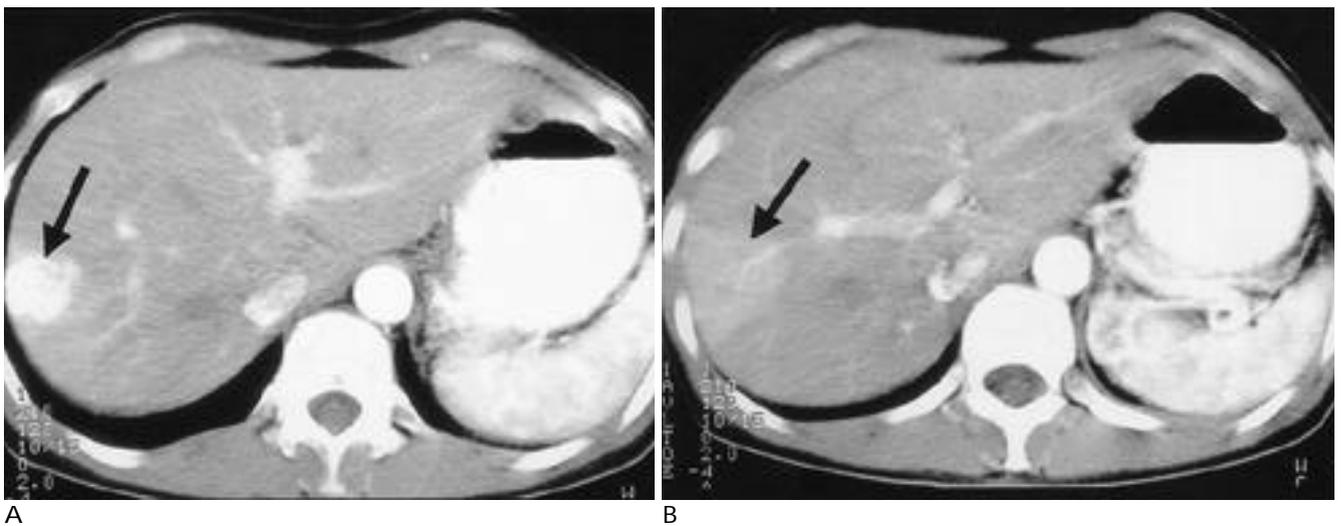


Fig. 2. CT scan obtained in a 44-year-old woman with hemangioma.
 A, B. Arterial phase images obtained continuous scan show about 2.5cm a homogeneously hyperdense mass (arrow) in right postero-inferior segment of the liver with an area of wedge shaped parenchymal enhancement inferior to the mass (arrow).

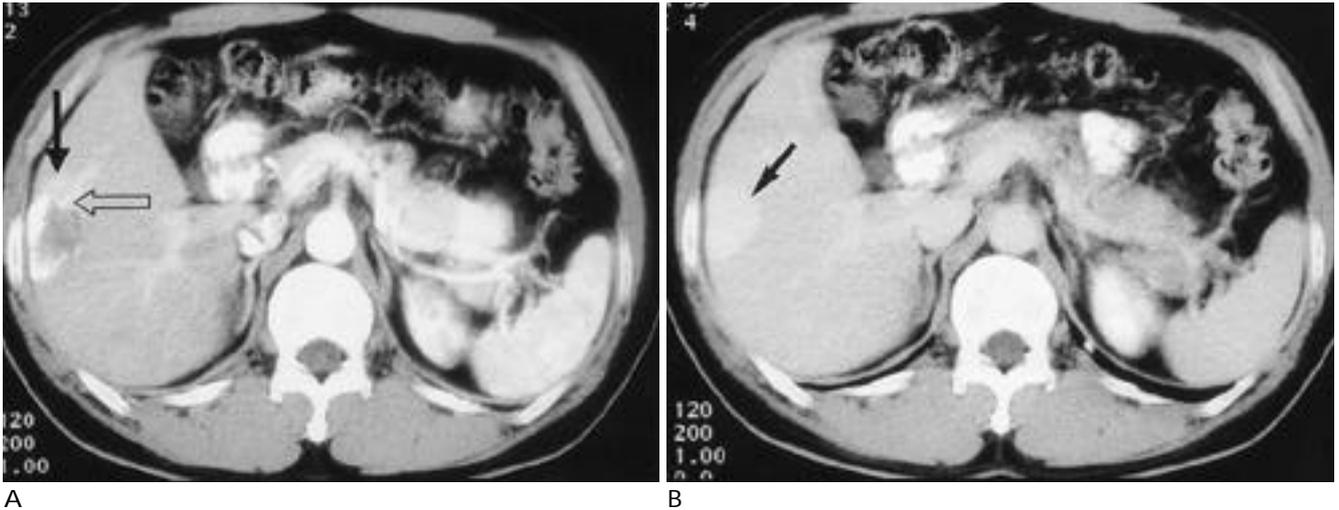


Fig.3.CT scan obtained in a 50-year-old man with hemangioma.
 A. Arterial phase image shows about 3.5cm a peripherally hyperdense mass with an area of tubular enhancement (arrow) and early opacification of the peripheral portal vein (open arrow).
 B. Delayed phase image shows homogeneously hyperdense mass (arrow).

1
 (Fig. 1, 3).
 2.1 cm ± 0.7
 2.9 cm ± 2.1
 가
 (p>0.05).
 1.8cm ± 0.7, 1.7cm ± 0.5
 (p>0.05),
 3.3cm ± 0.5 가 .
 가
 2.8cm ± 0.7,
 가
 CT 가
 CT 가
 Hanafusa (19)
 1cm 가
 (13)
 가
 가
 (9-11). Hanafusa (12) CT
 12
 10
 1980 5% (9), CT 20-30% (5),
 24-25.4% (12, 13). 가
 10.4% 가 가 , 가
 가 가 CT 가
 가 가 가 (9, 10).

가 (12, 19).

가

16

가

MR

CT

(12), 16

가

1. Bookstein JJ, Cho KJ, Davis GB, Dail D. Arterioportal communications: observations and hypotheses concerning transsinusoidal and transvasal types. *Radiology* 1982 ; 142 : 581-590
2. Itai Y, Furui S, Ohtomo K, et al. Dynamic CT features of arterioportal shunts in hepatocellular carcinoma. *AJR* 1986 ; 146 : 723-727
3. Nakayama T, Hiyama Y, Ohnishi K, et al. Arterioportal shunts on dynamic computed tomography. *AJR* 1983 ; 140 : 953-957
4. Kim TK, Choi BI, Han JK, Chung JW, Park JH, Han MC. Nontumorous arterioportal shunt mimicking hypervascular tumor in cirrhotic liver: two-phase spiral CT findings. *Radiology* 1998 ; 208 : 597-603

5. Okuda K, Musha H, Yamasaki T, et al. Angiographic demonstration of intrahepatic arterioportal anastomoses in hepatocellular carcinoma. *Radiology* 1977 ; 122 : 53-58
6. Winograd J, Palubinskas A. Arterial-portal venous shunting in cavernous hemangioma of the liver. *Radiology* 1977 ; 122 : 331-332
7. Itzchak Y, Adar R, Bogokowski H, Mozes M, Deutsch V. Intrahepatic arterial portal communications: angiographic study. *AJR* 1974 ; 121 : 384-387
8. : CT 1993 ; 29 : 765-774
9. Shimada M, Matsumata T, Ikeda Y, et al. Multiple hepatic hemangiomas with significant arterioportal venous shunting. *Cancer* 1994 ; 53 : 304-307
10. : 1 1995 ; 33 : 285-287
11. Arita T, Matsunaga N, Honma Y, Nishikawa E, Nagaoka S. Focally spared area of fatty liver caused by arterioportal shunt. *J Comput Assist Tomogr* 1996 ; 20 : 360-362
12. Hanafusa K, Ohashi I, Himeno Y, Suzuki S, Shibuya H. Hepatic hemangioma: findings with two-phase CT. *Radiology* 1995 ; 196 : 465-469
13. CT 54 1998 : 131
14. Itai Y, Matsui O. Blood flow and liver imaging. *Radiology* 1997 ; 202 : 306-314
15. Matsui O, Kadoya M, Yoshikawa J, et al. Aberrant gastric venous drainage in cirrhotic livers: imaging findings in focal areas of liver parenchyma. *Radiology* 1995 ; 197 : 345-349
16. Matsui O, Takahashi S, Kadoya M, et al. Pseudolesion in segment IV of the liver at CT during arterial portography: correlation with aberrant gastric venous drainage. *Radiology* 1994 ; 193 : 31-35
17. Ito K, Awaya H, Mitchell DG, et al. Gallbladder disease: appearance of associated transient increased attenuation in the liver at biphasic, contrast-enhanced dynamic CT. *Radiology* 1997 ; 204 : 723-728
18. Yamashita K, Jin MJ, Hirose Y, et al. CT finding of transient focal increased attenuation of the liver adjacent to the gallbladder in acute cholecystitis. *AJR* 1995 ; 164 : 343-346
19. Hanafusa K, Ohashi I, Gomi N, Himeno Y, Wakita T, Shibuya H. Differential diagnosis of early homogeneously enhancing hepatocellular carcinoma and hemangioma by two-phase CT. *J Comput Assist Tomogr* 1997 ; 21 : 361-368

CT Findings of Increased Attenuation of the Liver Adjacent to the Hemangioma¹

Suk Kwon Yoon, M.D., Dal Mo Yang, M.D., Myung Hwan Yoon, M.D., Hak Soo Kim, M.D.,
Sung Hye Koh, M.D., Eun Young O, M.D., Hyung Sik Kim, M.D., Jin Woo Chung, M.D.

¹*Department of Diagnostic Radiology, Gachon Medical College, Gil Medical Center*

Purpose: The purpose of this study was to evaluate the frequency, location, and appearance of increased attenuation of the liver adjacent to a mass during arterial-phase spiral CT in patients with hemangioma. The characteristics of the mass associated with these findings were also evaluated.

Materials and Methods: Using spiral CT, 153 lesions in 114 hepatic hemangioma patients were retrospectively reviewed. We evaluated the frequency, location, and appearance of increased hepatic attenuation adjacent to the hemangioma, and determined whether lesion size varied according to whether or not there was increased hepatic attenuation.

Results: Areas of increased hepatic attenuation adjacent to the hemangioma were identified in 10.5% of cases (16/153) and seen in masses which showed a homogeneously hyperdense (11/16, 69%) or peripherally hyperdense pattern (5/16, 31%). The location of increased hepatic attenuation was commonly the peripheral portion (9/16, 56%), and increased hepatic attenuation was frequently wedge shaped of the mass (11/16, 69%). Lesion size did not vary according to whether or not there was increased hepatic attenuation.

Conclusion: Increased hepatic attenuation adjacent to a hemangioma is not rare, and is usually located peripheral to the mass. It is common in a mass showing a homogeneously hyperdense pattern.

Index words: Liver neoplasms, CT
Angioma, gastrointestinal tract
Computed tomography (CT), helical

Address reprint requests to : Suk Kwon Yoon, M.D., Department of Diagnostic Radiology Gachon Medical College, Gil Medical Center,
Kuwol-Dong Namgong-Ku, Incheon 405-220, Korea.
Tel. (82-32) 460-3060 Fax. (82-32) 460-3055