

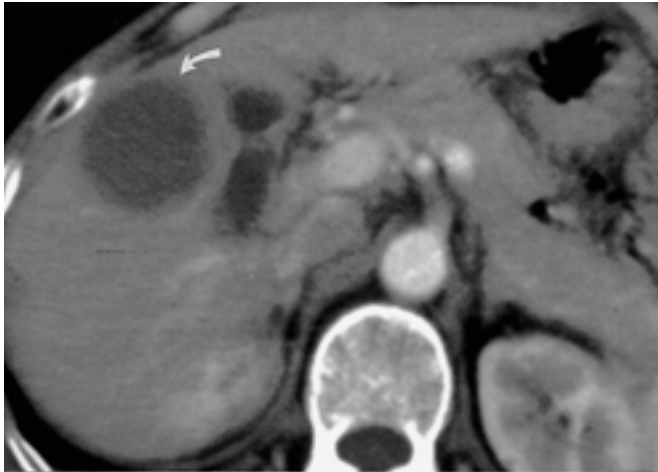


:
 : CT .
 95% 4 ,
 CT , , Lipiodol CT(LiCT)
 : CT 30 - 50 mm 41 mm , (3)
 (1) , .
 (halo)
 가 . LiCT
 3 가
 (trabecular type) , Edmondson II,
 III , 95% .
 : CT 가 B
 가 ,
 가 .
 CT 가 .
 가 가 .
 가
 (nodule in nodule)
 CT MR
 CT 가 4
 60 (56 - 64) .
 , 3 , 1
 (1 - 4).
 B C
 (5) (AFP)
 , ,
 Lipiodol CT(LiCT) ,
 ,

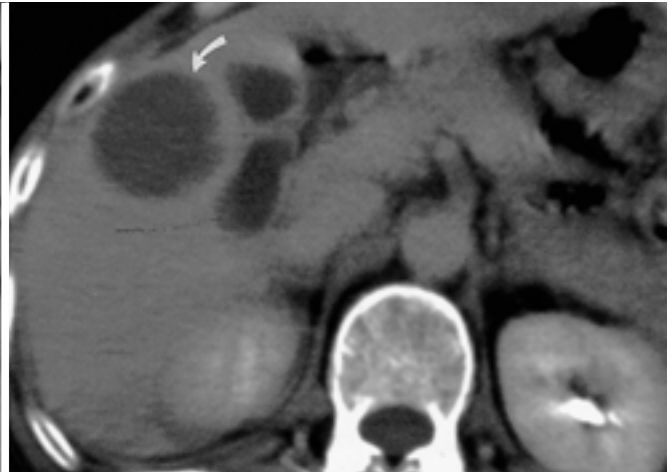
CT CT Somatom HiQ -
 S(Siemens Medical System, Erlangen, Germany)

100 ml 1.5 - 2 ml
 , 30
 , 90 10 mm

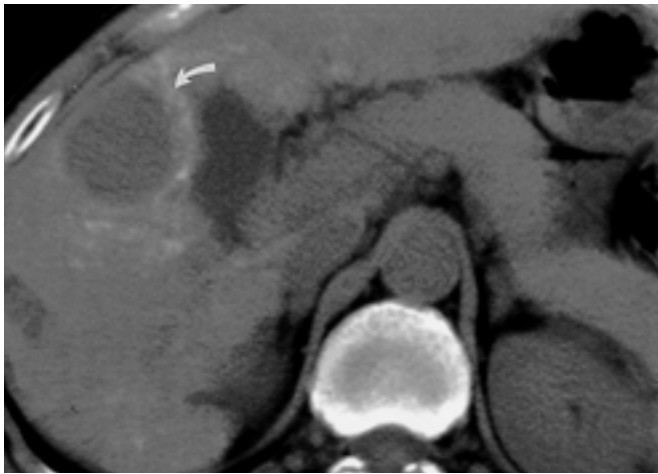
B 4
 C , AFP 1 (717
 ng/mL) 가가 3



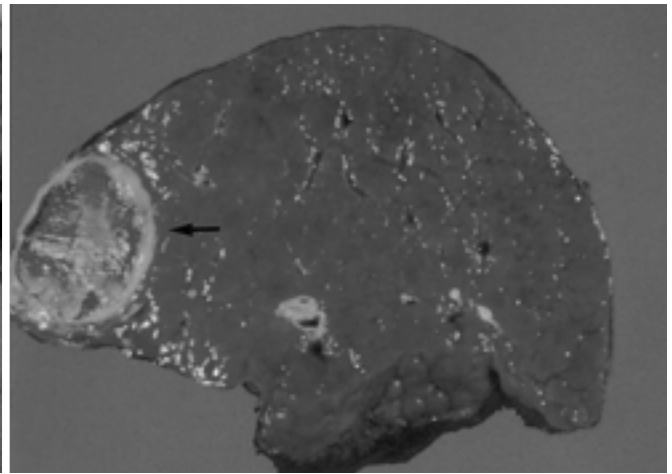
A



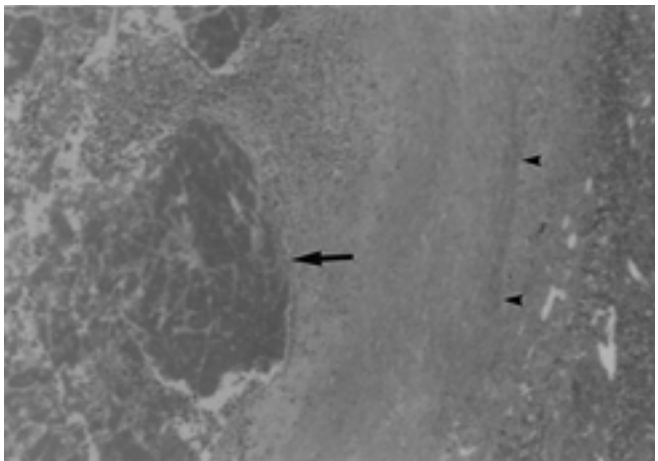
B



C



D



E

Fig. 1. Hepatocellular carcinoma with extensive coagulation necrosis in 62-year-old man.
 The arterial (A) and delayed (B) phase CT scans show nonenhancing mass lesion. Lipiodol CT (C) shows some lipiodol uptake in the periphery of the mass (arrow).
 D. Cut surface of liver specimen shows well encapsulated mass (arrow) with reddish brown and nearly total necrotized materials.
 E. Light microscopic photograph shows extensive coagulation necrosis (arrow) and capsule (arrow heads) (H & E, × 200).

Edmondson

30-50 mm 41 mm , II, III , 95%
가

CT , LiCT 2 1

3 , 1 2

Kupffer

가 95%
CT

가 2 ,

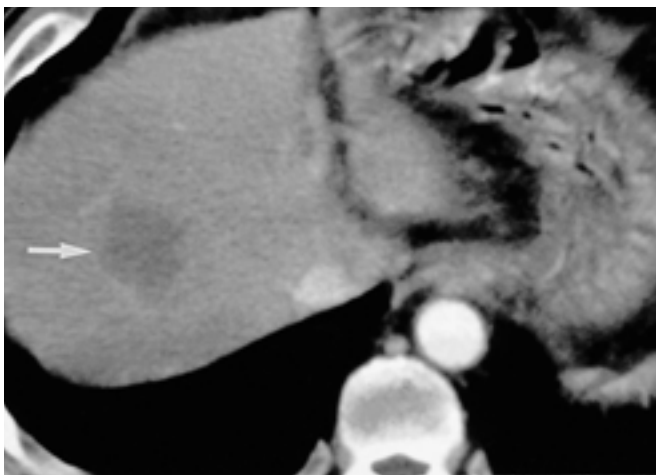
가 1 ,

가 1

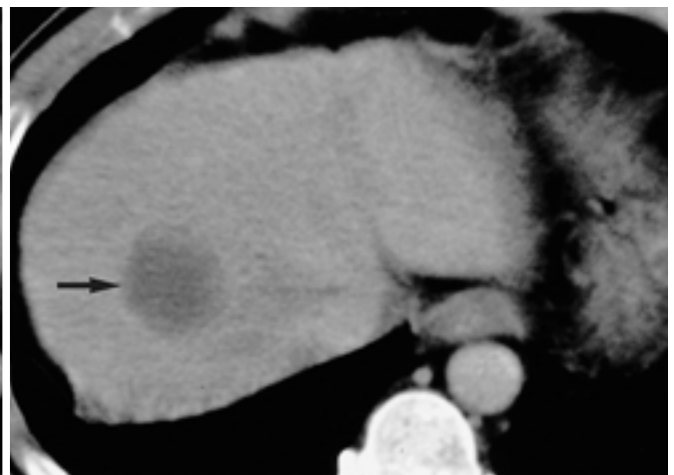
가

LiCT

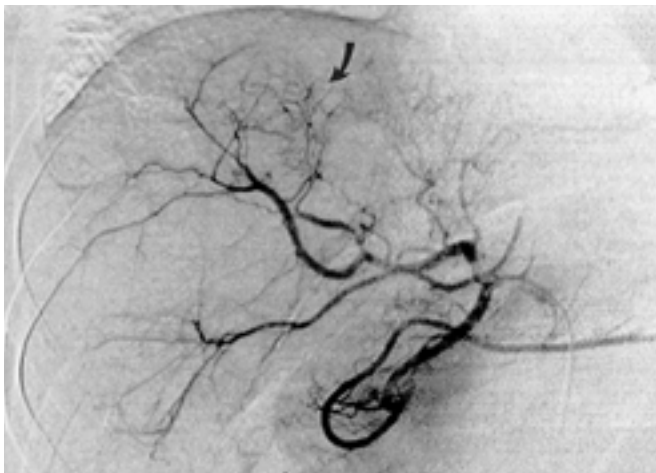
3 , 가 ,



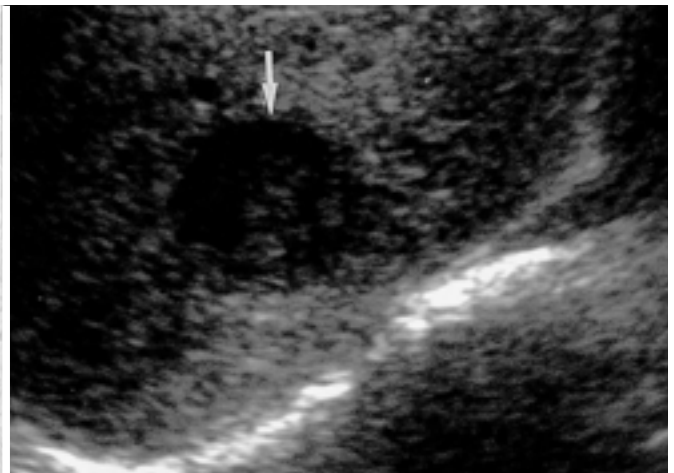
A



B



C



D

Fig. 2. Hepatocellular carcinoma with extensive coagulation necrosis in 56-year-old man. The arterial (A) and delayed (B) phase CT scans show nonenhancing mass lesion (arrow) in hepatic dome. Hepatic arteriogram (C) shows peripheral tumor staining (arrow) supplied by A8 and A4. The ultrasonogram (D) shows internal mixed echogenicity (arrow).

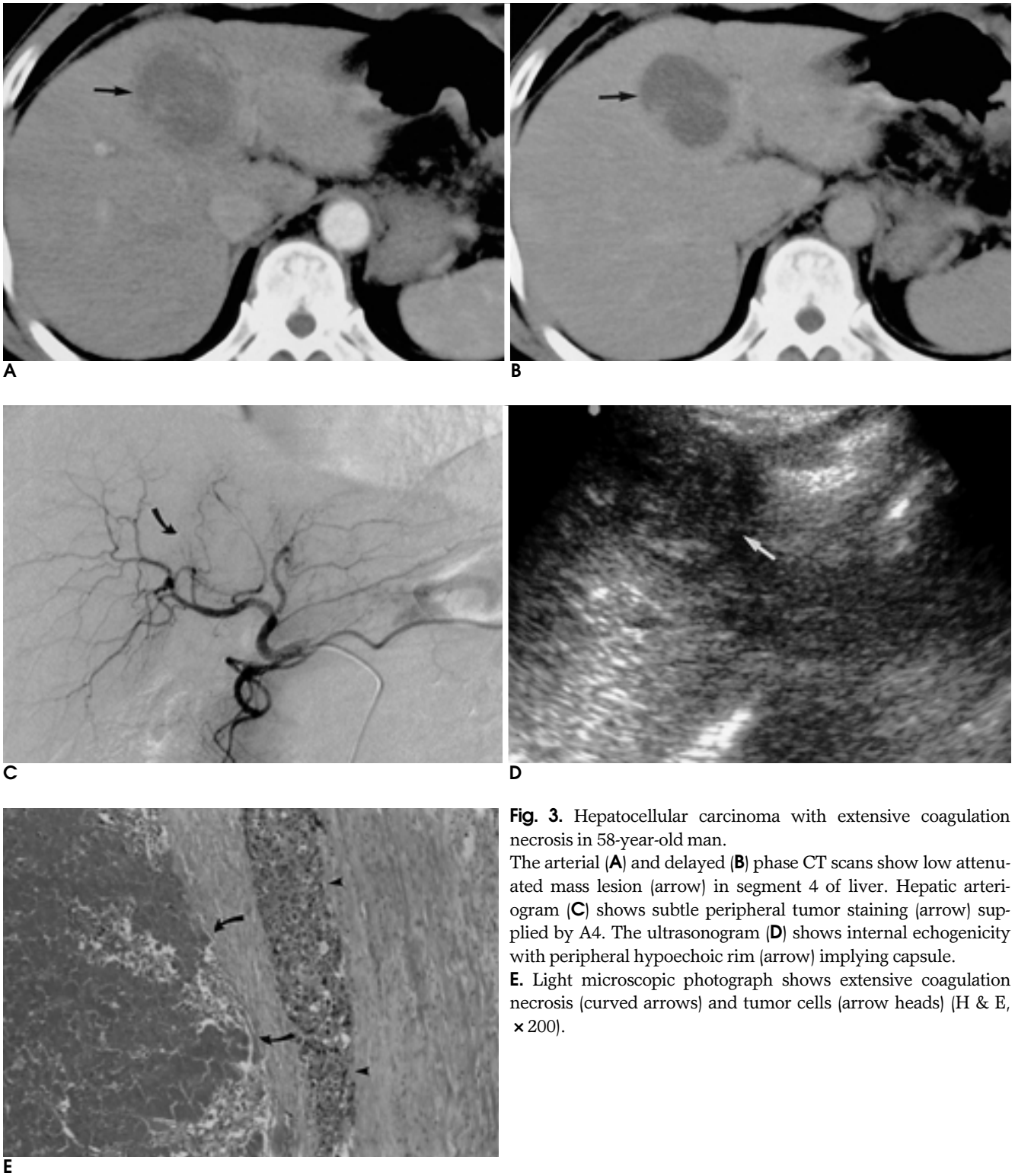


Fig. 3. Hepatocellular carcinoma with extensive coagulation necrosis in 58-year-old man. The arterial (**A**) and delayed (**B**) phase CT scans show low attenuated mass lesion (arrow) in segment 4 of liver. Hepatic arteriogram (**C**) shows subtle peripheral tumor staining (arrow) supplied by A4. The ultrasonogram (**D**) shows internal echogenicity with peripheral hypoechoic rim (arrow) implying capsule. **E.** Light microscopic photograph shows extensive coagulation necrosis (curved arrows) and tumor cells (arrow heads) (H & E, $\times 200$).

(vascular redistribution)

가

85 - 98%

가
(6),
, CT MR

가

가

(5, 6).

(7). CT . 30 -

50 mm

가

가 B

(5, 8).

가

가

Apoptosis

apoptosis

가

endoneuclease

가

가

가

(9).

가

(10).

가

(11).

(9).

가

가

가 B

1. IV bolus CT
1992;28:942-950
2. Ito K, Choji T, Nakada T, et al. Multislice dynamic MRI of hepatic tumors. *J Comput Assist Tomogr* 1993;17:390-396
3. Araki T, Itai Y, Furui S, Tasaka A. Dynamic CT densitometry of hepatic tumor. *AJR Am J Roentgenol* 1980;135:1037-1043
4. Burgener FA, Hamlin DJ. Contrast enhancement of hepatic tumors in CT: comparison between bolus and infusion techniques. *AJR Am J Roentgenol* 1983;140:291-295
5.
1999;41:129-140
6. : , 1998;37-45
7. Mahfouz AE, Hamm B, Wolf KJ. Peripheral washout: a sign of malignancy on dynamic gadolinium-enhanced MR images of focal liver lesions. *Radiology* 1994;190:49-52
8. In .
. 1997;1:32-43
9. L. Maximilian B, Marsha LE, Edwin HE. Apoptosis and Necrosis: Basic Types and Mechanisms of Cell Death. *Arch Pathol Lab Med*. 1993;117:1208-1214
10. In . 1994;31-70
11. Cotran RS, Kumar V, Robbins SL, *Pathologic Basis of Disease*. 5th Edition. Philadelphia: Saunders, 1994:1-34

Hepatocellular Carcinoma with Internal Extensive Coagulation Necrosis: Carefulness of Preoperative Imaging Diagnosis and Comparison with Surgical Specimen¹

Myong Ho Shin, M.D., Jay Chun Chang, M.D., Byeung Hak Rho, M.D., Jae Ho Cho, M.D.,
Mi Soo Hwang, M.D., Bok Hwan Park, M.D.

¹Department of Diagnostic Radiology, School of Medicine, Yeungnam University Daegu, Korea

Purpose: The aim of this study is to correlate the non-characteristic dual-phase CT imaging findings of hepatocellular carcinoma with the observed characteristics of surgical specimens.

Materials and Methods: We studied four cases in which homogeneous low attenuation was observed during the arterial and delayed phases of dynamic CT scanning and in which hepatocellular carcinoma with coagulation necrosis above 95% was pathologically confirmed. We compared the findings of dual phase CT scanning, ultrasonography, angiography and Lipiodol CT scanning with the observed features of surgical specimens.

Results: Nodules were 30 - 50 (mean, 41) mm in size, and were round in three cases and oval in one. In all four cases, a low density lesion was observed during the arterial and delayed phases of dual-phase CT scanning. Ultrasonography demonstrated internal echo and the presence of a hypoechoic halo, implying that in all cases a capsule was present. At angiography and LiCT, minimal peripheral and central tumor staining or lipiodol uptake was observed. In all surgical specimens a complete capsule was visible, and histologic structures were mainly of the trabecular type, Edmondson grade II or III was recorded, and the mass had undergone extensive coagulation necrosis (above 95%).

Conclusion: In cirrhotic liver which is hepatitis B-antigen positive, clear sonographic findings of internal echo and a capsule, rather than a simple cyst, indicate the possibility of hepatocellular carcinoma with extensive coagulation necrosis. This is so even if the arterial and delayed phases of dual-phase CT scanning indicate the presence of a low-density lesion, and in such cases additional work-up is therefore required.

Index words : Liver neoplasms
Liver, cirrhosis
Liver, necrosis

Address reprint requests to : Jay Chun Chang, M.D., Department of Diagnostic Radiology, School of Medicine, Yeungnam University
317-1 Daemyungdong, Namgu, Taegu 705-717, Korea.
Tel. 82-53-620-3042 Fax. 82-53-653-5484