

Epinephrine (Pharmaco-CTHA) :

CT
1

가 : CT 가 CT 가
가 : 가 CT
22 가
1 0.3cc/sec 8cc 5
CT , 2 10 µg normal saline 10cc
1 0.3cc/sec 8cc
11 CT , 3 CT (conven-
tional CTHA) 1cc/sec 25cc CT
가 CT 1) 가 , 2) 가
, 3) 4)
CT
: 22
가 12
1 , 2 3 가 5 , 4 1 가 CT
16 가 . 가 1, 2 3 9, 13 49 가
2 3 가 (p=.000). 1
가 9 가 가 8 2 (4) 3
(2) 2, 4 가 . 3 4 가
1 1 2 . 16 “
(good) ” “ (excellent) ” 1 4 (25.0%), 2 10
(62.5%), 3 13 (81.3%)
: CT (Pharmaco-CTHA)
가 .

CT (liver spiral CT during hepatic arteri-
ography : CTHA) ,
(pharmacoangiography)
CT (4-7),
(1-3). SPECT (single photon emission computed tomog-
raphy)
(8)
가

가 (Lipiodol Ultra-fluid, Ethylesters of the iodised fatty acids of poppyseed oil, Guerbet S.A., France) (,) 2-3cc

CT 3 가 CTHA 4가

Pharmaco-CTHA가 CTHA(: 1) CTHA CT 가 ; 2) CT CTHA ; 3) ; 4) . 가 CTHA CT I , IV , (arteriportal shunt)

1997 10 1998 9 가 70 32 C- THA , , 가 가 CT (9,10). 가 “ (poor) ”, 가 “ (good) ”, “ (excellent) ” . “ ” 8 cc 5 CT , “ ” “ ” (Fig. 1). 가 Post HOC test (SPSS, version 8.0) , 가 Chi-Square test

Pharmaco-CTHA 2 Pharmaco-CTHA 10 µg (,) 0.3cc 8 cc 11 CT normal saline 1000cc 1 mg 1 µg/cc 10cc 3 CTHA (conventional CTHA) 1cc 25cc 5 CT (Table 1). CT Somatom Plus-S(Siemens Medical System, Erlagen Germany) 10mm/sec 10mm 7mm (iodine 300mg/ml, ,) . CTHA

Table 1. Summary of Three Methods of CT Hepatic Arteriography (CTHA).

	Method 1 CTHA	Method 2 CTHA	Method 3 CTHA
Contrast media			
Infusion rate	0.3 cc/sec	0.3 cc/sec	1 cc/sec
Infusion amount	8 cc	8 cc	25 cc
Scan delay	5 sec	11 sec	5 sec
Epinephrine	(-)	10 µg for 1min	(-)

가 12 가
1, 2 3 가 5, 4 1
가 4, 5
CT 16 (0.73
)가
CTHA
CT 가 1, 2, 3
9, 13, 49 가 2 Pharmac-
CTHA가 3 conventional CTHA 가
(Post Hoc tests, $p = .000$)
(Fig. 2, 3). 3 conven-
tional CTHA 1/3 1 가
9 가 가 3
2 3 2, 4 가
가 (Chi-square tests,
 $p = .022$) (Table 2, 3). 가 2 4, 3
2 가 2
($p = .365$).
3 conventional CTHA 4
(4/22 = 18.2%)가 1/3 1
1 (1/22 = 4.5%), 2 Pharmac-
THA (Fig. 4).
“ ” “ ”

CT 16 1, 2
3 8, 12 14 가 , 1
“ ” 4 (25.0%) “ , ”가 4 (25.0%)
, 2 (Pharmac-CTHA) “ ” 2
(12.5%) “ , ”가 10 (62.5%)가 1 “

Table 2. Results of Comparison of 3 Different CTHA

	Method 1 CTHA	Method 2 CTHA	Method 3 CTHA
False positive			
Around the GB	0	0	3
Except around the GB	9	13	46
False negative	8	4	2
Portal effect	1	0	4

Table 3. Statistical Analysis of Each Item

	† False positive	* False negative
Method 1 vs. Method 2	$p = 0.879$	$p = 0.144$
vs. Method 3	$p = 0.000$	$p = 0.022$
Method 2 vs. Method 1	$p = 0.879$	$p = 0.144$
vs. Method 3	$p = 0.000$	$p = 0.365$
Method 3 vs. Method 1	$p = 0.000$	$p = 0.022$
vs. Method 2	$p = 0.000$	$p = 0.365$

*The mean difference is significant at the 0.05 level.

† Post HOC test (SPSS, version 8.0) was applied.

* Chi-square test was applied.

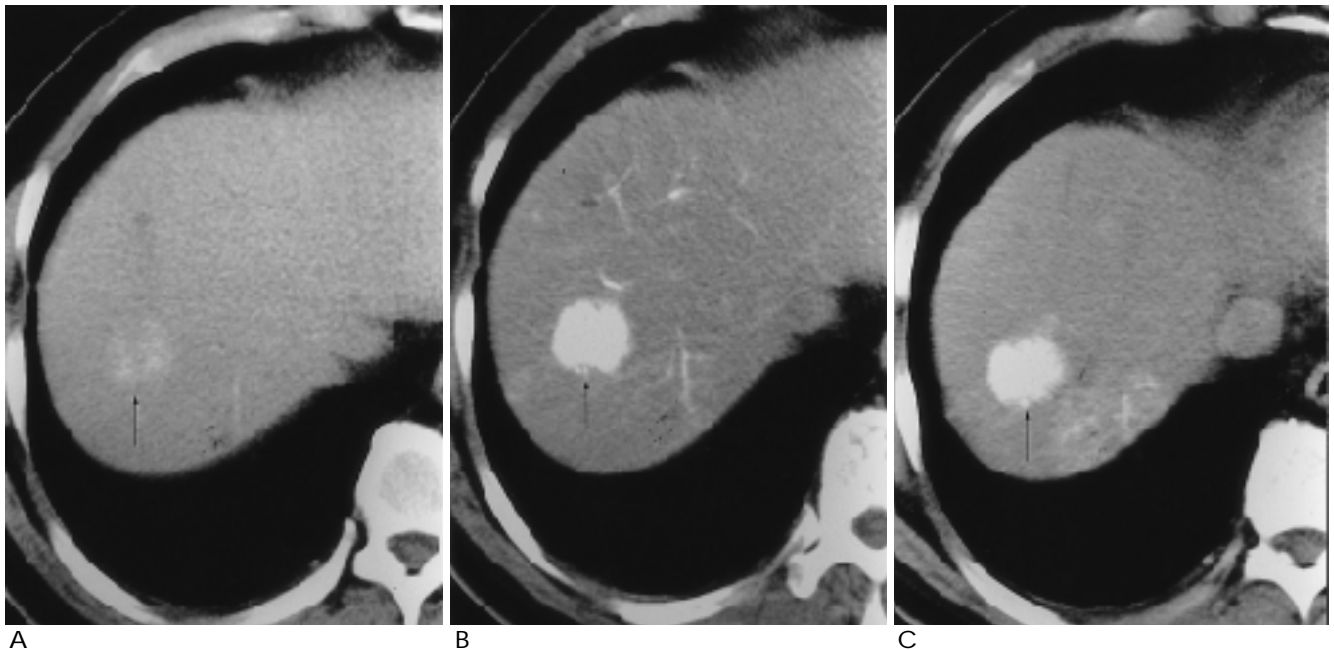


Fig. 1. The conspicuity of the lesion in a 54-year-old man.

A. On the first method poorly defined slightly enhancing lesion is graded " poor " (arrow). B. On the second method (Pharmac-CTHA) this lesion is well defined and well enhanced (arrow). So this lesion is graded " excellent ". C. On the third method (conventional CTHA) this lesion is also graded " excellent " (arrow).

가 (Chi-square tests, $p=0.033$). 3 (conventional CTHA) “ ” (p = .238) (Table 4).
 1 (6.3%) “ 가 13 (81.3%)가 1 Pharmaco-CTHA
 1 “ 가
 (Chi-square tests, $p=0.001$). 2 3

Table 4. Conspicuity of the 16 Lesion

	Method 1 CTHA	Method 2 CTHA	Method 3 CTHA
Poor	4 (25.0%)	2 (12.5%)	1 (6.3%)
Good	3 (18.8%)	5 (31.3%)	3 (18.8%)
Excellent	1 (6.3%)	5 (31.3%)	10 (62.5%)

75%

, 25%

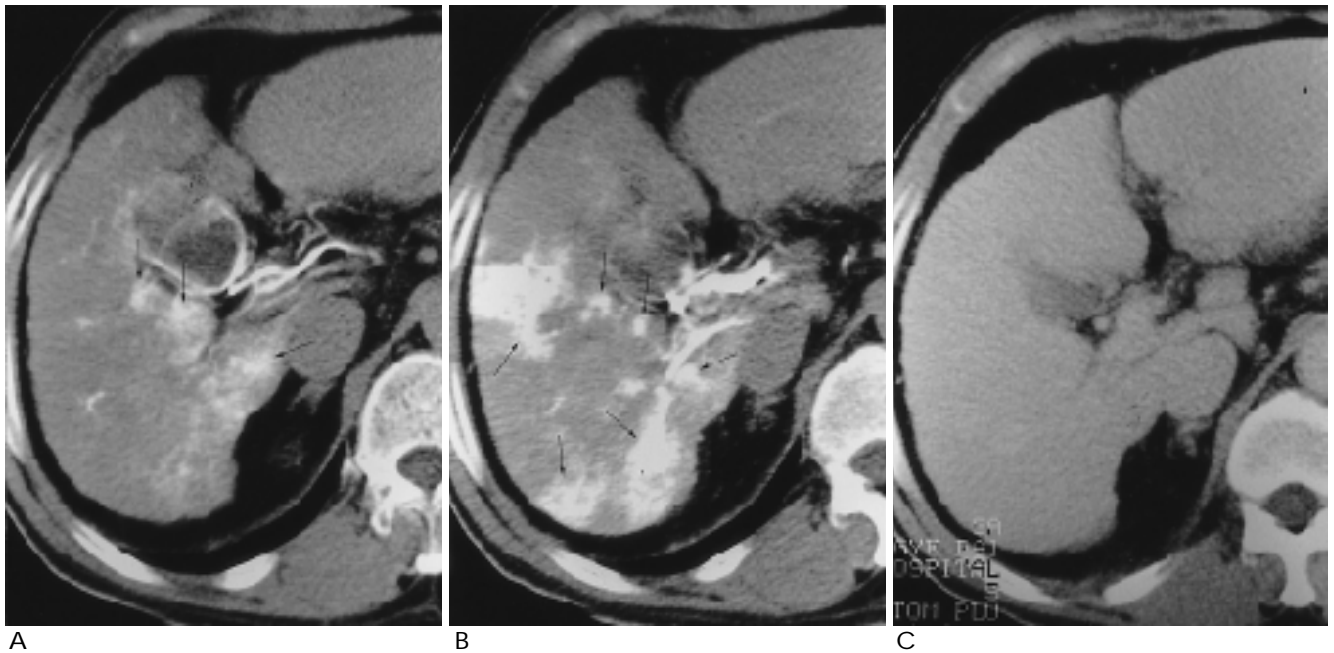


Fig. 2. 46-year-old man underwent CTHA for the sixth chemoembolization.

A. Pharmaco-CTHA shows poorly defined enhancing lesions (arrows). B. Conventional-CTHA shows increased number of poorly defined enhancing lesions (arrows), as compared with A-C. Follow-up lipiodol CT scan shows no lipiodol uptake. Enhancing lesions on both Pharmaco-CTHA and conventional CTHA reveals false positive lesion probably due to arterioportal shunt because of repeated chemoembolization. These false positive lesions are decreased on the Pharmaco-CTHA

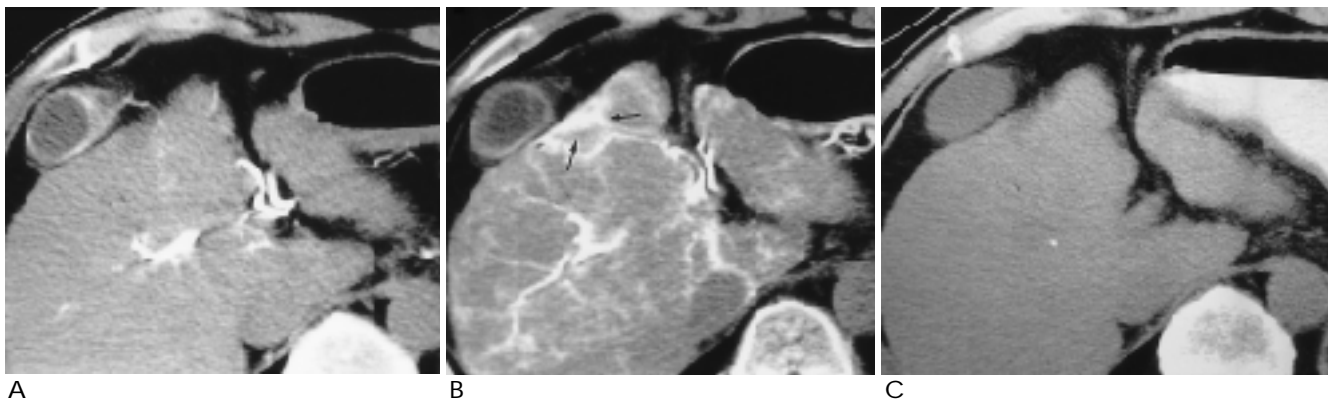


Fig. 3. False positive lesion in a 59-year-old man.

A. Pharmaco-CTHA does not show any perfusion abnormality. B. Conventional CTHA shows a focal area of hyperattenuation in the liver around the gallbladder (arrow). C. Follow-up lipiodol CT also no lipiodol uptake around the gallbladder.

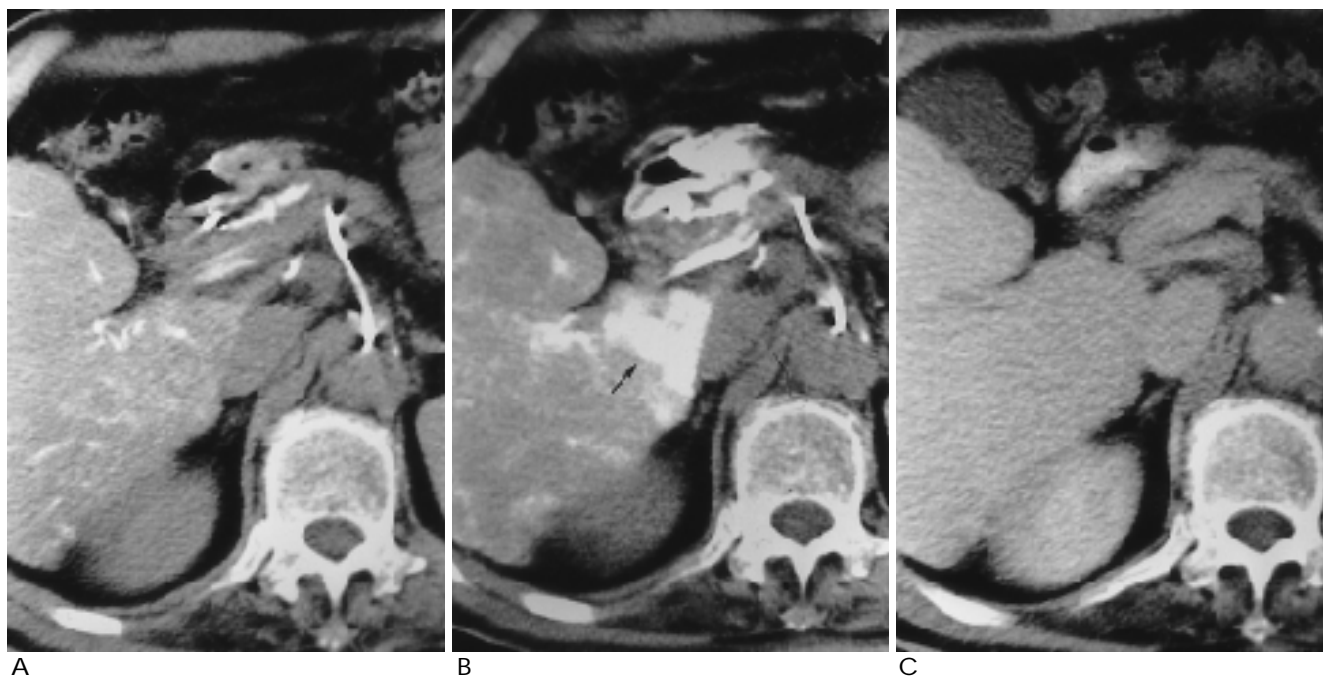


Fig. 4. False positive lesion probably due to portal effect in a 56-year-old man.

A. Pharmaco-CTHA does not show any perfusion abnormality. B. Conventional CTHA shows a focal enhancing lesion in the caudate lobe of the liver (arrow). C. Follow-up lipiodol CT also no lipiodol uptake.

(11-13). CTHA , 가
70%
CT (7). CTHA
Pharmaco-CTHA
가
CT 가
CTHA
가 (14)
I , IV , , 가
(15). 10 μ g
Paul (16)
5-30 μ g
James (8) SPECT 5-50
5-30 μ g
Paul (16)
가 25%
2 가 15
가
(4-7). James tech-
netium-99m-labeled macroaggregated albumin
SPECT(single photon emission computed tomography)
1.7-18.7(4.8)
(tumor-to-normal-liver ra-
tio of the radioisotope uptake)가 1.1-
53.6 (7.1)가 가 (8), Leif
Ekelund
(pharmacoangiogram)
가
1/3-1/4
con-
ventional CTHA 1cc 25cc
1/3 0.3cc 8cc
(15) conventional CTHA 가
I , IV , , ,
가
가
가

가
Pharmaco-CTHA 가
Pharmaco-CTHA가 conventional CTHA
가 가
가 가
가
가 Pharmaco-CTHA가 conventional
가
CTHA
Pharmaco-CTHA CTHA
conventional CTHA
1/3 CTHA 1
conventional CTHA
가 가
CTHA (Pharmaco-
CTHA (conventional CTHA)
conventional CTHA
가 가 가

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Use of Epinephrine Infusion During CT Hepatic Arteriography (Pharmaco-CTHA) : Clinical Application in Patients with Hepatocellular Carcinoma¹

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Purpose : To evaluate the usefulness of epinephrine infusion (Pharmaco-CTHA) prior to liver to liver spiral CT during hepatic arteriography in patients with hepatocellular carcinoma.

Materials and methods : Twenty-two patients in whom hepatocellular carcinoma had been diagnosed underwent three types of liver spiral CT during hepatic arteriography. In the first method, spiral CT scanning was started 5 seconds after injecting 8cc of contrast media at a rate of 0.3cc/sec. In the second, 10 µg of epinephrine was slowly injected for 1 minute via the catheter and subsequent spiral CT scanning began 11 seconds after injecting 8cc of contrast media at a rate of 0.3cc/sec. In the third method, spiral CT scanning was started 5 seconds after injecting 25cc of contrast media at a rate of 1cc/sec. The following were evaluated and compared with the results of follow-up lipiodol CT: 1) the incidence of false positive lesions; 2) the incidence of false negative lesions; 3) portal enhancement; and 4) lesion conspicuity.

Results : Follow-up lipiodol CT of 22 patients showed 16 masses. In 12 patients there was no lipiodol uptake, and in five, four and one patient(s), uptake occurred once, twice, and three times, respectively. With method 1 there were nine false-positive lesions, with method 2 there were 13, and with method 3, there were 49. The use of method 2(Pharmaco-CTHA) led to less false-positives than did method 3 (conventional CTHA) ($p=0.000$). Method 1 showed the lowest false positive rate (nine lesions), but its false-negative rate was two and four times higher than with method 2 (four lesions) and with method 3 (two lesions), respectively. Portal enhancement was observed four times using method 3 and once with method 1, but was absent with method 2. As regards the conspicuity of 16 masses, " good "and" excellent "lesions were seen four times with method 1(25%), ten times with method 2 (62.5%) and thirteen times with method 3 (81.3%).

Conclusion : The infusion of epinephrine (Pharmaco-CTHA) prior to spiral CT during hepatic arteriography has the advantage of reducing the amount of contrast media required as well as the number of cases which are false positive and show no portal enhancement.

Index words : CT, angiography
Drugs, effects
Liver neoplasms, CT
Liver neoplasms, blood supply

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