

가

CT

:

1

2

2

3

3

4

: 가

CT

,

:

CT

가 7

1

3

120

CT

Omnipaque 350 mgI/ml

, 가

(700 mgI/kg)

,

1

0.3ml/sec(1) , 2

1ml/sec(2) , 3

2ml/sec(3)

. 가

, ,

(HU)

,

가

:

18sec 310HU(1) , 9 sec

383HU(2) , 6sec 357HU(3)

36sec 34HU, 36sec 40HU, 30sec

41HU

36sec 135HU, 24sec 153HU, 21sec 170HU

12-21 sec(0.3ml/sec), 6-12sec(1ml/sec), 6-12sec(2ml/sec)

,

30sec(0.3ml/sec), 21sec(1ml/sec), 21sec(2ml/sec)

가

1

2,3 (<0.05)

, 2

3

가

.

가

.

: 가

CT

,

,

.

CT

가

가

CT

(1-3),

CT

(temporal window)

,

(4-6). 가

.

,

,

가

CT

가

1850-2800gm(2500gm)

7

가

. Bluemke

가

CT

(New Zealand White)

1

429mgI/kg

(7).

3

CT

가

2

2ml/sec

,

CT

BUN, creatinine, sGOT, sGPT

, 80ml/sec

,

가

. CT

(

,

,

) 75-100 mg

,

(

) 15-30 mg

1

2

3

4

1998 11 4

1999 3 6

.

0.8ml

,

Omnipaque(Iohexol, Nycomed, Oslo, Norway) 350 mgI/ml , 가 (700 mgI/kg) 3.7-5.6ml 1 (0.3ml/sec, 1), 2 (1ml/sec, 2), 3 (2ml/sec, 3)

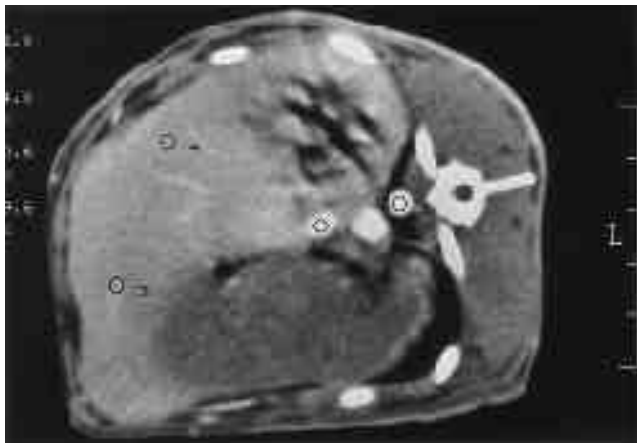
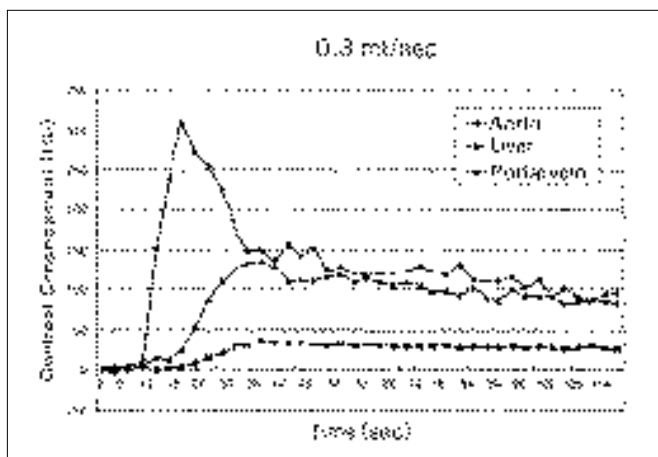


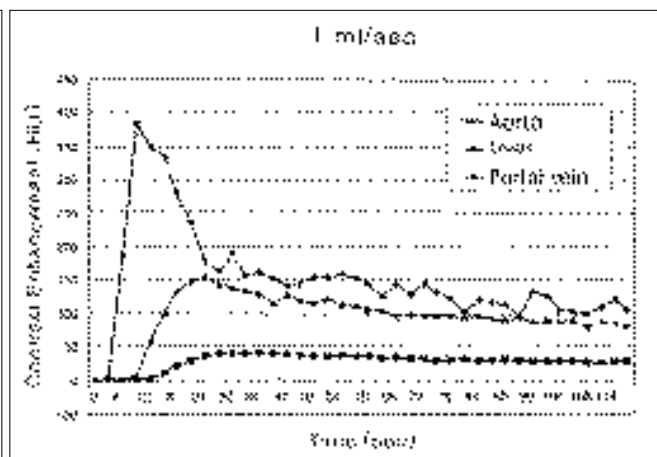
Fig. 1. Enhanced dynamic CT scan through mid rabbit liver shows regions of interest placed over portal vein(1), aorta(2) and liver(3 and 4).

가 CT SCT-7000TH(Shimadzu, Kyoto, Japan) 100 mA, 80 kVp, 3 mm, 110 mm CT , 3 120 CT . 2

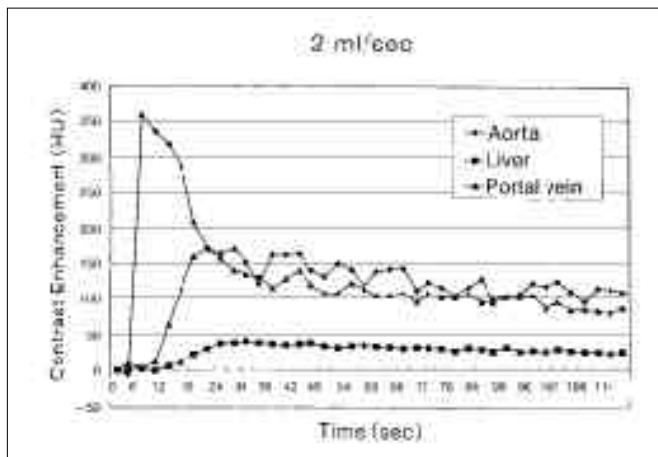
HU(Hounsfield Unit,) . 가 , (Fig. 1). (HU) (7, 8). 150HU 30% (9) 70% (10). 가 가 Wilcoxon signed ranks test



A



B



C

Fig. 2. Time-density curves of aorta, liver and portal vein after contrast injection in a 0.3ml/sec(A), 1ml/sec(B) and 2ml/sec(C) in rabbit.

18 sec 310HU, 2 9 sec 383HU, 3 6 sec
357HU . 36 sec 34HU, 36
sec 40HU, 30 sec 41HU . 36 sec
135HU, 24 sec 153HU, 21 sec 170HU (Table 1, Fig.
2, Fig. 3).

1 150HU 12
30 %, 34HU 30 %
10.2HU , 21
. 21 , 가 7 6 (85.7
)가 10.2HU . 70 % 23.8HU
, 30 . 30 7
6 (85.7 %) 23.8HU
0.3ml/sec 12-21
(10) , 30

Table 1. Mean Peak Enhancement in Equivalent Time(HU/Sec) of Three Contrast Injection Rate Protocol.

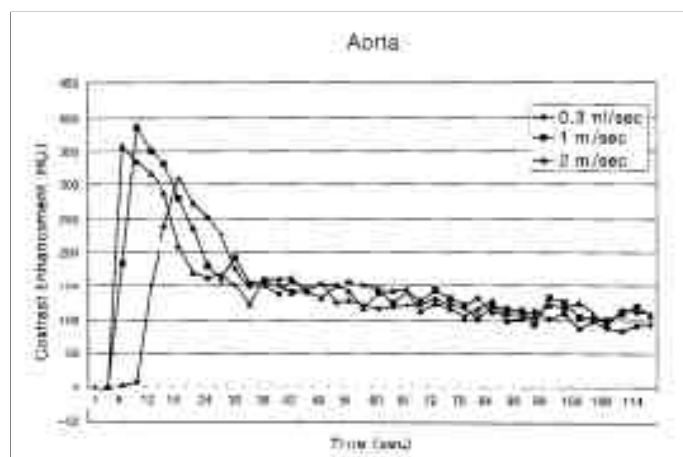
	0.3ml/sec	1ml/Sec	2ml/Sec
Aorta	310/ 18	383/ 9	357/ 6
Liver	34/ 36	40/ 36	41/30
Portal vein	135/ 36	153/ 24	170/21

(Fig. 2A).

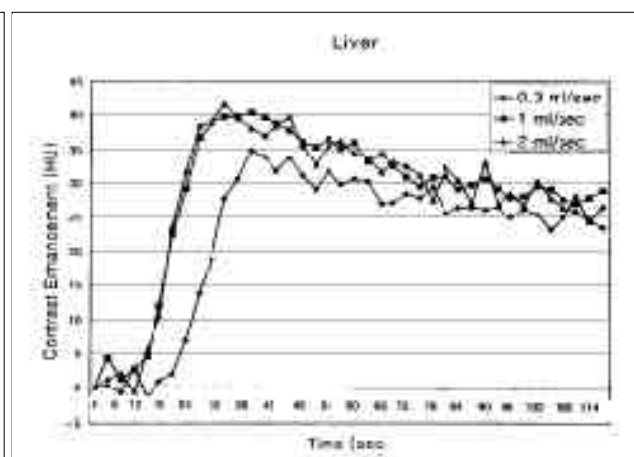
2 150HU
6 , 36 sec 40HU
30 % 12HU
12 15 , 15 sec 28.6 % (2/7) ,
12 sec 100 % (7/7) 12HU 12
(40HU)
70 % 28HU , 21
71.4 % (5/7) 28HU , 21
1ml/sec 6-12
(7) 21

(Fig. 2B).

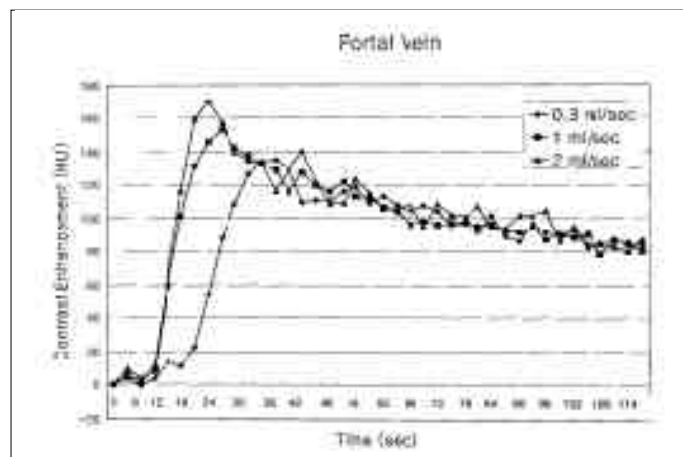
3 150HU 6
, 41HU 30 % 123HU , 12
7 6 (85.7 %)
41HU
70% 28.7HU , 21 7 5
(71.4 %) 28.7HU 21 sec
2ml/sec



A



B



C

Fig. 3. In the comparison with the faster contrast injection rates of 1, 2ml/sec, the slower injection rate of 0.3ml/sec shows delayed and lower-peak enhancement patterns in the aorta(A), liver(B) and portal vein(C). The rates between 1ml/sec and 2ml/sec show no significant difference in enhancement.

가 CT

6-12 (7)

21 (Fig. 2C). 21 (10), 1ml/sec 6 12 (7),

1 2, 3 2ml/sec 6 12 (7)

(Fig. 3). 가 1 0.3ml/sec 가

2, 3 (<0.05), 2 3 0.3ml/sec

가 (>0.05), 1 가 0.3ml/sec 30 ,

2 (<0.05), 1 3 가 1ml/sec 21 , 2ml/sec 21

(<0.05).

가 (1-3). 가 (16-18).

CT, 가 가 4ml/sec 8ml/sec 가

. 가 가 가 (17).

CT가 가 0.3ml/sec

CT 1ml/sec 2ml/sec가

CT 1ml/sec 2ml/sec (Fig. 3).

(4-6). 가 가

가 가

가 3 : 7 가

(11). 가 가 CT

가 가 가

가 150HU 가 CT

1 12 , 2 3

6

3 : 7 30%가

(9).

20HU (11).

50HU (12-14).

가 20HU

가

30% (HU)

Walkey (10),

70% (15).

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Optimal Scan Time of Dual-phase Spiral CT in Normal Rabbit Liver : Effect of Contrast Injection Rate¹

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Purpose : To determine the effect of contrast injection rate on rabbit liver enhancement and the optimal temporal window for dual-phase spiral CT of rabbit liver at each injection rate

Materials and Methods : Using spiral CT, seven New Zealand White rabbits underwent dynamic scanning at one level of liver. Three protocols of contrast injection rates were employed, namely 0.3 ml/sec(group 1), 1 ml/sec(group 2) and 2 ml/sec(group 3). During 120 seconds of total scan time, the scan interval was 3 seconds. Densities of the aorta, liver and portal vein were averaged in equivalent time. The different injection rate protocols were compared for peak enhancement/time on a time density curve.

Results : Mean peak enhancement (HU) in equivalent time(secs) was 310/18(group 1), 383/9(group 2) and 357/6(group 3) in the aorta ; 34/36, 40/36 and 41/30 in the liver ; and 135/36, 153/24 and 170/21 in the portal vein. The temporal window during the arterial phase was 12-21 sec(group 1), 6-12 sec(group 2), and 6-12 sec(group 3). The temporal window during the portal phase was from 30 sec(0.3ml/sec), 21sec(1ml/sec) and 21sec(2ml/sec).

Conclusion : During dual-phase spiral CT, the temporal window for liver scanning should be determined according to each contrast injection rate. A slow contrast injection rate prolongs the temporal window during the arterial phase.

Index words : Computed tomography(CT), helical
Contrast media, experimental studies
Liver, CT

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