

CT

CT (n=21) 49 (n=28)

24 3 ml 120 ml

45 () 80 () 25

35 75 (HU)

35 45 가 , 35

45 (254

HU ± 41:224 HU ± 43, 259 HU ± 55: 212 HU ± 44, $p < .05$).

35 45 가

75 80

35 45 가

35 75

CT가

가 70 - sec delay) CT가

10% - 30% 가 가 (1, 2). (3, 4).

가 가 (5),

(CT) 가 CT 40 - 70 - sec delay) (hepatic phase, 70 - 100 - sec delay) 가 (6, 7).

가 가 CT

(Group 1; 45 /80 , Group 2; 35 /75)

(HU)

(protocol)

CT

(arterial phase, 18 - 30 - sec delay)

가 (portal phase, 60 -

/80 (Group 1) 1998 5 1999 6
 35 /75 (Group 2)
 . 1 24 (61
 , : =17:7) 12
 . 2 25 (
 60 , : =18:7) 9
 28
 CT HiSpeed Advantage (General Electric
 Medical Systems, Milwaukee, WI, U.S.A.) 7
 mm
 120 ml
 3 ml 45 /80
 5 mm , 1.0
 . 35 / 75 3 mm ,
 1.2 7 mm

ROI (region of interest)

가 가 ROI (> 10 mm)

(Fig. 1A),

가 ,
 (ROI > 10 mm, Fig. 1A).

(ROI > 3 mm, Fig. 1B, 1C).

SPSS t - test

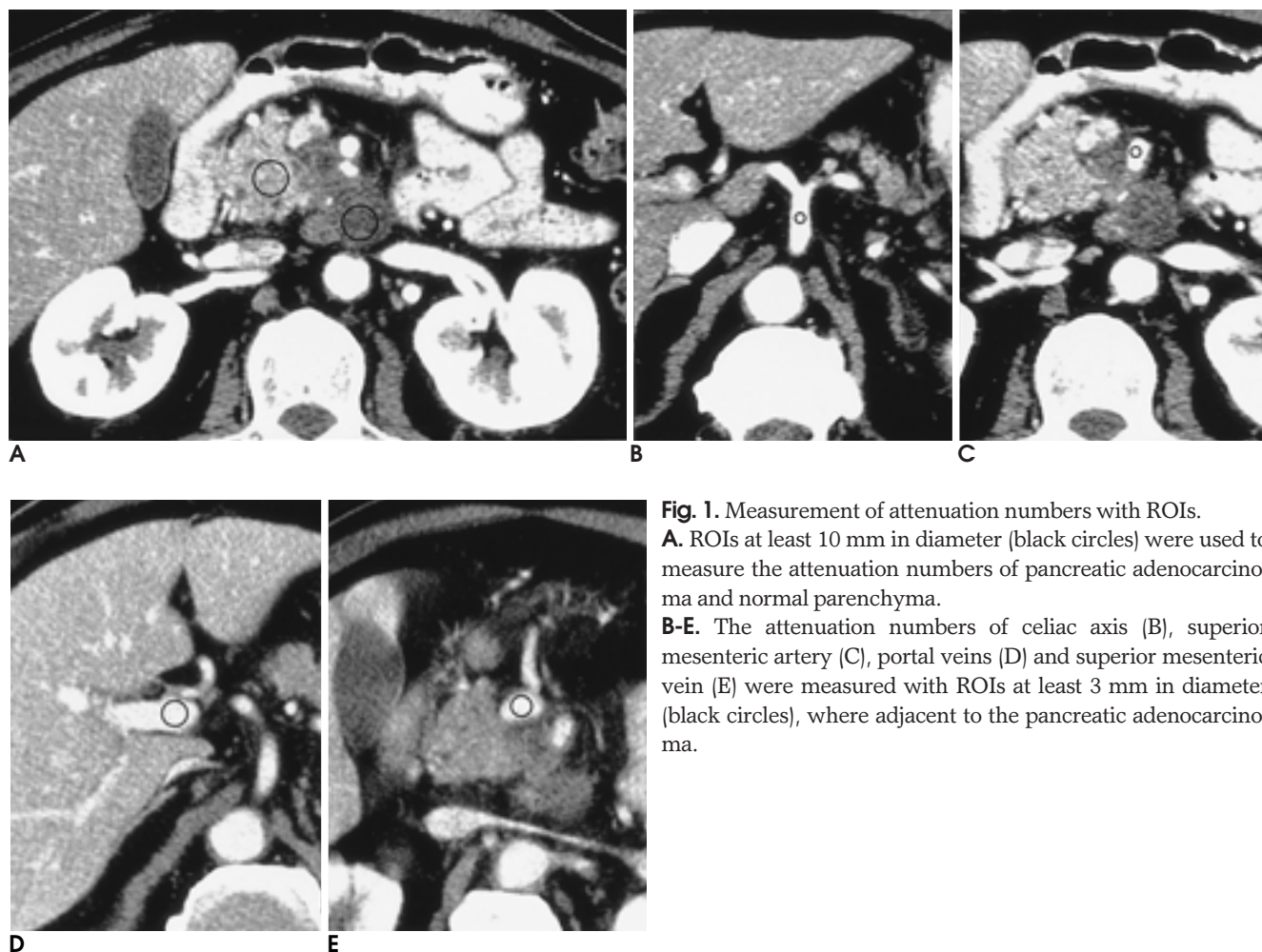


Fig. 1. Measurement of attenuation numbers with ROIs.
A. ROIs at least 10 mm in diameter (black circles) were used to measure the attenuation numbers of pancreatic adenocarcinoma and normal parenchyma.
B-E. The attenuation numbers of celiac axis (B), superior mesenteric artery (C), portal veins (D) and superior mesenteric vein (E) were measured with ROIs at least 3 mm in diameter (black circles), where adjacent to the pancreatic adenocarcinoma.

35 45
 (p > .05),
 (p < .05).
 (Table 1, Fig. 2).
 /
 (p < .001), 35
 (group 2) 45 (group 1) 가
 (35 52 HU ± 21, 45 56 HU ± 29, p > .05)

Table 1. Mean Attenuation Values of Normal Parenchyma, Tumor, Arteries, and Veins

	35-sec delay	45-sec delay	75-sec delay	80-sec delay
Parenchyma	94 ± 20	99 ± 24	90 ± 14	87 ± 18
Tumor	40 ± 15	45 ± 16	49 ± 16	51 ± 21
Celiac A	254 ± 41	224 ± 43	144 ± 18	122 ± 18
SMA	259 ± 55	212 ± 44	139 ± 19	127 ± 19
SMV	121 ± 46	164 ± 38	144 ± 18	122 ± 18
PV	119 ± 49	157 ± 38	154 ± 22	141 ± 19

(HU ± SD)

Table 2. Attenuation Difference between Normal Parenchyma and Tumor

Protocols	Early phase	Delayed phase
Group 1	56 ± 29	37 ± 29
Group 2	52 ± 21	39 ± 22

(HU ± SD)

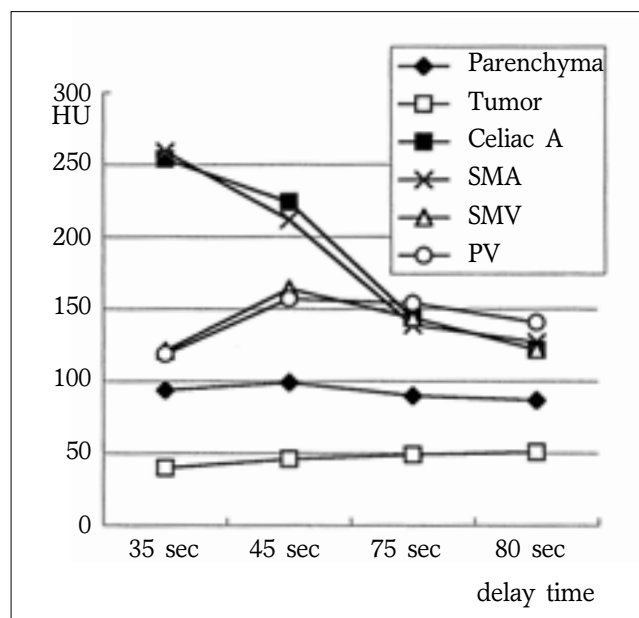


Fig. 2. Mean attenuation values of pancreatic parenchyma, tumor, and peripancreatic arteries and veins

(Table 2).
 35 45
 (p < .05, Table 1).
 45 가
 75 , 80 , 35
 ,
 (p > .05, Table 1).

(desmoplastic)
 (8, 9). , 가
 가
 CT 가
 가
 Hollet (3) (20)
 (49 - 71) 20 HU
 (4) 30 180
 180
 , Graf (5)
 160 ml
 (18)
 (60) 가
 (10)
 가
 45 70
 . Lu (6)
 (pancreatic phase) 70 -
 (hepatic phase)
 / 가
 (11) CT
 120 ml
 50 56
 /
 40 - 70
 . Silverman (12) Cham -

ber (13, 14)

70 - 100

, CT

가 45 , 45
80 / 가
(6) (Table 1, 2).
가 45
가 35 (11)
35
45
가 (Table 2).
35
가 35
45
(Table 1, Fig. 2). , 35
45
가
reconstruction image) CT
Lu (6) (40 - 70)
45
가 (Table 1, Fig.
2). 35
, 75
가
75 3 mm
CT
5 mm
가
가
CT 45 /80
35

- 가 , 75
가
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Pancreatic Cancer: Comparison of Two Series of Dual-phase Helical CT in Detection of Tumor and in Assessing Vascular Invasion¹

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Purpose: To compare the clinical utility of two series of dual-phase helical CT scans of the pancreas for tumor detectability and for the evaluation of vascular invasion.

Materials and Methods: Two series of dual-phase helical CT scans of the pancreas were performed in 49 patients with pancreatic adenocarcinoma proven by pathology (n = 21) and by clinical findings (n = 28). The first series, in 24 patients, was obtained with a 45-sec (pancreatic phase) and an 80-sec delay (hepatic phase), and for the second series, in 25 patients, the corresponding delay times were 35 and 75 secs. A total of 120 ml non-ionic contrast media was injected of a speed of 3 ml/sec. Tumor conspicuity for each phase was assessed by measuring the attenuation number of the pancreatic mass and of normal pancreas. Enhancement of the celiac axis (CA), superior mesenteric artery (SMA), and superior mesenteric and portal veins was assessed by measuring the attenuation number of each phase.

Results: A comparison of the first and second series revealed no statistically significant tumor conspicuity. Enhancement of the celiac axis and superior mesenteric artery was better on scans obtained at 35-sec/75-sec delay (CA 254 HU \pm 41, 224 HU \pm 43; SMA 259 HU \pm 55, 212 HU \pm 44; $p < .05$), as was enhancement of the superior mesenteric and portal veins, but no statistical significance was observed.

Conclusion: Dual-phase helical CT scans of the pancreas obtained at 35-sec/75-sec and 45-sec/80-sec delay for the pancreatic phase and hepatic phase, respectively, are equal in terms of the detectability of pancreatic adenocarcinoma, but for the evaluation of vascular invasion, dual-phase scanning with delays of 35 and 75 sees may be more appropriate.

Index words : Computed tomography (CT), helical
Pancreas, CT
Pancreas, neoplasms

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