

# CT

1

2

3

CT  
: 1991 3 1998 5 262  
26  
40 CT CT  
TNM  
: S  
가 12% (3/26)  
(p < 0.01).  
(p < 0.01), / 가 (p < 0.01). CT  
(p < 0.05). TNM  
가 CT

(signet ring cell carcinoma)  
(1).  
mucin)

(extracellular CT  
TNM

50-80%

(2).

가

가 (3-7).

1991 3

1998 5

262

26

40

CT

CT

26

11

15

23-83

61.8

40

23

17

33-75

57.4

(colon)

(rectum)

CT Somatom plus-Drg (Siemens, Erlangen, Germany)

HiSpeed Advantage system (GE Medical system,

Milwaukee, Wis, U.S.A.)

1

2

3

1999 4 6

1999 7 28

(Bari-um sulfate;  
 E-Z cat; E-Z-Em, Westbury, NY, USA) 1  
 600ml, 300 mL  
 200-  
 500 ml  
 (iopamidol, Iopamiro 300, Bracco, Milan, Italy) 120-150 ml  
 (Medrad, Pittsburg, Pa, U.S.A.) 2.5-  
 3.0ml/sec 65-70sec  
 10mm  
 13 (50%) 28 (60%)  
 CT 가  
 가  
 CT  
 CT  
 (lumen)  
 (circumferential),  
 (eccentric)  
 (polypoid),  
 (infiltrative)  
 (Fig. 1).  
 (thickness) (length)  
 가  
 CT collimation  
 TNM

: CT  
 Fisher's Exact Test  
 S  
 13 (50%), 8 (31%), 2 (7.7%), 1 (4%)  
 24 (60%), 9 (23%), 5 (13%), 1 (2.5%)  
 (p > 0.05).  
 3 (12%)  
 (Fig 2)  
 (p < 0.01).  
 16  
 35  
 (62%), 10 (38%)  
 (87.5%), 5 (12.5%) (p < 0.05),  
 19 (73%), 7 (27%)  
 2 (5%), 38 (95%) (p < 0.01).  
 / 10 (38%) (Fig 2,3), / 9  
 (35%), / 7 (27%)  
 / 35 (87.5%), / 3 (7.5%),  
 / 2 (5%) (p < 0.05).  
 3.5 ± 1.66cm ( ± , 1 - 7cm), 6.0 ±  
 1.83cm ( 3 - 10cm), 1.2  
 ± 0.52cm ( 0.5 - 3cm), 5.2 ± 1.53cm ( 3  
 - 10cm), / 0.61 ±  
 0.24, 0.24 ± 0.11 (p < 0.01).  
 CT 22  
 (85%) (Fig. 2-4), 2 (8%),  
 23 (57.5%), 17 (42.5%) (p < 0.05).

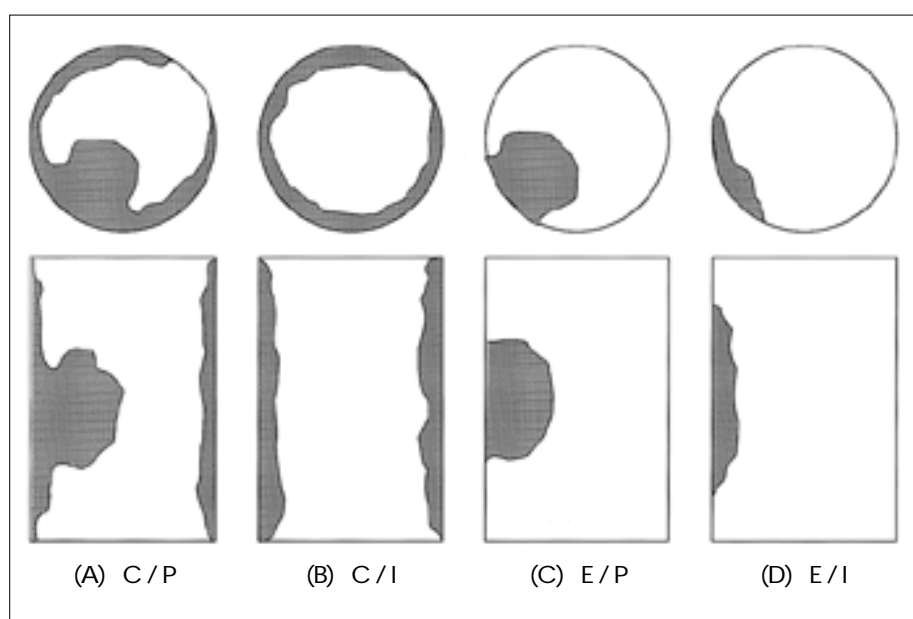


Fig. 1. Diagram of tumoral shape  
 A. C/P indicates that a tumor shows circumferential and polypoid growth pattern.  
 B. C/I indicates that a tumor shows circumferential and infiltrative growth pattern.  
 C. E/P indicates that a tumor shows eccentric and polypoid growth pattern.  
 D. E/I indicates that a tumor shows eccentric and infiltrative growth pattern.

22 (85%) (Fig. 2-4),  
 4 (15%), 14  
 (35%), 26 (65%) ( $p < 0.01$ ).

TNM

TNM

가 (p > 0.05) (Table 1). 2

7 2 (31%)

가 7 (27%) (5, 1, 가

1), 7 (18%) (4, 1, 2)

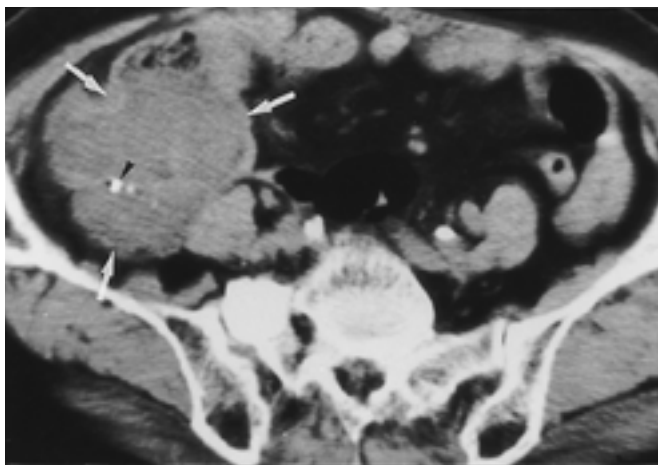
가

5-19 (10, 12),  
 8 -6 (23, 40)

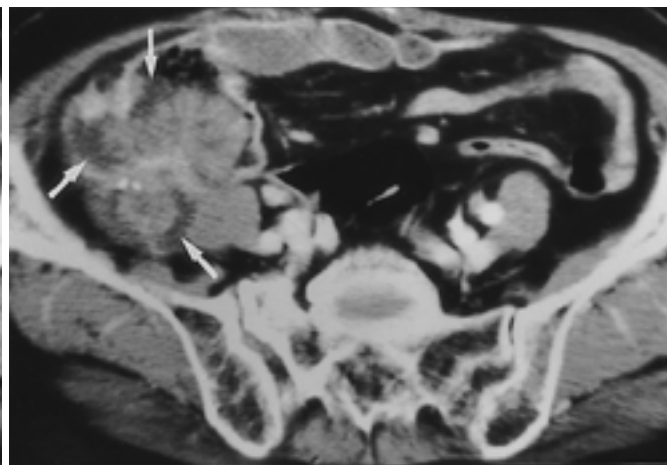
Table 1. TNM Stage in Patients with Colorectal Mucinous Adeno-carcinoma and Non-mucinous Adenocarcinoma on Surgical Specimen

		MC n= 26 (%)	NMC n= 40 (%)	p value
T	T2	-	1 (2.5)	> 0.05
	T3	24 (92)	38 (95)	
	T4	2 (8)	1 (2.5)	
N	N0	17 (65)	20 (50)	
	N1	6 (23)	5 (37.5)	
	N2	3 (12)	5 (12.5)	
M	M0	25 (96)	34 (85)	
	M1	1 (4)	6 (15)	

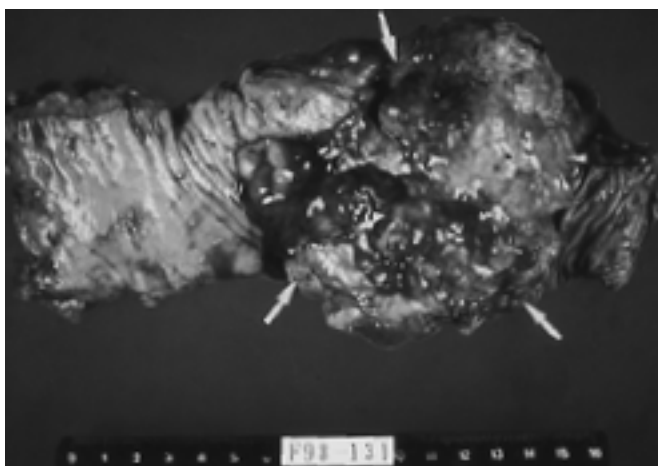
MC, Mucinous adenocarcinoma; NMC, Non-mucinous adenocarcinoma



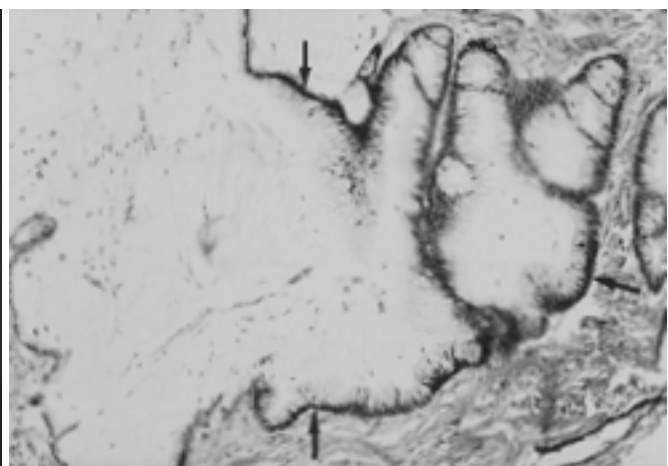
A



B



C



D

Fig. 2. A 78-year-old woman with mucinous carcinoma of eccentric/polypoid shape and thickness to length ratio 0.7.

A. Unenhanced CT shows a lobulated hypoattenuating mass (arrows) containing punctate calcifications (arrowhead) in the cecum.

B. Contrast-enhanced CT shows heterogeneous enhancing mass with irregular hypoattenuated portion (arrows) within the lesion.

C. Photography of the resected specimen shows a lobulated polypoid mass (arrows) with yellowish mucin pool (arrowheads) at the surface of the mass.

D. Photomicrograph of resected specimen shows mucin-secreting adenocarcinoma cells within massive mucin pool (arrows) (H & E stain,  $\times 100$ ).

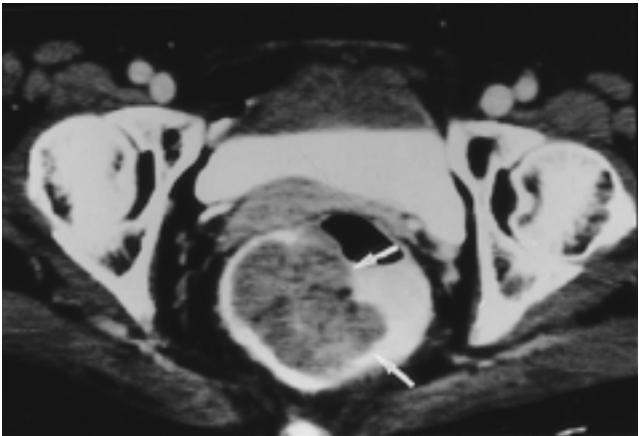


Fig. 3. A 67-year-old woman with mucinous carcinoma. Contrast-enhanced CT shows intraluminal eccentric and polypoid mass (arrows) with heterogeneous hypoattenuation in the rectum.

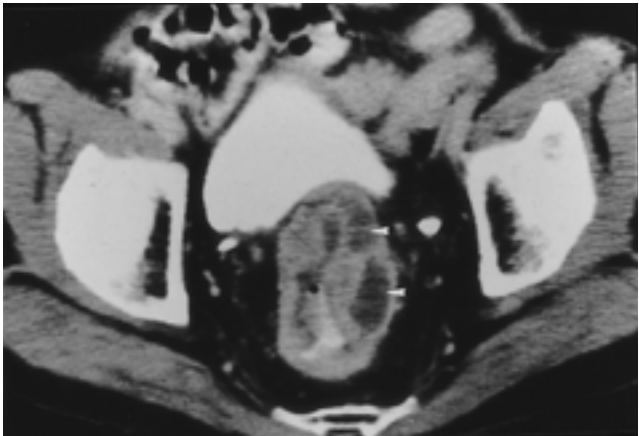


Fig. 4. A 61-year-old man with mucinous carcinoma of circumferential/polypoid shape. Contrast-enhanced CT shows circumferential wall thickening of the rectum with heterogeneous enhancing mass containing multifocal hypoattenuated mucin pool (arrowheads).

Table 2. Incidence of Tumor Recurrence according to the Duke Classification of Tumor staging in Colorectal Mucinous and Non-mucinous Adenocarcinoma during Follow-up

Mucinous Adenocarcinoma		
Duke Classification	Patients number	Recurrence (%)
A	-	-
B	15	4 (27)
C	10	2 (20)
D	1	1 (100)
Total	26	7 (27)
Non-mucinous Adenocarcinoma		
Duke Classification	Patients number	Recurrence (%)
A	-	-
B	18	2 (11)
C	15	4 (27)
D	6	1 (17)
Total	40	7 (17)

Parham(15) 1923  
가  
(2,3,5,10,11,13)  
가  
1976 WHO  
(extracellular mucin) 가 50-70%

(4,5,7), 1985 Umpleby (3)  
(60-80%) (80%)  
50%  
(1,10,14)  
10-15%  
, 40 가 (1,8,9,11). 20%  
(11-13). 가 15 (58%)  
(3,5,11-13) 가 (3,5-13), 8 (31%) 9  
(23%)  
CT  
/ 가  
(5,6)

(dystrophic calcification)

가

가 (ontogenic calcification) (14).

(1-7,10-13).

, 5  
(1-5,10,11,14). Sasaki (4)  
75% 75%

75%  
가 Duke's 가  
5

가 ,

가  
(10,11) . Earls (8)  
(1,5,8), 가

. Umpleby (3)

containing peri-interstitial tissue)  
tance) (surgical margin)

(mucin-  
(low resis-  
가

가  
5 - 19 , 8 - 6

TNM

가  
CT

1. Secco GB, Fardelli R, Campora E, et al. Primary mucinous adenocarcinomas and signet-ring cell carcinomas of colon and rectum. *Oncology* 1994;51:30-34
2. Connelly JH, Robey-Cafferty SS, Cleary KR. Mucinous carcinomas of the colon and rectum. *Arch Pathol Lab Med.* 1991;115:1022-1025
3. Umpleby HC, Ranson DL, Williamson RCN. Peculiarities of mucinous colorectal carcinoma. *Br J Surg* 1985;72:715-718
4. Sasaki O, Atkin WS, Jass JR. Mucinous carcinoma of the rectum. *Histopathology* 1987;11:259-272
5. Symonds DA, Vickery AL Jr. Mucinous carcinoma of the colon and rectum. *Cancer* 1976;37:1891-1900
6. Sundblad AS, Paz RA. Mucinous carcinomas of the colon and rectum and their relation to polyps. *Cancer* 1982;50:2504-2509
7. Pihl E, Nairn RC, Hughes ESR, Cuthbertson AM, Rollo AJ. Mucinous colorectal carcinoma: immunopathology and prognosis. *Pathology* 1980;12:439-447
8. Earls JP, Colon-Negron E, Dachman AH. Colorectal carcinoma in young patients: CT detection of an atypical pattern of recurrence. *Abdom Imaging* 1994;19:441-445
9. Griffin PM, Liff JM, Greenberg RS, Clark WS. Adenocarcinomas of the colon and rectum in person under 40 years old. *Gastroenterology* 1991;100:1033-1040
10. Green JB, Timmcke AE, Mitchell WT, Hicks TC, Gathright JB Jr, Ray JE. Mucinous carcinoma-just another colon cancer? *Dis Colon Rectum* 1993;36:49-54
11. Wu CS, Tung SY, Chen PC, Kuo YC. Clinicopathological study of colorectal mucinous carcinoma in Taiwan: a multivariate analysis. *J Gastroenterol Hepatol* 1996;11:77-81
12. Halvorsen TB, Seim E. Influence of mucinous components on survival in colorectal adenocarcinomas: a multivariate analysis. *J Clin Pathol* 1998;41:1068-1072
13. Okuno M, Ikehara T, Nagayama M, Kato Y, Yui S, Umeyama K. Mucinous colorectal carcinoma: clinical pathology and prognosis. *Am Surg* 1988;54:681-685
14. , , , CT .  
1996;34:517-522
15. Parham D. Colloid carcinoma. *Ann Surg* 1823;77:90-105

## CT Findings and Clinical Characteristics of Colorectal Mucinous Adenocarcinoma<sup>1</sup>

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**Purpose:** To establish the CT findings and clinical characteristics of colorectal mucinous adenocarcinoma.

**Materials and Methods:** The CT features of 26 surgically proven cases of colorectal mucinous adenocarcinoma were reviewed. The subjects were selected from among 262 patients with colorectal cancer, of whom 40 with non-mucinous adenocarcinoma were included as a control group. Contrast-enhanced CT images were analyzed for tumor location, the presence or absence of tumoral calcification, tumor shape (circumferential or eccentric, polypoid or infiltrative), tumor thickness-to-length ratio, and attenuation and homogeneity. In each group, the TNM stage of pathologic specimens was compared. During follow-up, the incidence of recurrence, and outcome, were also compared.

**Results:** CT images of mucinous adenocarcinoma revealed intratumoral calcification in three patients (12%,  $p < 0.01$ ). Tumors were eccentric and polypoid-shaped, with a high tumoral thickness/length ratio ( $p < 0.01$ ). On contrast-enhanced images, most were seen as a heterogeneous hypoattenuated mass. No differences in TNM stage were found in surgical specimens. In patients with mucinous adenocarcinoma, recurrence during the early follow-up period is more common than in patients with non-mucinous cancer.

**Conclusion:** Contrast-enhanced CT reveals mucinous adenocarcinoma as an eccentric polypoid mass with heterogeneous hypoattenuation. In patients with mucinous colorectal cancer, careful follow-up is required because tumors tend to recur early in the follow-up period.

**Index words :** Colon, CT

Colon, neoplasms

Rectum, CT

Rectum, neoplasms

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