

Borrmann Type IV

CT

1

:

2

Borrmann type IV
CT

가
: 30 Borrmann type IV
9 CT 500-700ml
120-140ml 3ml , 35-45 ()
180 () 10mm, 10mm 10mm

1.2-3.5cm 2.2cm , 1.2-7.6cm
4cm 24 (80%) , 4 (44%)
, 11 (44%) 30 15 (50%)
9 7 (78%)
18 (60%)
9 (30%)
3 (10%), 2 (22%)
7 (78%)
Borrmann type IV , 3cm

eni (6) CT Borrmann type IV
3 CT 2 가 가 , 3cm
(1,2). 가 가 ,
, 가 가 CT
가 (1-5), 60-100% CT
Borrmann type IV 가 . Tho- Borrmann type IV

¹
²

: Borrmann Type IV

hancement), (nonenhancement)

Chi square test

1994 1 1997 12 30

Borrmann type IV 9

. 39 25 , 14

34 78 51.4

9 The Working Formulation (7)

diffuse large cell type

CT Somatom plus S 40B(Siemens, Erlangen, Germany)

(gastric fundus) (gastric body)

(supine position) (gastric antrum)

(prone position)

10mm, 10mm 10mm

8

500-700ml . 120-

140ml (50%) , 11 (37%)

3ml (13%)

180 () 35 -45 () , 2 (22%)

3 (p value < 0.05).

19 (63%)

11 (37%) 5

(enhancement pattern of gastric inner layer) (56%) , 4 (44%)

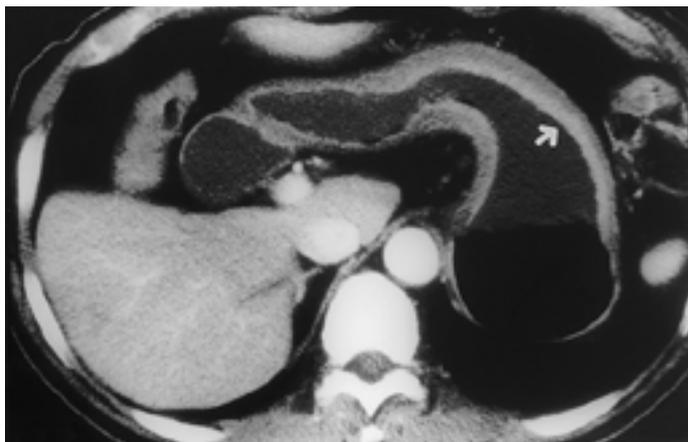
(perigastric fat infiltration) 가

18 (60%) , 9

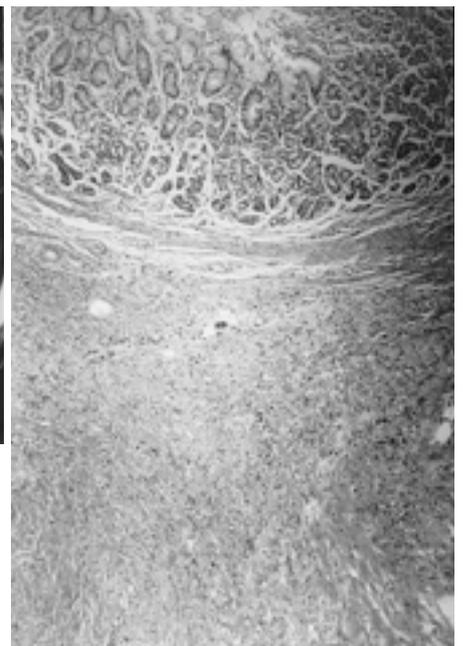
(continuous thick enhancement), (30%) , 3 (10%)

(discontinuous thick enhancement), 9

(thin en- 7 (78%) , 2 (22%)



A



B

Fig. 1. A 61-year-old male with Borrmann type IV adenocarcinoma.
 A. CT scan shows continuous thick enhancement of gastric inner layer in body and antrum(arrow).
 B. Cancer infiltration is prominently seen in the submucosa and there is no definite mucosal thickening in histologic examination(H&E stain, × 40).

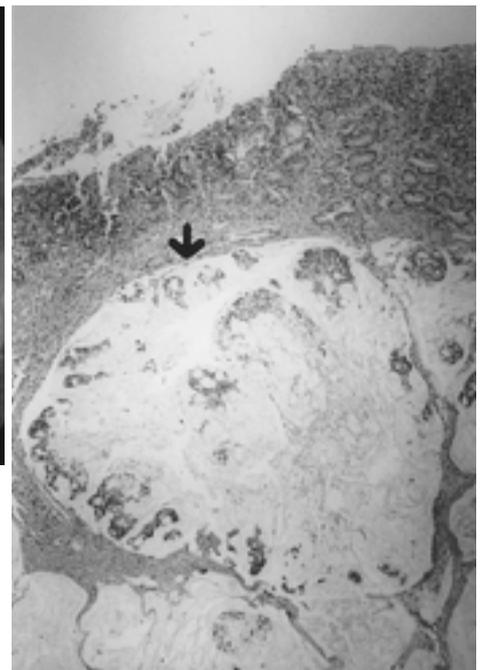
test	p value	Chi square	60-100%	가
	> 0.05	(1-5).	2	35-45
			3	
				1.2-3.5 cm
mann type IV		Borr- 2.2cm,	1.2-7.6cm,	4cm
non-Hodgkin's lymphoma			44%	80%,
			Thoeni (6)	
				50%
가		Borrmann type IV		
		brushing	30-70%	
		(8-11),	Fork (12)	
18		8 (44%)		
Nelson (13)		Solidoro (14)		
		Borrmann type IV		
		가	(lamina	
propria)		(submucosa)	CT	
			2	3
		(1,2).	가	
가				

Table 1. Comparison of CT Findings of Borrmann Type IV Adenocarcinoma and Gastric Lymphoma

	Adenocarcinoma (n= 30)(%)	Lymphoma (n= 9)(%)
Thickness of gastric wall	1.2-3.5 cm (mean 2.2 cm)	1.2-7.6 cm (mean 4 cm)
Perigastric fat infiltration	24(80)	4(44)
Degree of enhancement of gastric entire wall	Hyperdense 15(50) Isodense 11(37) Hypodense 4(13)	Isodense 2(22) Hypodense 7(78)
Homogeneity of gastric entire wall	11(37)	5(56)
Enhancement of gastric inner layer	Thick continuous 18(60) Thick discontinuous 9(30) Thin 3(10) Non 0	0 0 2(22) 7(78)



A

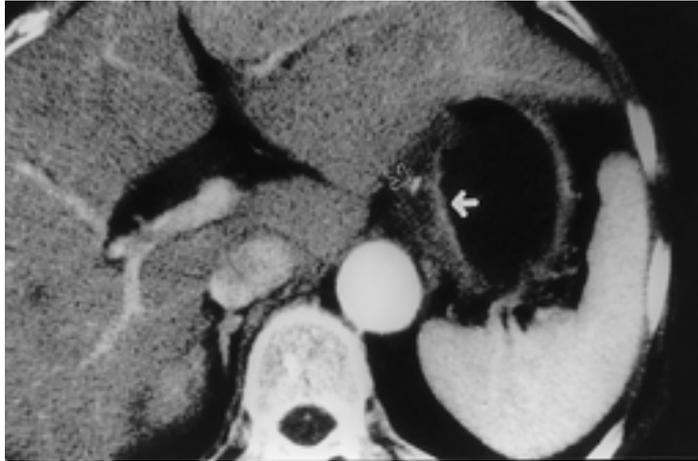


B

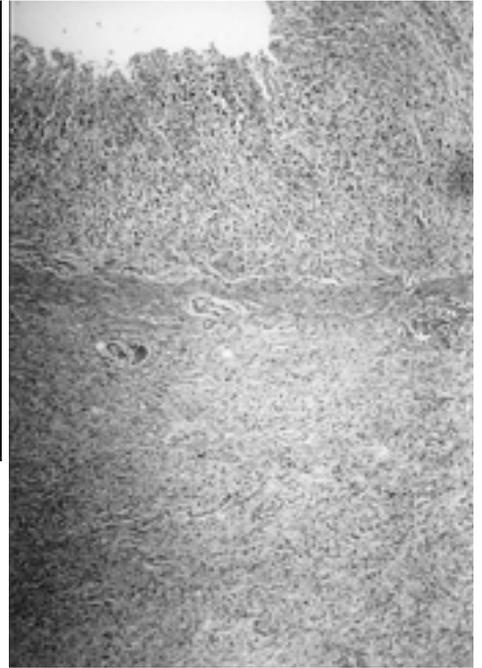
Fig. 2. A 44-year-old male with Borrmann type IV adenocarcinoma(mucinous type). A. CT scan shows gastric wall thickening with heterogeneous hypoattenuation. The gastric inner layer has discontinuous thick enhancement(arrows). B. The histologic specimen demonstrates mucin pool(arrow) in the submucosa and there is no definite mucosal thickening(H&E stain, x 1).

: Borrmann Type IV

13%	78%			30	27 (90%)
(fibrosis)가	, 1	(mucinous adeno-			
carcinoma)	, 1	가		30	3 (10%),
4	1	가	1 (22%)		9 2
2		가		1.2-3cm,	2.1cm
1	, 1			가 1.2-2cm	1.6cm

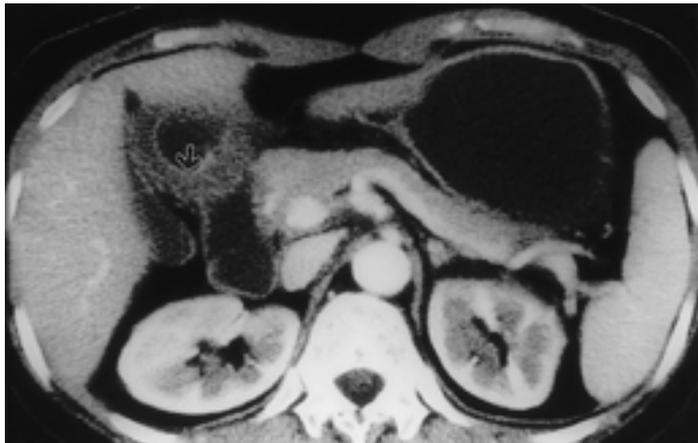


A

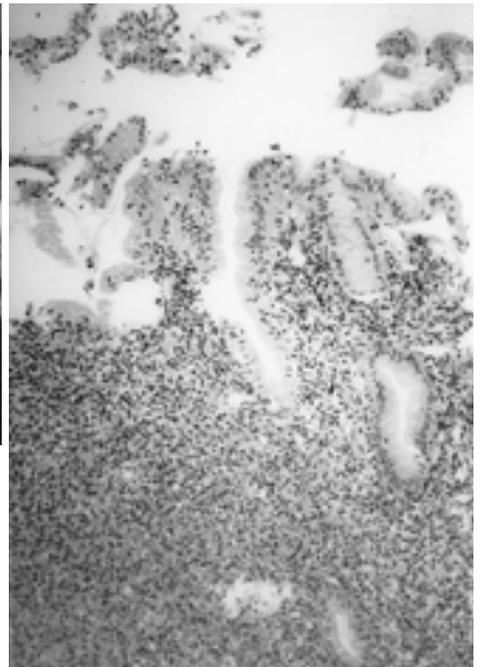


B

Fig. 3. A 66-year-old female with Borrmann type IV adenocarcinoma.
 A. CT scan demonstrates thickening of gastric wall along lesser curvature with homogeneous hypoattenuation. The inner layer of thickened gastric wall (arrow) has thin enhancement similar to normal gastric wall. Small dot-like calcification (open arrow) is seen in thickened gastric wall of fundus.
 B. The histologic specimen demonstrates prominent fibrosis in the submucosa and cancer infiltration is seen in gastric entire wall along lesser curvature (H&E stain, $\times 40$). The calcification is small and insignificant.



A



B

Fig. 4. A 50-year-old female with lymphoma.
 A. CT scan shows antral wall thickening with homogeneous hypoattenuation. The gastric inner layer has thin enhancement, similar to normal gastric inner wall of body (arrow).
 B. The histologic specimen shows lymphoma infiltration in lamina propria and superficial epithelium is mostly preserved. Focal sloughed epithelium is noted but insignificant (H&E stain, $\times 100$).

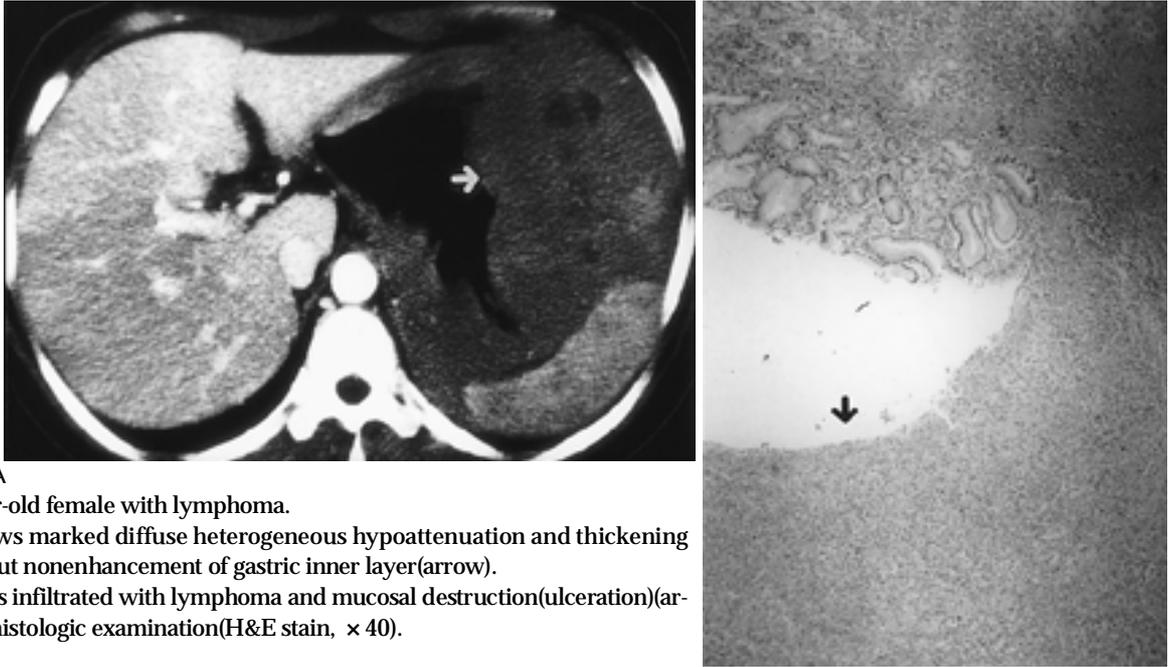


Fig. 5. A 39-year-old female with lymphoma.
 A. CT scan shows marked diffuse heterogeneous hypoattenuation and thickening of gastric wall but nonenhancement of gastric inner layer (arrow).
 B. Gastric wall is infiltrated with lymphoma and mucosal destruction (ulceration) (arrow) is seen on histologic examination (H&E stain, $\times 40$).

3 2
 (78%)
 4.7cm
 1.2-7.6 cm
 가 CT
 2 가 CT
 Borrmann type IV
 3cm

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Borrmann Type IV Adenocarcinoma versus Gastric Lymphoma: Spiral CT Evaluation¹

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Purpose : To distinguish the spiral CT findings of Borrmann type IV adenocarcinoma from those of gastric lymphoma with diffuse gastric wall thickening.

Materials and Methods : We retrospectively reviewed the spiral CT scans of 30 patients with Borrmann type IV adenocarcinoma and nine with gastric lymphoma with diffuse gastric wall thickening. In all patients the respective condition was pathologically confirmed by gastrectomy. CT scanning was performed after peroral administration of 500-700 ml of water. A total of 120-140ml bolus of nonionic contrast material was administered intravenously at a flow rate of 3ml/sec and two-phase images were obtained at 35-45 sec(early phase) and 180 sec(delayed phase) after the start of bolus injection. Spiral CT was performed with 10mm collimation, 10mm/sec table feed and 10mm reconstruction. We evaluated the degree and homogeneity of enhancement of thickened entire gastric wall, and the enhancement pattern of gastric inner layer, as seen on early-phase CT scans. On early and delayed views, the thickness of gastric wall and the presence of perigastric fat infiltration were determined. The enhancement patterns of gastric inner layer were classified as either continuous or discontinuous thick enhancement, thin enhancement, or nonenhancement.

Results : The thickness of gastric wall was 1.2-3.5 cm(mean 2.2 cm) in cases of adenocarcinoma and 1.2-7.6 cm (mean 4 cm) in lymphoma. Perigastric fat infiltration was seen in 24 patients with adenocarcinoma(80 %) and four with lymphoma(44 %). In those with adenocarcinoma, the degree of enhancement of entire gastric wall was hyperdense in fifteen patients(50 %) and isointense in eleven (37 %). Seven patients with lymphoma(78 %) showed hypodensity. In those with adenocarcinoma, continuous thick enhancement of gastric inner layer was seen in 18 patients(60 %) and discontinuous thick enhancement in nine(30 %). In lymphoma cases, no thick enhancement was observed. Thin enhancement of gastric inner layer was demonstrated in three patients with adenocarcinoma(10 %) and two with lymphoma(22 %). In seven patients with lymphoma(78 %), there was no enhancement.

Conclusion : The following early-phase findings are highly suggestive of gastric lymphoma: a gastric wall thickness of more than 3 cm; no or minimal perigastric fat infiltration, hypodense enhancement of thickened entire gastric wall; and no or thin enhancement of gastric inner layer.

Index words : Stomach, CT
Stomach, neoplasms
Lymphoma, CT

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