

:
 : 1998 4 7 16
 가 12 , 3 , S- 1
 1.5T 300-
 1000ml Magnevist Enteral (Shering, Berlin, Germany) (SE) T1
 (TSE) T2 2 Fast low Angle Shot (FLASH 2D), Half-
 Fourier TSE (HASTE) T1, T2
 2 가 1)
 (1, ; 2, ; 3,) 2) (0, ; 1,
 ; 2,) 3) (1, ; 2, ; 3,)
 Wilcoxon signed ranked test

:
 FLASH T1 T1 T1 2
 (p<0.05),
 2 FLASH T1 HASTE
 T1, T2 (p<0.05).
 가

: 가
 가
 T2 가 T1 가 (2, 3).
 가 CT 가 (8)

가 (1-3). 가 가
 가 , , (4, 5). 가 ,
 Gd-DTPA mannitol

FLASH T1		3	(P<0.05) (Table 2).	
93.75 % (15/16)				가
(P<0.05).		T2		
3	56.25 % (9/16)	50 % (8/16)	(Table 3).	1000ml
	(P=0.39)	HASTE	T1	T2
3	68.75 % (11/16)		8/10, 9/10	300ml
		(P=0.17) (Table 1).	6	2/6, 3/6
	2	FLASH T1		
HASTE	" "	100%	가	가
T1,	T2	(75%, 37.5%)	,	,

Table 2. Imaging Quality after Enteral Contrast Media Application (N= 16)

	Good	Fair	Poor
SE T1WI			
Enteral (-)	12 (75%)	4 (25%)	0
Enteral (+)	11 (68.75%)	5 (31.25%)	0
TSE T2WI			
Enteral (-)	6 (37.5%)	10 (62.5%)	0
Enteral (+)	3 (18.75%)	9 (56.25%)	4 (25%)
FLASH 2D*	16 (100%)	0	0
HASTE*	16 (100%)	0	0

Enteral : enteral contrast media.

SE T1WI : Spin echo T1-weighted image.

TSE T2WI : Turbo spin echo T2-weighted image.

FLASH 2D* : 2 dimensional Fast Low Angle Shot with enteral application.

HASTE* : Half-Fourier TSE with enteral application.

Table 3. Number of Artifact after Enteral Contrast Media Application (N= 16)

	Enteral (-)	Enteral (+)
TSE T1WI	4	10
TSE T2WI	6	12
FLASH 2D*		0
HASTE*		0

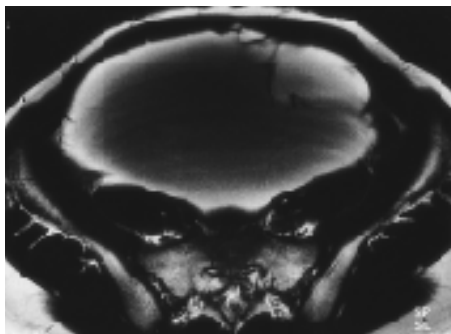
Enteral : enteral contrast media.

SE T1WI : Spin echo T1-weighted image.

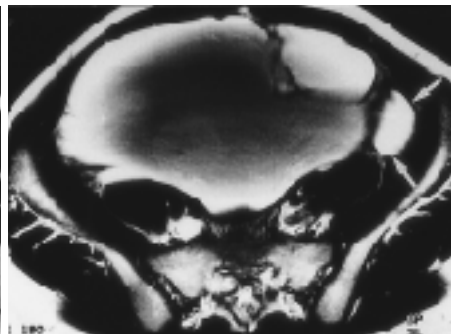
TSE T2WI : Turbo spin echo T2-weighted image.

FLASH 2D* : 2 dimensional Fast Low Angle Shot with enteral application.

HASTE* : Half-Fourier TSE with enteral application.



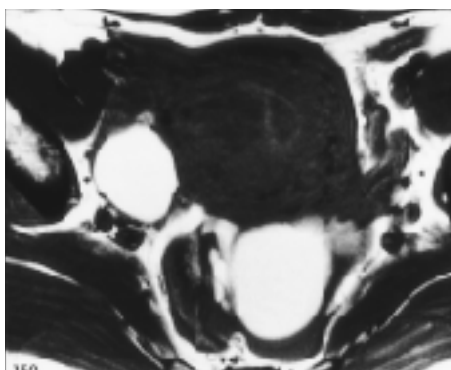
A



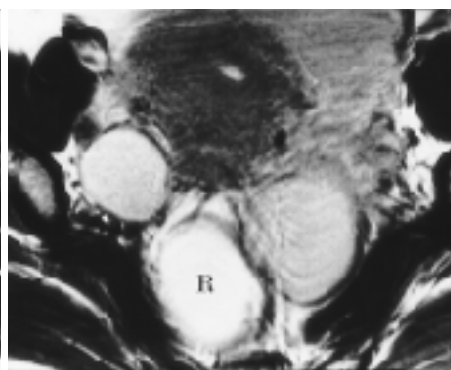
B

Fig. 2. Mucinous cystadenocarcinoma in a 42-year-old woman.

TSE T2-weighted axial image without Magnevist Enteral (A) shows a multi loculated cystic mass with various signal intensity of the chambers. TSE T2-weighted axial image with Magnevist Enteral (B), Enteral-filled bowel loop (arrows) mimic locule of mass.



A



B

Fig. 3. Bilateral ovarian endometrioma in a 29-year-old woman.

SE T1-weighted axial image without Magnevist Enteral (A) shows bilateral ovarian masses, with homogeneous high signal intensity, SE T1-weighted axial image with Magnevist Enteral (B) shows decreased image quality due to artifact and the signal intensity of the masses are similar to the contrast-filled rectum (R).

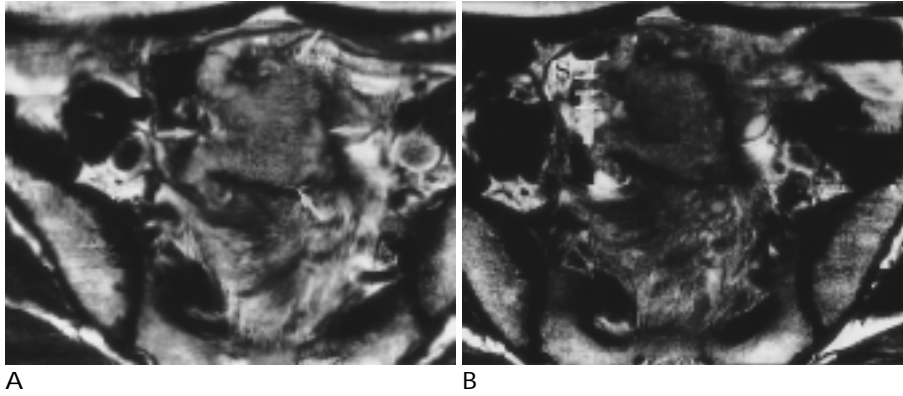
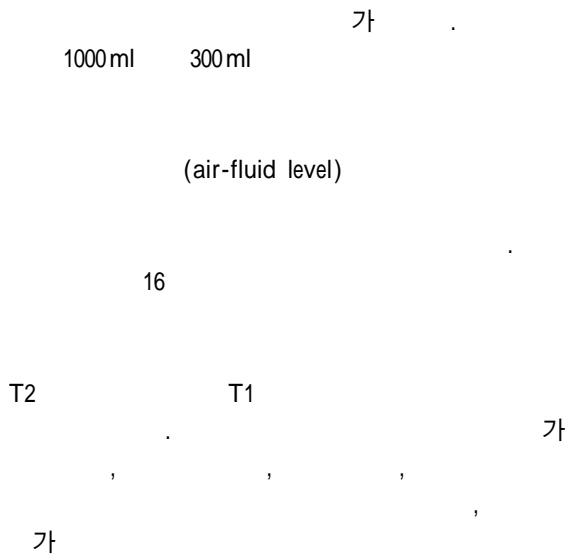


Fig. 4. Adenocarcinoma of sigmoid colon in a 58-year-old woman.
T2-weighted axial image without Magnevist Enteral (A) shows an ill defined solid mass (arrows) with indistinct margin. TSE T2-weighted axial image with Magnevist Enteral (B) shows well visualization of contrast-filled sigmoid colon (S) with exophytically growing mass.

[illegible]



1. Young TR, Clarke GJ, Bailes DR, pennock JM, Doyle TH, Bydder GM. Enhancement of relaxation rate with paramagnetic contrast agent in NMR imaging. *J Comput Assist Tomogr* 1981 ; 5 : 543-548
2. Lainado M, Kornmesser W, Hamm B, Clauss W, Weinmann H, Felix R. MR imaging of the gastrointestinal tract : Value of Gd-DT-

- PA. *AJR* 1988 ; 150 : 817-821
3. Valhos L, Gouliamos A, Clauss W et al. GD-DPTA : A bowel contrast agent for magnetic resonance imaging of the abdomen. *Eur Radiol* 1992 ; 2 : 282-286
4. Li KCP, Tart RP, Storm B, Ang P, Rolfes P, Ros PR. Oral contrast agent : comparative study with five agents in humans. *Society of Magnetic Resonance in Medicine* 1989 ; 2 : 791(abstrat)
5. Weinreb JC, Maravilla KR, Redman HC, Nunnaly R. Improved MR imaging of the upper abdomen with glugacon and gas. *J Comput Assist Tomogr* 1985 ; 8 : 835-838
6. Kaminsky S, Laniado M, Gogoll M et al. Gadopentetate dimeglumine as a bowel contrast agent : Safty and efficacy. *Radiology* 1991 ; 178 : 503-503
7. Hahn PF, Stark DD, Saini S, Lewis JM, Wittenberg J, Ferrucci JT. Ferrite particles for bowel contrast in MR imaging ; Design issues and feasibility studies. *Radiology* 1987 ; 164 : 37-41
8. Hawnaur JM, Taylor PM, Hutchinson CE, Isherwood I. The use of positive oral contrast medium in magnetic resonance imaging of the pancreas. *Clin Radiol* 1992 ; 46 : 422
9. Stark PD, Hendrick RE, Hahn PF, Ferrucci JT. Motion artifact reduction with fast spin-echo imaging. *Radiology* 1987 ; 164 : 183-191
10. Widder DJ, Edelman RR, Grief WL, Monda L. Magnetite albumin suspension ; A superparamagnetic oral MR contrast agent. *AJR* 1987 ; 149 : 839-843
11. Hahn PF. Gastrointestinal Contrast Agents. *AJR* 1991 ; 156 : 253-254
12. Schomer W, Brauschweig, Harald H et al. Enteral MRI contrast media -Progress in magnetic resonance imaging of the abdomen. *Eur Radiol* 1994 ; 4 : 2-12(Insert)

Usefulness of Enteral Contrast Media in MR Evaluation of Pelvic Mass

Hun Kim, M.D., Jung Sik Kim, M.D., Hong Kim, M.D., Chul Ho Shon, M.D.,
Hee Jung Lee, M.D., Sung Moon Lee, M.D., Sung Ku Woo, M.D., Soo Jhi Suh, M.D.

¹Department of Diagnostic Radiology, Dongsan Medical Center, School of Medicine Keimyung University

Purpose : To assess the value of enteral contrast media for the evaluation of pelvic masses by MR imaging.

Materials and Methods : Between April and July 1998, 16 women with pelvic masses were examined by MRI. The origin of the lesion was the ovary in twelve cases, the uterus in three, and the sigmoid in one. Using a 1.5T scanner(Magnetom Vision, Siemens), T1-weighted axial spin echo(SE), T2-weighted turbo spin echo(TSE), two-dimensional fast low-angle shot(FLASH 2D), and half-Fourier TSE(HASTE) images were obtained in all patients after the administration of Magnevist Enteral (Shering, Berlin, Germany). In each MR imaging sequence, distinction between the lesion and adjacent bowel (1, not distinguished; 2, partly distinguished; 3, clearly distinguished), artifact (0, absent; 1, mild; 2, severe), image quality (1, poor; 2, fair; 3, good), were compared before and after the use of enteral contrast media. Changes in MRI impression after the use of enteral contrast media were also evaluated. Two radiologists reached a consensus after reviewing the images. Statistical significance was determined by Wilcoxon's signed ranked test.

Results : For distinguishing lesions, SE T1WI and FLASH 2D with enteral contrast media were significantly superior to SE T1WI without enteral contrast media ($p < 0.05$). With regard to image quality, FLASH 2D and HASTE, both with enteral contrast media, were significantly superior to SE T1WI and TSE T2WI, respectively, both without enteral contrast media ($p < 0.05$). Artefacts were more frequently found after the application of enteral contrast media in conventional sequences but were not present in breathhold sequences. In two patients, MRI impression changed after the application of enteral contrast media.

Conclusion : In a limited number of cases, enteral contrast media improved lesion detection, image quality and diagnostic accuracy when breathhold fast MR imaging was applied.

Index words : Pelvis, MR
Pelvis, Neoplasms
Contrast media, MR

Address reprint requests to : Jung Sik Kim, M.D., Department of Diagnostic Radiology, Dongsan Medical center,
School of Medicine Keimyung University, #194 Dongsan-Dong, Joong-Ku, Taegu, 700-712, Korea.
Tel. 82-53-250-7767 Fax. 82-53-250-7766