

가

1

T2 - T1 -

가 53

, 1.5T MR fast SPGR T2 - 20, 40, 60, 90, 120

T1 - . 3

가 , 가

3가

(99.4%) T2 - (95.6%)

T1 - (89.3%) , T1 - , T2 -

79.9%, 78%, 76.1%

가 가 90

120

90 120

T1 - T2 - 가

(1, 5, 9 - 11), T2WI가
(3, 11 - 14)가

(MRI) 가 MRI

T2 - (T2WI) 가 T1 - (Gd - T1WI) T2WI

MRI가 가

(1 - 8).

가 . Gadopentetate dimeg -
lumin (Magnevist; Schering, Berlin, Germany, Gd -
DTPA) MRI

가

2 MRI
가 53 (34 - 76 , 51)

47 , 4 ,
Interna -

. T2WI, MRI, 53 8 6
 Gd - T1WI 가 77.8%, 66.7%, 2 . 가
 77.8%, 가 74.2%, 82.6%, 78.0%, 가
 76.1%, 79.9%, 78.0% MRI가 T2WI Gd - T1WI 가 3 ,
 가 (p>0.05), ROC 가 2 , (Nabothian cysts)
 3가 가 1 .
 3 가 3가 가 가

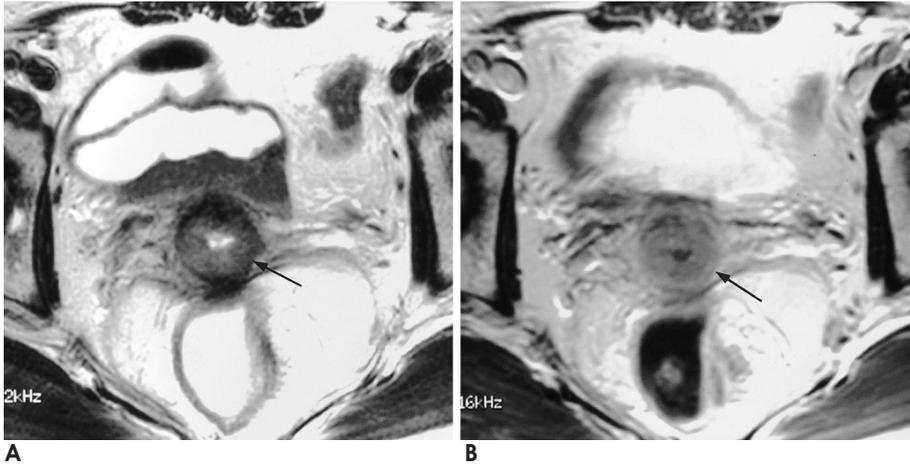
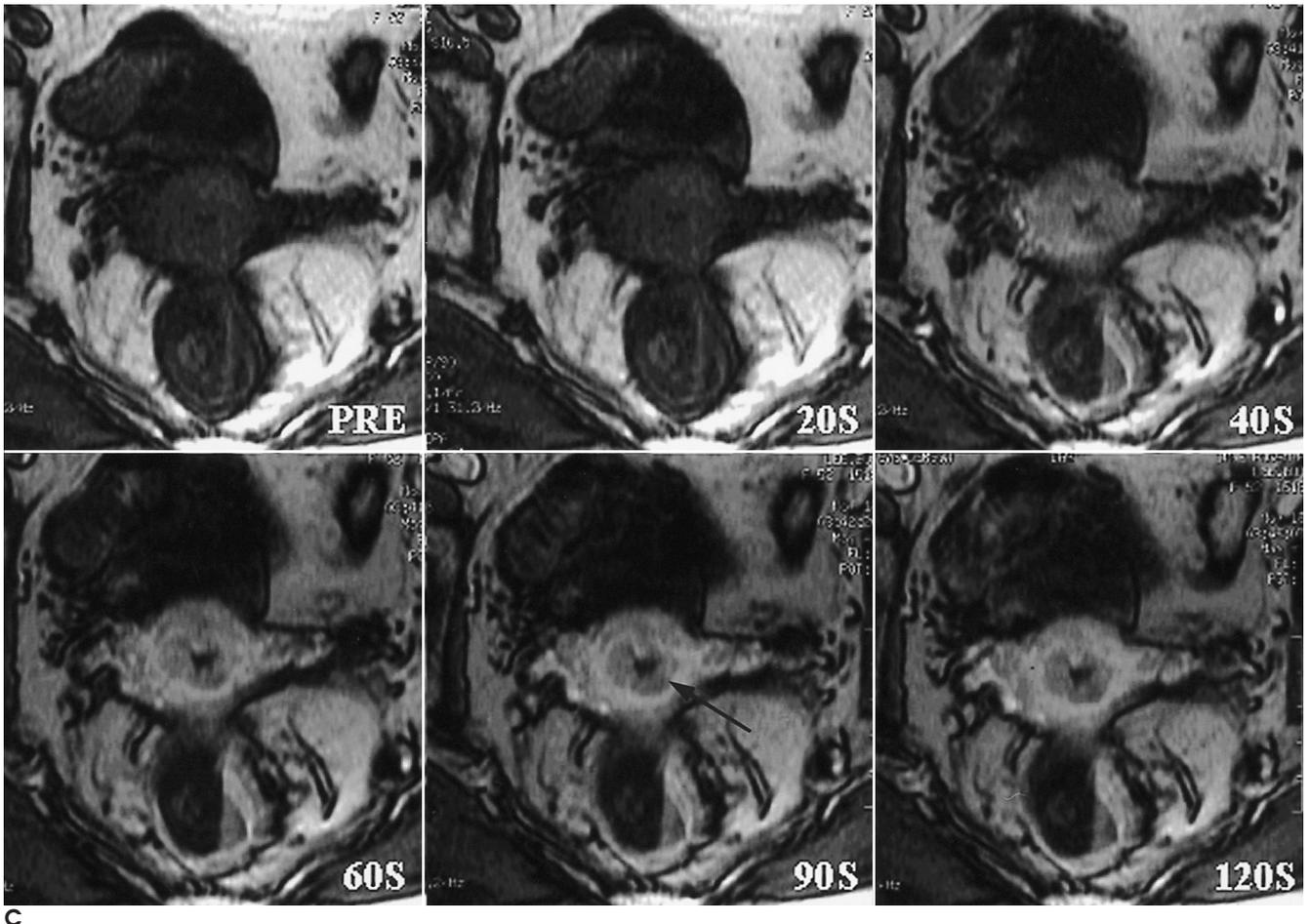


Fig. 1. A 52-year-old woman with stage IB cervical carcinoma. Axial T2-weighted (A) and Gd-T1 weighted image (B) show cervical mass of high signal intensity (arrow) which is confined within cervix. C. Dynamic MRI clearly reveals hypointense mass in uterine cervix. The contrast between the tumor and cervical stroma is seen more clearly on dynamic MRI than on T2WI and Gd-T1WI.



: 가

가 27 , 가 15 , MRI 가 9 , 가 2 , MRI 90 가 120 81.8% 80.5% (Table 4, Fig. 2).

Table 3. Comparison of Parametrial Invasion of Cervical Cancer among T2WI, Dynamic MRI, and Gd-T1WI

Statistic	T2WI (%)	Dynamic (%)	Gd-T1WI (%)
Sensitivity			
Reader 1 (n=9)	7 (77.8)	6 (66.7)	7 (77.8)
Reader 2 (n=9)	7 (77.8)	6 (66.7)	7 (77.8)
Reader 3 (n=9)	7 (77.8)	6 (66.7)	7 (77.8)
Mean (n=27)	21 (77.8)	18 (66.7)	21 (77.8)
Specificity			
Reader 1 (n=44)	32 (72.7)	36 (81.8)	34 (77.3)
Reader 2 (n=44)	34 (77.3)	37 (84.1)	34 (77.3)
Reader 3 (n=44)	34 (77.3)	36 (81.8)	35 (79.5)
Mean (n=132)	98 (74.2)	109 (82.6)	103 (78.0)
Accuracy			
Reader 1 (n=53)	39 (73.6)	42 (79.2)	41 (77.4)
Reader 2 (n=53)	41 (77.4)	43 (81.1)	41 (77.4)
Reader 3 (n=53)	41 (77.4)	42 (79.2)	42 (79.2)
Mean (n=159)	121 (76.1)	127 (79.9)	124 (78.0)

Table 4. Diagnostic Sensitivity of Cervical Cancer over Time on Dynamic MRI

Statistic	20s (%)	40s (%)	60s (%)	90s (%)	120s (%)
Reader 1 (n=53)	0 (0)	14 (26.4)	37 (69.8)	48 (90.6)	44 (83.0)
Reader 2 (n=53)	0 (0)	18 (34.0)	34 (64.2)	39 (73.6)	40 (75.5)
Reader 3 (n=53)	0 (0)	16 (30.2)	38 (71.7)	43 (81.1)	44 (83.0)
Mean (n=159)	0 (0)	48 (30.2)	109 (68.6)	130 (81.8)	128 (80.5)

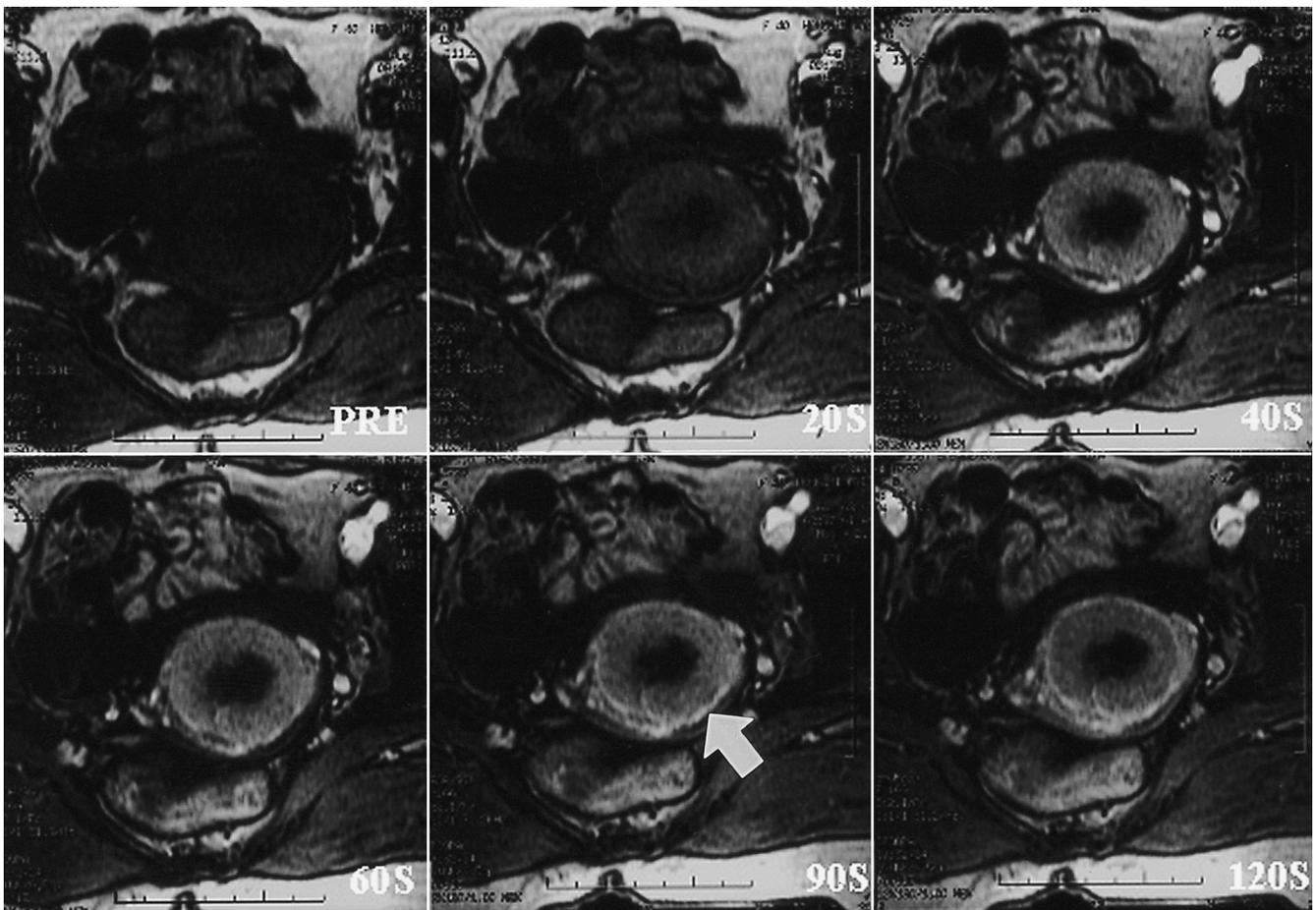


Fig. 2. A 40-year old woman with stage IB cervical carcinoma. The tumor begins to be enhanced at 20 seconds after injection of contrast material. Dynamic MR image at 90 and 120 seconds after injection of contrast media shows peak enhancement and best visualization of cervical cancer. Peripheral hyperintense rim (arrow) was confirmed as reactive hyperplasia on histopathologic diagnosis.

가

(20). MRI Gd - T1WI

가가 가

가 가

가 가

(2, 10, 18, 21, 22).

(21).

가

가

(7, 8).

(oblique axial plane)

T2WI가 T2WI 가

(23, 24)

MRI

T2WI Gd - T1WI

90 120

MRI T2WI

Gd - T1WI

3가

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The Usefulness of Dynamic MR Imaging for the Evaluation of Cervical Cancer¹

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Purpose: We wished to evaluate the diagnostic usefulness of dynamic MRI in assessing tumor visualization and the parametrial invasion of cervical cancer, and we also wished to determine the most adequate enhancing time by comparing the T2-weighted image (T2WI) and enhanced T1-weighted image (Gd-T1WI).

Materials and Methods: Fifty-three women with histopathologically proven cervical cancer underwent a pre-operative MRI. Using a 1.5 T magnet, the fast spin echo axial T2WI without fat saturation was taken; after contrast administration, 20, 40, 60, 90, 120 sec-dynamic MRIs were taken using fast SPGR and spin echo axial Gd-T1WI. Tumor conspicuity and parametrial invasion in each pulse sequence and the most adequate enhancing time for the evaluation of the tumor on dynamic MRI were evaluated prospectively by three radiologists working at three separate sessions. The results were then correlated with the histopathologic findings.

Results: The conspicuity of tumor on dynamic MRI (99.4%) and T2WI (95.6%) were better than on Gd-T1WI (89.3%). In the assessment of parametrial invasion of the tumor, the diagnostic accuracy of dynamic MRI, Gd-T1WI and T2WI was 79.9%, 78% and 76.1%, respectively; the highest values were for the dynamic MRI, but there was no statistically significant difference among three pulse sequences. The most adequate enhancing time on dynamic MRI was between 90 seconds and 120 seconds.

Conclusion: Dynamic MRI is useful for the assessment of tumor visualization of cervical cancer, and the most appropriate scan time on dynamic MRI is between 90 seconds and 120 seconds. For the determination of parametrial invasion, the dynamic MRI revealed a higher diagnostic accuracy than that of T2WI or Gd-T1WI, but the differences were statistically insignificant.

Index words : Uterine neoplasms
Uterine neoplasms, MR
Uterine neoplasms, diagnosis
Magnetic resonance (MR), contrast enhancement

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