

# Value of Imaging Study in predicting pelvic lymph node metastases for uterine cervical cancer

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# Introduction

The only imaging modalities without pathological findings are used to assess lymph node (LN) metastases in patients treated with concomitant chemoradiotherapy (CCRT). The aim of this study was to evaluate the accuracy of computed tomography(CT), magnetic resonance imaging(MRI) and positron emission tomography-computed tomography (PET/CT) in predicting pelvic LN metastases in patients with uterine cervical cancer.

# **◆** Detection of Pelvic Lymph Node Metastasis

The pelvic lymph nodes were divided into two sites of right and left side. For 156 patients, 312(Rt 156, Lt 156) sites of pelvic lymph nodes were analyzed. The pelvic lymph node metastases were present in 46 sites among 312 pelvic lymph node sites (14.7%) on surgical specimens.

7 of the 46 pelvic lymph nodes showed positive findings of lymph node metastases in all three imaging modalities.

Table 2. Comparison of findings of CT, MRI and PET/CT with histologic findings on the LN Sites (N=312)

### Methods

From January 2009 to March 2015, one hundred fifty six patients with International Federation of Obstetrics and Gynecology (FIGO) Stage IA1-IIB uterine cervical cancer who underwent radical hysterectomy and pelvic lymphadenectomy, and CT, MRI and PET/CT before surgery were included in this study. The Criteria for LN metastases were a LN diameter of 1cm or

more at CT and MRI and a focally increased FDG uptake at PET/CT.

The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy for pelvic LN metastases were estimated on the basis of imaging and pathological findings.

McNemar's test was used to compare the sensitivity and specificity of imaging modalities for the detection of metastatic pelvic LN. A P value≤0.05 was considered statistically significant.

Imaging	Pos	itive	Neg	ative	Sensitivity	Specificity	PPV	NPV	Accuracy
Modality	ТР	FP	TN	FN	(%)	(%)	(%)	(%)	(%)
СТ	22	35	231	24	47.83	86.84	38.60	90.59	81.09
MRI	13	9	257	33	28.26	96.62	59.09	88.62	86.54
PET/CT	20	26	240	26	43.48	90.23	43.48	90.23	83.33

TP=true-positive, TN=true-negative, FP=false-positive, FN=false negative, PPV=positive predictive value, NPV=negative predictive value

In specificity, PPV and accuracy, MRI had greatest values among three imaging modalities for detection of metastatic lymph node detection. In sensitivity and NPV, CT had greatest values.

Table 3. Comparisons	between	image	modalities	for	sensitivity
and specificity					

LN sites (N=312)	Sensitivity	Specificity
CT vs MRI	47.83% vs 28.26% (0.064)	86.84% vs 96.62% (0.000*)
<b>CT vs PET/CT</b>	47.83% vs 43.48% (0.815)	86.84% vs 90.23% (0.108)

#### Results

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# Clinicopathological Characteristics

These patients ranged in age from 26 years to 86 years (median age, 48yrs). The clinicopathological characteristic of the 156 enrolled patients is showed in Table 1.

FIGO staging was with the following distribution. The incidence of pelvic node metastasis overall was 22%. The incidence rate of pelvic lymph node metastasis have increased according to higher pathological staging.

Table 1. The clinical characteristic of the enrolled patients and positive pelvic LN on surgery

Characteristic	Number of patients (%)	Positive Pelvic LN on surgery Number of patients (%)		
FIGO staging				
IA	15 (9)	0 (0)		
IA1	10 (6)	0 (0)		
IA2	5 (3)	0 (0)		
IB	118 (76)	22 (19)		
IB1	103 (66)	20 (19)		
IB2	15 (10)	2 (13)		
IIA	11 (7)	5 (45)		
IIA1	5 (3)	2 (40)		
IIA2	6 (4)	3 (50)		
IIB	12 (8)	8 (67)		
Total	156	35 (22)		

**PET/CT vs MRI** 43.48% vs 28.26% (0.039\*) 90.23% vs 96.62% (0.000\*)

#### Note- \* P < .05 (McNemar test)

The sensitivity of CT was higher than those of MRI or PET/CT. The difference of sensitivity between PET/CT and MRI was statistically significant (P=0.039). The difference of sensitivity was not statistically significant between CT and MRI(P=0.064) or CT and PET/CT(P=0.815) respectively.

The specificity of MRI was higher than those of CT or PET/CT. The difference of specificity between MRI and CT or MRI and PET was statistically significant (P=0.000, P=0.000 respectively). The difference of specificity between PET/CT and CT was not statistically significant (P=0.108).

# Conclusions

These results indicate that preoperative CT, MRI and PET/CT showed low sensitivity and PPV and high specificity, NPV and accuracy. PET/CT is more useful for the detection of pelvic LN than MRI; however PET/CT still had very low sensitivity. These imaging modalities should not replace pathological assessment to detect pelvic LN involvement in patients with uterine cervical cancer. More efforts are necessary to improve sensitivity of imaging modalities in order to predict pelvic LN metastases for the patients who received CCRT without surgery.

# References

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Clinical track: Gynaecological (endometrium, cervix, vagina, vulva)

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