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Research Article

Diagnostic performance of preoperative contrast-enhanced computed tomography in predicting lymph node metastasis in endometrial cancer: a single-center study of 408 patients

Endometrium kanserinde lenf nodu metastazını öngörmede preoperatif kontrastlı bilgisayarlı tomografinin tanısal performansı: 408 hastalık tek merkezli bir çalışma

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Abstract

Aim: To evaluate the diagnostic performance of preoperative computed tomography (CT) using a short-axis diameter threshold of ≥10 mm for predicting lymph node metastasis (LNM) in patients with endometrial cancer.

Material and Methods: This retrospective single-center study included 408 patients with endometrial cancer who underwent primary surgical treatment with sentinel lymph node (SLN) mapping and/or systematic lymphadenectomy. Preoperative contrast-enhanced CT scans were reviewed, and lymph nodes with a short-axis diameter ≥10 mm were considered positive. Pathological LNM was defined as metastatic involvement in SLN and/or lymphadenectomy specimens. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), accuracy, and odds ratios (ORs) were calculated.

Results: Pathological LNM was identified in 36 patients (8.8%). CT detected lymph node enlargement (≥10 mm) in 39 patients. The sensitivity and specificity of CT for detecting LNM were 50.0% and 94.4%, respectively. PPV was 46.2%, NPV was 95.1%, and overall diagnostic accuracy was 90.5%. CT positivity was significantly associated with pathological LNM (OR 16.7, 95% CI: 8.1–34.3, $p < 0.001$). However, 18 patients with LNM (50%) had no radiologically enlarged lymph nodes on CT. In multivariable analysis, CT positivity remained independently associated with LNM after adjustment for LVSI and histological type (adjusted OR: 2.83, 95% CI: 1.10–7.29, $p = 0.031$).

Conclusion: Preoperative CT using a ≥10 mm short-axis criterion demonstrates high specificity and negative predictive value but limited sensitivity for detecting lymph node metastasis in endometrial cancer. While CT positivity markedly increases the likelihood of nodal metastasis, a negative CT does not reliably exclude microscopic disease. Therefore, surgical nodal assessment strategies should not rely solely on CT findings.

Keywords: endometrial neoplasms, lymphatic metastasis, computed tomography, sensitivity and specificity, diagnostic imaging

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Öz

Amaç: Bu çalışmada, endometrium kanseri hastalarında preoperatif bilgisayarlı tomografide (BT) kısa aks çapı ≥10 mm olan lenf nodlarının, patolojik lenf nodu metastazını (LNM) öngörmedeki tanısal performansının değerlendirilmesi amaçlandı.

Gereç ve Yöntemler: Bu retrospektif tek merkezli çalışmaya, sentinel lenf nodu (SLN) haritalaması ve/veya sistematik lenfadenektomi uygulanan 408 endometrium kanseri hastası dahil edildi. Preoperatif kontrastlı BT incelemelerinde kısa aks çapı ≥10 mm olan lenf nodları pozitif olarak kabul edildi. Patolojik LNM, SLN ve/veya lenfadenektomi örneklerinde metastaz saptanması olarak tanımlandı. Duyarlılık, özgüllük, pozitif öngörü değeri (PPV), negatif öngörü değeri (NPV), doğruluk ve olasılık oranları (OR) hesaplandı.

Bulgular: Patolojik LNM 36 hastada (%8.8) saptandı. BT'de 39 hastada lenf nodu pozitif (≥10 mm) izlendi. BT'nin LNM saptamadaki duyarlılığı %50.0, özgüllüğü %94.4 olarak bulundu. PPV %46.2, NPV %95.1 ve genel tanısal doğruluk %90.5 idi. BT pozitifliği ile patolojik LNM arasında anlamlı ilişki saptandı (OR 16.7, 95% CI: 8.1–34.3, p < 0.001). Ancak LNM saptanan hastaların %50'sinde BT'de büyümüş lenf nodu izlenmedi. Çok değişkenli analizde, BT pozitifliğinin LVSI ve histolojik tip için düzeltme yapıldıktan sonra da lenf nodu metastazı ile bağımsız olarak ilişkili olduğu gösterildi (düzeltilmiş OR: 2.83, %95 GA: 1.10–7.29, p = 0.031).

Sonuç: Kısa aks ≥10 mm kriteri kullanılarak yapılan preoperatif BT değerlendirmesi, EK'de LNM saptamada yüksek özgüllük ve negatif öngörü değerine sahip olmakla birlikte, duyarlılığı sınırlıdır. BT pozitifliği nodal metastaz olasılığını belirgin şekilde artırsa da, negatif BT mikroskopik metastazı güvenilir biçimde dışlamamaktadır. Bu nedenle cerrahi nodal değerlendirme stratejileri yalnızca BT bulgularına dayandırılmamalıdır.

Anahtar Kelimeler: Endometrium Neoplazileri, Lenfatik Metastaz, Bilgisayarlı Tomografi, Duyarlılık ve Özgüllük, Tanısal Görüntüleme

Introduction

Endometrial cancer (EC) is the most common gynecologic malignancy in developed countries, and disease stage and lymph node status play a decisive role in determining prognosis and guiding adjuvant treatment decisions [1]. The presence of lymph node metastasis (LNM) directly affects the International Federation of Gynecology and Obstetrics (FIGO) stage and is closely associated with recurrence risk and survival outcomes [2]. Therefore, accurate preoperative assessment of disease extent is considered a fundamental requirement for planning an appropriate surgical approach.

Although EC is a surgically staged disease according to the FIGO system, preoperative staging provides significant contributions to the identification of recurrence risk groups and the individualization of surgical management.[2] In international guidelines, magnetic resonance imaging (MRI) is primarily recommended for the assessment of myometrial and cervical invasion, whereas cross-sectional imaging modalities such as computed tomography (CT) and/or positron emission tomography/computed tomography (PET/CT) are recommended for the evaluation of lymph node involvement and distant metastases [3-4]. Nevertheless, the diagnostic performance of these imaging modalities in detecting LNM is heterogeneous, and significant limitations remain, particularly in the identification of micrometastatic disease.

Recent literature indicates that even advanced imaging techniques such as PET/CT and MRI demonstrate only moderate sensitivity for the detection of LNM, while their specificity remains high [5-7]. Despite these limitations, contrast-enhanced CT continues to be widely used in clinical practice as a preoperative imaging modality due to its broad availability, rapid acquisition, and cost-effectiveness. However, data regarding the true diagnostic value of preoperative contrast-enhanced CT in predicting lymph node metastasis in EC are limited and heterogeneous, and performance differences according to anatomical regions have not been sufficiently elucidated. In this context, the aim of the present study was to evaluate the diagnostic performance of preoperative contrast-enhanced CT in predicting lymph node metastasis in patients with EC and to assess this performance in conjunction with contemporary histopathological and immunohistochemical (IHC) risk factors.

Material and Methods

After obtaining approval from the local ethics committee (AEŞH-EK1-2023-447), a total of 408 patients who underwent primary surgery for a diagnosis of EC at the gynecologic oncology clinic between January 2023 and April 2025 were included in this study. All patients underwent total hysterectomy and bilateral salpingo-oophorectomy, together with sentinel lymph node (SLN) mapping and/or pelvic ± para-aortic lymph node dissection. The decision to perform lymph node dissection was made according to the Mayo criteria [8].

Patients without available preoperative contrast-enhanced upper abdominal and pelvic CT imaging, those with extrauterine disease (FIGO 2023 stages IIIA, IIIB, IVA, IVB, and IVC), those who had received prior chemotherapy and/or radiotherapy, or those with a history of another malignancy were excluded from the study. Written informed consent was obtained from all patients.

Preoperative CT images were evaluated and reported by two radiologists experienced in the field of gynecologic oncology. During the evaluation, lymph nodes in the para-aortic and paracaval regions (suprarenal and infrarenal levels) as well as in the bilateral parailiac regions were assessed. Lymph nodes with a short-axis diameter ≥10 mm and reported as lymphadenopathy (LAP) were considered CT-positive.

Pathological evaluation was performed by two pathologists specialized in gynecologic pathology. According to the presence of pelvic and/or para-aortic LNM, patients were divided into two groups: Group 1, LNM-negative (n = 372), and Group 2, LNM-positive (n = 36). Lymph node findings detected on preoperative CT were compared between the two groups. LNM was defined as the presence of metastatic involvement in SLN and/or pelvic and para-aortic lymphadenectomy specimens.

All patients were staged according to the FIGO 2023 staging system. Tumor histologic type, tumor diameter, depth of myometrial invasion, lymphovascular space invasion (LVSI), and IHC molecular subtypes were obtained from pathology reports. LVSI was classified into three categories absent, focal, and substantial in accordance with World Health Organization (WHO) recommendations [9]. Based on IHC evaluation, tumors were grouped as mismatch repair–deficient (MMRd), p53-abnormal (p53abn), and tumors with no specific molecular profile (NSMP).

The primary outcome measure of the study was the diagnostic performance of lymph node positivity detected on preoperative CT in predicting pathological LNM. As secondary outcomes, the associations between clinical, pathological, and radiological variables and LNM were evaluated.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Mac software (version 22.0; IBM Corp., Armonk, NY, USA). The distribution of continuous variables was assessed using the Kolmogorov–Smirnov test. Continuous variables not showing a normal distribution were expressed as median (minimum–maximum). The Mann–Whitney U test was used for comparisons of continuous variables between groups. Categorical variables were presented as number and percentage [n (%)] and were compared using the chi-square test or Fisher's exact test, as appropriate.

The diagnostic performance of preoperative CT in predicting lymph node metastasis was evaluated using a short-axis diameter threshold of ≥10 mm. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy were calculated. The association between CT positivity and pathological lymph node metastasis was expressed as odds ratios (ORs) with 95% confidence intervals (CIs).

To assess whether CT positivity is an independent predictor of lymph node metastasis, multivariable logistic regression analysis was conducted. Given the relatively limited number of events, the number of variables included in the model was carefully restricted to avoid overfitting and ensure model stability. Variables were selected based on clinical relevance and included CT positivity, LVSI, and histological type. Adjusted ORs with 95% CIs were reported.

All statistical tests were two-sided, and a p value < 0.05 was considered statistically significant.

Results

The median age of the patients was 61 years (34–83), and the median parity was 3 (0–11). The median body mass index (BMI) was 32 kg/m^2 (19–50). The median CA-125 level was 14 U/mL (3–4290). The median tumor diameter was 50 mm (2–180). On pathological evaluation, LNM was identified in 8.8% of patients (n = 36), while 91.2% (n = 372) were lymph node–negative. SLN mapping was performed in 51.2% of patients (n = 209). According to the FIGO 2023 staging system, 91.2% of patients (n = 372) had stage I–II disease and 8.8% (n = 36) had stage III–IV disease. Surgical approaches included laparotomy in 25.0% of patients (n = 102), laparoscopy in 44.9% (n = 183), robotic surgery in 27.9% (n = 114), and vaginal/vNOTES surgery in 2.2% (n = 9) (Table 1).

Among the 36 patients with pathologically confirmed

LNM, lymph nodes with a short-axis diameter ≥10 mm were observed on preoperative CT in 18 patients (50.0%). Conversely, CT findings were interpreted as lymph node–negative in the remaining 18 patients (50.0%). Of the 372 patients who were pathologically lymph node–negative, 351 (94.4%) were also CT-negative, whereas CT positivity was detected in 21 patients (5.6%). Overall, CT positivity was observed in 39 patients (9.6%), while 369 patients (90.4%) were CT-negative (Table 2A).

The sensitivity and specificity of CT for detecting pathological LNM were 50.0% and 94.4%, respectively. The PPV was 46.2%, the NPV was 95.1%, and the overall diagnostic accuracy was 90.5%. A statistically significant association was found between CT positivity and pathological LNM (OR 16.7, 95% CI: 8.1–34.3, p < 0.001) (Table 2B).

Table 1. Baseline demographic, clinical, and pathological characteristics of the study population.

Variables	
Number of patients	408
Age (years) median (min-max)	61 (34-83)
Parity, median (min-max)	3 (0-11)
BMI, median (min-max)	32 (19-50)
CA-125, median (min-max)	14 (3-4290)
Tumor size (mm), median (min-max)	50 (2-180)
Total LN count, median (min-max)	5 (2-91)
Total pelvic LN count, median (min-max)	5 (2-61)
Total para-aortic LN count, median (min-max)	11 (3-38)
LNM, n (%)	
Negative	372 (91.2)
Positive	36 (8.8)
SLN mapping, n (%)	
No	199 (48.8)
Yes	209 (51.2)
FIGO 2023, n (%)	
I-II	372 (91.2)
III-IV	36 (8.8)
Operation Type, n (%)	
Laparotomy	102 (25)
Laparoscopic	183 (44.9)
Robotic	114 (27.9)
Vaginal/vNOTES	9 (2.2)

Data are expressed as median (minimum–maximum) or number (%).

BMI: Body Mass Index, LN: lymph node, LNM: lymph node metastasis, SLN: Sentinel lymph node, FIGO: International Federation of Gynecology and Obstetrics, vNOTES: Transvaginal Natural Orifice Transluminal Endoscopic Surgery

Table 2. Diagnostic performance of CT (short-axis ≥10 mm) in detecting lymph node metastasis

A. Crosstabulation of CT findings and pathological lymph node metastasis

	Group 1 (LNM-)	Group 2 (LNM+)	Total
CT positive (≥10 mm)	21	18	39
CT negative (<10 mm)	351	18	369
Total	372	36	408

B. Diagnostic performance

Metric	Value
Sensitivity	50.0%
Specificity	94.4%
PPV	46.2%
NPV	95.1%
Accuracy	90.5%
Odds ratio (95% CI)	16.7 (8.1–34.3)
p-value	<0.001

CT positivity was defined as a short-axis diameter ≥10 mm. Pathological LNM was defined as metastasis in sentinel lymph nodes and/or lymphadenectomy specimens.

CT, computed tomography; LNM, lymph node metastasis; PPV, positive predictive value; NPV, negative predictive value; OR, odds ratio; CI, confidence interval.

On histological evaluation, endometrioid histology was observed in 83.3% of patients in Group 1 (310/372) and 50.0% of patients in Group 2 (18/36), whereas non-endometrioid histology was identified in 16.7% (62/372) and 50.0% (18/36), respectively (p < 0.001). The proportion of patients without LVSI was 81.5% (303/372) in Group 1 and 36.1% (13/36) in Group 2. Focal LVSI was detected in 6.7% (25/372) of patients in Group 1 and 2.8% (1/36) in Group 2, while substantial LVSI was observed in 11.8% (44/372) and 61.1% (22/36), respectively (p < 0.001). SLN mapping was performed in 55.1% (205/372) of patients in Group 1 and 11.1% (4/36) of patients in Group 2 (p < 0.001). Deep myometrial invasion was identified in 34.7% (129/372) of patients in Group 1 and 77.8% (28/36) of patients in Group 2 (p < 0.001).

According to IHC molecular subtypes, NSMP tumors were observed in 64.8% (241/372) of patients in Group 1 and 38.9% (14/36) in Group 2, while MMRd tumors were identified in 20.4% (76/372) and 19.4% (7/36), respectively. The p53abn subtype was detected in 14.8% (55/372) of patients in Group 1 and 41.7% (15/36) of patients in Group 2 (p < 0.001). Preoperative CT positivity for lymph nodes with a short-axis diameter ≥10 mm in any region was observed in 5.6% (21/372) of patients in Group 1 and 50.0% (18/36) of patients in Group 2 (p < 0.001). Pelvic lymph node positivity (≥10 mm) was detected in 4.3% (16/372) of patients in Group 1 and 50.0% (18/36) of patients in Group 2 (p < 0.001). Among patients who underwent para-aortic lymphadenectomy, para-aortic lymph node positivity (≥10 mm) was observed in 4.8% (8/167) of patients in Group 1 and 21.9% (7/32) of patients in Group 2 (p < 0.001) (Table 3).

Table 3. Univariate analysis of factors associated with lymph node metastasis

Variable	Group 1 (LNM–, n=372)	Group 2 (LNM +, n=36)	p-value
Age, years, median (min-max)	62 (34-83)	64 (48-72)	0.207
BMI, kg/m^2, median (min-max)	31 (19-50)	33 (25-48)	0.314
CA-125, U/mL, median (min-max)	14 (3-4290)	24 (6-145)	0.005
Tumor size, mm, median (min-max)	45 (2-180)	60 (10-160)	0.002
Histology (endometrioid), n (%)			<0.001
Endometrioid	310 (83.3)	18 (50)	
Non-endometrioid	62 (16.7)	18 (50)	
LVSI, n (%)			<0.001
No	303 (81.5)	13 (36.1)	
Focal	25 (6.7)	1 (2.8)	
Substantial	44 (11.8)	22 (61.1)	
SLN mapping, n (%)			<0.001
No	167 (44.9)	32 (88.9)	
Yes	205 (55.1)	4 (11.1)	
Deep myometrial invasion (≥50%), n (%)	129 (34.7%)	28 (77.8%)	<0.001
IHC subtype, n (%)			<0.001
NSMP	241 (64.8)	14 (38.9)	
MMRd	76 (20.4)	7 (19.4)	
P53abn	55 (14.8)	15 (41.7)	
CT any LN ≥10 mm (+), n (%)	21 (5.6)	18 (50)	<0.001
CT pelvic LN ≥10 mm (+), n (%)	16 (4.3)	18 (50)	<0.001
CT para-aortic LN ≥10 mm (+)*, n/N (%)	8/167 (4.8)	7/32 (21.9)	<0.001

Data are expressed as median (minimum–maximum) or number (%). Continuous variables were compared using the Mann–Whitney U test; categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate.

*Para-aortic analysis includes only patients who underwent para-aortic lymphadenectomy (n = 199).

LNM, lymph node metastasis; BMI, body mass index; CA-125, cancer antigen 125; LVSI, lymphovascular space invasion; SLN, sentinel lymph node; IHC, immunohistochemistry; NSMP, no specific molecular profile; MMRd, mismatch repair deficient; p53abn, abnormal p53 expression; CT, computed tomography.

In multivariable logistic regression analysis, CT positivity remained independently associated with lymph node metastasis after adjustment for LVSI and histological type (adjusted OR: 2.83, 95% CI: 1.10–7.29, p = 0.031). LVSI was also significantly associated with lymph node metastasis in the overall model (p = 0.005), whereas histological type did not retain statistical significance. The results of the multivariable analysis are presented in Table 4.

Table 4. Multivariable logistic regression analysis of factors associated with lymph node metastasis

Variable	Adjusted OR	95% CI	p-value
CT positivity (≥10 mm)	2.83	1.10 – 7.29	0.031
LVSI (overall)	—	—	0.005
Focal vs none	0.07	0.02 – 0.35	0.001
Substantial vs none	0.24	0.02 – 2.52	0.233
Non-endometrioid histology	1.52	0.36 – 6.31	0.568

LVSI was entered as a categorical variable with "no LVSI" as the reference category. CT positivity was defined as lymph nodes with a short-axis diameter ≥10 mm on preoperative computed tomography. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) were derived from multivariable logistic regression analysis.

CT, computed tomography; LVSI, lymphovascular space invasion; OR, odds ratio; CI, confidence interval.

Discussion

In this study, we evaluated the diagnostic performance of preoperative CT in predicting LNM in patients with EC. Using a short-axis diameter threshold of ≥10 mm, CT demonstrated a sensitivity of 50.0%, a specificity of 94.4%, a positive predictive value of 46.2%, and a negative predictive value of 95.1% for the detection of LNM. CT positivity was observed in half of the patients with confirmed LNM (50.0%), whereas false-positive findings were detected in only 5.6% of patients without metastasis. Conversely, 95.1% of CT-negative patients were pathologically free of LNM. These findings indicate that preoperative CT, which is frequently used in routine practice, is more reliable as a rule-out tool for lymph node involvement but is insufficient as a standalone modality for detecting metastatic disease. Importantly, in multivariable analysis, CT positivity remained an independent predictor of lymph node metastasis after adjustment for LVSI and histological type. This finding suggests that CT provides additional predictive value beyond established pathological risk factors.

Numerous studies have assessed the diagnostic performance of preoperative imaging modalities for detecting LNM in EC. Yılmaz et al. reported that CT had higher sensitivity than MRI for detecting pelvic LNM when different imaging modalities were compared (87.5% vs. 53.1%) [10]. However, studies including larger patient cohorts and advanced imaging techniques have demonstrated that sensitivity for nodal staging remains limited. In the prospective, multicenter SENTIREC-Endo study by Holm et al., the sensitivity of FDG-PET/CT for detecting LNM in high-risk EC was reported as 56%, while specificity remained high at 91% [5]. Similarly, a recent meta-analysis by Qiu Bi et al. demonstrated that MRI had a moderate sensitivity (59–65%) but high specificity (approximately 95%) for the detection of LNM [11]. Antonsen et al. reported that PET/CT provided higher sensitivity than MRI (74% vs. 59%) with comparable specificity (93%) in predicting LNM, while emphasizing that no imaging modality can replace surgical staging [12]. Other studies comparing MRI and PET/CT have likewise reported superior diagnostic performance of PET/CT over MRI [6-7]. In the multicenter prospective ACRIN 6671/GOG 0233 study conducted by Atri et al., the sensitivity of FDG-PET/CT for detecting LNM in the abdomen and pelvis was reported as 65%, which was significantly higher than that of diagnostic CT [13]. Nevertheless, the persistence of only moderate sensitivity even with advanced imaging techniques highlights the limited ability of imaging modalities to exclude nodal involvement, particularly micrometastatic disease. In addition, the high cost and limited availability of PET/CT remain important barriers to its routine clinical use. Taken together, these data indicate that the pattern of moderate sensitivity and high specificity observed with conventional CT in our study is consistent with the existing literature and supports the role of CT as an adjunctive, rather than definitive, tool for lymph node assessment.

When preoperative CT findings were evaluated according to anatomical regions in our study, CT demonstrated better performance in predicting pelvic LNM compared with the para-aortic region. Lymph node positivity with a short-axis diameter ≥10 mm in the pelvic region was observed in 50.0% of patients with LNM, whereas this rate was limited to 21.9% among patients with para-aortic metastasis. In contrast, CT positivity rates in both pelvic and para-aortic regions were low among patients without LNM. These findings suggest that the sensitivity of preoperative CT is particularly limited for detecting para-aortic LNM and that micrometastatic disease in the para-aortic region may be easily overlooked on CT imaging.

Although EC is a surgically staged disease according to the FIGO system, preoperative staging plays an important role in estimating recurrence risk and planning the surgical approach.[13] In the guidelines of the European Society of Gynaecological Oncology (ESGO) and the European Society for Medical Oncology (ESMO), MRI is primarily recommended for the assessment of myometrial and cervical invasion, while cross-sectional imaging modalities such as CT or PET/CT may be used for the evaluation of lymph node involvement and distant metastases [3-4]. However, these guidelines clearly emphasize that imaging modalities cannot replace surgical staging. In our study, the limited sensitivity but high specificity and negative predictive value of CT for detecting LNM further confirm that CT serves as a supportive tool, rather than a definitive method, in accordance with guideline recommendations.

In recent years, the integration of IHC molecular profiles into the FIGO 2023 staging system has further underscored the importance of tumor biology in predicting LNM and recurrence risk in EC.[13] The p53abn subtype, in particular, has been associated with aggressive clinical behavior and increased lymph node involvement [15-17]. In our study, patients with LNM exhibited significantly higher rates of deep myometrial invasion, larger tumor size, and substantial LVSI; moreover, 41.7% of these patients had the p53abn subtype ($p < 0.001$). These findings suggest that, in addition to classical histopathological risk factors, knowledge of molecular subtypes may enhance the prediction of LNM and contribute to more individualized surgical and adjuvant treatment strategies.

This study has several strengths. First, preoperative contrast-enhanced CT scans were evaluated by two experienced radiologists in a single-center cohort with a relatively large sample size. In addition, all patients were staged according to the FIGO 2023 system, and IHC molecular subtypes were systematically reported. The separate analysis of pelvic and para-aortic lymph nodes according to anatomical regions provides clinically meaningful insights into the regional performance of CT. Nevertheless, several limitations should also be acknowledged. The retrospective design may have introduced potential biases related to patient selection and data completeness. The single-center nature of the study may limit the generalizability of the findings. Furthermore, because CT assessment was based on size criteria, micrometastatic lymph node involvement may not have been detected. In addition, the relatively limited number of events may have contributed to wider confidence intervals and restricted the number of variables that could be included in the multivariable model. Finally, the absence of survival and recurrence analyses represents another important limitation.

In conclusion, this study demonstrates that preoperative contrast-enhanced CT has limited sensitivity but high specificity and negative predictive value for detecting lymph node metastasis in EC. CT negativity appears reassuring for the absence of LNM, whereas CT positivity does not definitively indicate pathological metastasis. The better diagnostic performance observed in pelvic lymph nodes compared with the para-aortic region suggests region-specific limitations of CT in nodal assessment. Importantly, CT positivity was also found to be independently associated with lymph node metastasis after adjustment for established pathological risk factors. These findings indicate that preoperative CT cannot replace surgical staging in EC; however, when interpreted in conjunction with appropriate clinical and pathological risk factors, it may contribute to clinical decision-making as a supportive tool. With the integration of the FIGO 2023 staging system and molecular classification, more individualized and multimodal approaches to predicting lymph node metastasis are likely to gain prominence in the future.

Declaration of conflicting interests

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Ethics approval

The study protocol was approved by the Etlik City Hospital Ethics Committee (Approval No: AEŞH-EK1-2023-447, 09/08/2023)

Authors' contribution

HNÖ: Conceptualization, methodology, Data curation, Writing – original draft, Writing – review & editing. GE: Data curation, Formal Analysis. NÖ: Data curation. OKK: Data curation. ŞKB: Data curation. BT: Data curation, Formal Analysis. SDK: Data curation, Formal Analysis. CH: Data curation, Supervision. VK: Conceptualization, Supervision, Writing –review & editing.

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