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The Effect of Prognostic Factors and Adjuvant Radiotherapy on Survival in Patients with High-Grade Early-Stage Endometrial Cancer: A Retrospective Clinical Study

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Background: This retrospective clinical study aimed to investigate the effect of prognostic factors and adjuvant radiotherapy in patients with high-grade early-stage endometrial cancer on overall survival (OS) and disease-free survival (DFS).

Material/Methods: The medical records of patients diagnosed with high-grade, early stage (I or II) endometrial adenocarcinoma who had received adjuvant radiotherapy after surgery were reviewed.

Results: Seventy-nine patients included 39 patients (49.4%) with stage II endometrial cancer, 25 patients (31.6%) with histologic grade 3 tumors, and 47 patients (59.5%) with endometrial cancer showing lymphovascular space invasion (LVSI). There were 45 patients (57.0%) who received external pelvic radiotherapy with an average dose of 46.0 Gy (range, 11.2–50.4 Gy), and 34 patients (43.0%) received vaginal brachytherapy (VBT) with an average dose of 21.5 Gy (range, 10–36 Gy). Multivariate analysis showed that tumor stage (HR, 4.066; 95% CI, 1.227–13.467; p=0.022) and histologic grade (HR, 16.652; 95% CI, 4.430–62.589; p<0.001) were independent predictors for OS. Increased serum CA-125 levels (HR, 1.136; 95% CI, 0.995–1.653; p=0.047) and histologic grade (HR, 3.236; 95% CI, 1.107–15.156; p=0.015) were independent predictors for DFS. Adjuvant radiotherapy was not found to be significantly associated with improved OS (HR, 1.259; 95% CI, 0.518–3.058; p=0.612) or DFS (HR, 1.056; 95% CI, 0.994–1.123; p=0.078).

Conclusions: This retrospective study showed that in high-grade early-stage endometrial cancer treated with postoperative adjuvant radiotherapy, independent predictors for OS were tumor stage and grade. Adjuvant radiotherapy was not associated with improved OS or DFS.

MeSH Keywords: Endometrial Neoplasms • Prognosis • Survival

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Background

Worldwide, endometrial cancer, most commonly endometrial adenocarcinoma, is the fourth most common type of primary malignancy in women [1]. Early-stage endometrial cancer can present with abnormal vaginal bleeding, but even with high-grade tumors, there may be minimal presenting symptoms until the tumors become advanced [1–3]. The 2009 International Federation of Gynecology and Obstetrics (FIGO) staging system for endometrial cancer classified stage Ia or early-stage tumors as invading <50% of the myometrium and recommends treatment with total abdominal hysterectomy (TAH) and bilateral salpingo-oophorectomy operations (BSO) [4–6]. However, cases with >50% myometrial invasion and/or cervical, adnexal, lymph node, pelvic, or distant organ metastases represent advanced-stage tumors, and recommended surgery includes lymphadenectomy and omentectomy in addition to the standard surgery [2,6]. Prognostic factors that include patient age, tumor grade, histological type, tumor grade, and lymphovascular space invasion (LVSI) are considered to be independent factors that can affect the choice of surgery and other treatment regimens following surgery, while having impact on patient overall survival (OS) and disease-free survival (DFS) [3].

In the guidelines of gynecology oncology group, age, grade (II and III), depth of myometrial invasion (>66%), and positive or negative LVSI status have been used to score the prognosis of endometrial cancer [6]. Patients age >70 years who have at least one of the risk factors, patients age <50 years who have two of the risk factors, and patients in any age group who show three of risk factors are considered to be in the high-risk group [6].

For patients with endometrial cancer who are in the high-risk group or who have advanced-stage endometrial cancer, surgical treatment alone is insufficient and adjuvant radiotherapy or chemotherapy is recommended to prolong the OS and DFS [6]. Planned radiotherapy includes vaginal brachytherapy (VBT) or external pelvic radiotherapy. Although the effects of external radiotherapy and VBT on OS and DFS remain controversial, the impact of these treatments on local recurrence is unclear [5].

Therefore, this retrospective clinical study aimed to investigate the effect of prognostic factors and adjuvant radiotherapy in patients with high-grade and early-stage endometrial cancer on OS and DFS.

Material and Methods

Patient selection

A retrospective review was conducted of the medical records of patients who admitted to the Department of Obstetrics and Gynecology of the Faculty of Medicine, Inonu University, between January 1, 2009, and February 1, 2018, with high-grade early-stage endometrial adenocarcinoma. Patients included in the study had received adjuvant radiotherapy after surgery that included total abdominal hysterectomy (TAH), bilateral salpingo-oophorectomy (BSO), omentectomy, and pelvic and paraaortic lymph node dissection. The Committee of Scientific Investigation and Publication Ethics of Inonu University approved the study (Approval No. 2018/6-9).

The inclusion criteria for this study were patients with 2009 International Federation of Gynecology and Obstetrics (FIGO) stage I or stage II endometrial cancer [6]; a histologically confirmed diagnosis of primary endometrial adenocarcinoma; no previous history of a cancer diagnosis and no other known primary tumor.

Surgical treatment

All patients who met the study inclusion criteria were surgically treated with TAH, BSO, omentectomy, pelvic and paraaortic lymphadenectomy. To prevent local recurrence, during the TAH procedure, the cardinal ligaments and the upper 1.5–2.0 cm of the vaginal wall were removed. The pelvic lymph node dissection included the right and left common iliac, external iliac, supra-inguinal, internal iliac, obturator, sacral, and parametrial lymph nodes. Paraaortic lymph node dissection included lymph nodes from the bifurcation of the aorta to the renal veins. All patients underwent an infracolic omentectomy inferior to the transverse colon. Pelvic lymph node dissection attempted to remove a minimum of 20 pelvic lymph nodes. Histopathology of the hysterectomy specimens and all excised lymph nodes was performed as part of the tumor staging and grading procedure.

Radiotherapy

The decision to use adjuvant radiotherapy was made according to the current criteria for the use of postoperative radiotherapy in endometrial carcinoma [3]. External beam radiotherapy was applied with a linear accelerator and cobalt-60 (Co-60) machine. Brachytherapy was applied with a high-dose-rate (HDR) Nucletron system. All patients were treated in the supine position. Conventional or conformal radiotherapy was administered. The area of external radiotherapy included the entire pelvic region extending from the level of L5–S1 to the inferior part of obturator foramina and extended 1–2 cm beyond the lateral margins of the bony structures to include the bilateral regional lymphatic system. In the patients receiving brachytherapy, the anterior border of the radiotherapy site included the front of the symphysis pubis and extended to the bottom of the ischial tuberosity with the posterior border at the level of the mid sacrum. Brachytherapy was administered using a vaginal cylinder, with the reference isodose covering the

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Table 1. Clinical characteristics and treatment of patients included in the study.

Variables	Mean ±SD	
Age*	65.49±10.43	
BMI**		
<30 kg/m²	35	(44.3)
≥30 kg/m²	44	(55.7)
CA-125**		
CA-125 ≥35 U/ml	16	(20.3)
CA-125<35 U/ml	63	(79.7)
Tumor diameter**		
<3 cm	15	(19.0)
≥3 cm	64	(81.0)
Number of resected pelvic lymph nodes***	26	(20–42)
Number of resected paraaortic lymph nodes**	18	(17–44)
Stage**		
Ia	7	(8.8)
Ib	33	(41.8)
II	39	(49.4)
Histologic grade**		
I	22	(27.9)
II	32	(40.5)
III	25	(31.6)

Variables	Mean ±SD	
LVSI**		
Absent	32	(40.5)
Present	47	(59.5)
Type of adjuvant radiotherapy (RT)**		
External pelvic radiotherapy	45	(57.0)
Vaginal brachytherapy	34	(43.0)
External pelvic radiorthерapy dose (Gy)***	46	(11.2–50.4)
Brachytherapy dose (Gy)***	21.5	(10–36)
External pelvic radiotrherapy period (days)***	25	(23–28)
Brachytherapy period (days)***	5	(2–6)
Follow up (months)***	51.7	(12.9–108.8)
DFS (mean in months)	146.03	
OS (mean in months)	114.1	
Recurrence**		
Absent	69	(87.3)
Present	10	(12.7)
Last status**		
Alive	59	(74.7)
Dead	20	(25.3)

* Mean ±standard deviation (SD); ** n (%); *** median (minimum–maximum); BMI – body mass index; DFS – disease-free survival; Gy – Gray; LVSI – lymphovascular space invasion; OS – overall survival; RT – radiotherapy.

proximal half of the vagina. The radiation dose was administered at a distance of 5 mm from the surface of the cylinder. Adjuvant radiotherapy began within eight weeks after surgery.

Postoperative follow-up

All patients were evaluated weekly during radiotherapy treatment. After radiotherapy, all patients were assessed at three-monthly intervals in the first two years, six-monthly intervals in the next three years, and yearly after five years by physical and gynecological examination, complete blood count and vaginal cuff cytology. Thorax and abdominopelvic computed tomography (CT) scans were performed at six-monthly intervals.

Statistical analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Normality of the data distribution was confirmed using the Shapiro-Wilk test and homogeneity of variance was assessed by Levene's test. The t-test and the bootstrap test were used based on sampling distributions to compare the quantitative variables with a normal distribution. The Mann-Whitney U test was performed following the Monte Carlo simulations when the dependent variables were not normally distributed. The Pearson chi-squared (χ^2) test, Fisher's exact test, and the Fisher-Freeman-Holton test with Monte Carlo simulations were performed to test the relationship between groups and categorical variables. Ratios were compared with each other and expressed according to the Benjamini-Hochberg corrected p-value.

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Table 2. Comparison of survival and recurrence in patients with endometrial carcinoma.

Variables	Alive (n=59)	Dead (n=20)	p-Value	Recurrence (–) (n=69)	Recurrence (+) (n=10)	p-Value
Age*	63.00±10.24	72.85±7.08	**0.001**[t]	65.57±10.59	65.00±9.81	0.845[t]
BMI**			**0.018**[f]			0.172[f]
<30 kg/m^2	31 (52.5)[B]	4 (20.0)		33 (47.8)	2 (20.0)	
≥30 kg/m^2	28 (47.5)	16 (80.0)[A]		36 (52.2)	8 (80.0)	
CA-125**			**0.013**[f]			**0.025**[f]
CA-125 ≥35 U/ml	9 (15.3)	7 (35.0)		11 (15.9)	5 (50)A	
CA-125 <35 U/ml	50 (84.7)	13 (65.0)		58 (84.1)[B]	5 (50)	
Tumor diameter**			0.436[f]			0.677[f]
<3 cm	12 (20.3)	3 (15)		14 (20.3)	1 (10)	
≥3 cm	47 (79.7)	17 (85)		55 (79.7)	9 (90)	
Number of resected pelvic lymph nodes***	24 (20–48)	30 (21–44)	**0.015**[u]	26 (20–52)	29 (21–39)	0.502[u]
Number of resected paraaortic lymph nodes***	18 (10–41)	19 (10–43)	0.849u	19 (10–44)	17 (12–31)	0.555[u]
Stage**			**<0.001**[ff]			0.887[ff]
Ia	7 (11.9)	0 (0.0)		7 (10.1)	0 (0.0)	
Ib	29 (49.2)[B]	4 (20.0)		28 (40.6)	5 (50)	
II	23 (39.0)	16 (80.0)[A]		34 (49.3)	5 (50)	
Histologic grade**			**<0.001**[ff]			**0.010**[ff]
I	22 (37.3)[B]	0 (0.0)		22 (31.9)[B]	0 (0.0)	
II	28 (47.5)[B]	4 (20.0)		29 (42.0)	3 (30.0)	
III	9 (15.3)	16 (80.0)[A]		18 (26.1)	7 (70.0)[A]	
LVSI **			**<0.001**[f]			**0.005**[f]
Absent	32 (54.2)	0 (0.0)		32 (46.4)	0 (0.0)	
Present	27 (45.8)	20 (100.0)[A]		37 (53.6)	10 (100.0)	
Type of adjuvant radiotherapy**			0.999[x]			0.502[f]
External pelvic RT	34 (57.6)	11 (55)		38 (55.1)	7 (70.0)	
Vaginal brachytherapy	25 (42.4)	9 (45)		31 (44.9)	3 (30.0)	

* Mean ± standard deviation (SD); ** n (%); *** median (minimum–maximum); [t] independent samples t-test (bootstrap); [u] Mann-Whitney U test (Monte Carlo); [x] Pearson chi-squared test (exact); [f] Fisher's exact test; [ff] Fisher-Freeman-Halton test (Monte Carlo); [A] significant compared with the alive or non-recurrent group; [B] significant compared with the deceased group and the recurrence group; BMI – body mass index; LVSI – lymphovascular space invasion; RT – radiotherapy.

Disease-free survival (DFS) was determined as the time period between the operation date and the first episode of recurrent disease. The overall survival OS was determined as the period between the date of surgery operation date and patient death. Cox regression analysis (Enter and Forward Stepwise) using the Wald test was used to determine the effects of prognostic variables on OS and DFS. To predict the relative risks of OS and DFS, the hazard ratio (HR) was used with a 95% confidence interval (CI). In the calculation of the probability of cumulative survival, Kaplan-Meier method was

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Table 3. Clinical and pathological details of patients with recurrence of endometrial carcinoma.

Patient No.	Age	Stage	Grade	LVSI	Type of radiotherapy (RT)	Initial recurrence	Distant metastasis	Time to recurrence (months)
1	79	Ib	3	+	Brachytherapy	Distant	Lung	6
2	50	II	3	+	Brachytherapy	Local	–	32
3	62	Ib	2	+	External pelvic RT	Local	–	6
4	50	II	3	+	External pelvic RT	Local	–	10
5	68	Ib	2	+	Brachytherapy	Distant	Liver	30
6	63	Ib	3	+	External pelvic RT	Local	–	44
7	71	II	2	+	External pelvic RT	Local	–	42
8	68	II	3	+	External pelvic RT	Local	–	16
9	77	Ib	3	+	External pelvic RT	Local	–	20
10	62	II	3	+	External pelvic RT	Local	–	13

followed by the log-rank test, and the results were compared. Quantitative variables were shown as mean ± standard deviation (SD), and median and categorical variables were shown as the number (n) and percentage (%) in the tables. The variables were examined at 95% CI. A p-value <0.05 was considered to be statistically significant.

Results

The study included 79 patients with high-grade early-stage endometrial cancer treated with surgery followed by adjuvant radiotherapy. Table 1 shows the patient characteristics and their clinical details. The average age of the patients was 65.49±10.43 years. In the study population, 39 patients (49.4%) had stage II endometrial cancer, 25 patients (31.6%) had histologic grade 3 tumors, and lymphovascular space invasion (LVSI) was found in 47 patients (59.5%). There were 45 patients (57.0%) who received external pelvic radiotherapy with an average dose of 46.0 Gy (range, 11.2–50.4 Gy), and there were 34 patients (43.0%) who received vaginal brachytherapy (VBT) with an average dose of 21.5 Gy (range, 10–36 Gy).

At the time of data analysis, 59 of the 79 patients (74.7%) were alive, and 20 patients (25.3%) had died. Increased age, body mass index (BMI), serum CA-125 levels, the number of pelvic lymph nodes which were resected at surgery, tumor stage, histologic grade, and the presence of LVSI were found to be significantly associated with reduced survival (p=0.001, p=0.013, p=0.015, p<0.001, p<0.001, and p<0.001, respectively). Comparison between patients with and without tumor recurrence showed that increased serum CA-125 levels, histologic grade, and the presence of LVSI were significantly associated with tumor recurrence (p=0.025, p=0.01, and p=0.005, respectively) (Table 2). No significant difference was found in the treatment types of adjuvant radiotherapy between the survival and non-survival groups, and recurrence and non-recurrence group (p=0.999 and p=0.502, respectively).

The mean duration of patient follow-up was 51.7 months (range, 12.9–108.8 months), ten patients (12.7%) experienced tumor recurrence, of which, two patients (2.5%) had distant metastases, including one patient with lung and one with liver metastasis. The remaining eight patients (10.2%) had local vaginal or pelvic recurrence. The clinical and pathological details of the patients with recurrence are summarized in Table 3.

Univariate analysis showed that increased patient age (HR, 1.081; 95% CI, 1.023–1.142; p=0.005), increased serum CA-125 levels (HR, 1.059; 95% CI, 1.032–1.087; p<0.001), increased stage (HR, 2.155; 95% CI, 1.188–3.910; p=0.011), increased histologic grade (HR, 16.391; 95% CI, 4.819–55.756; p<0.001) and the presence of lymphovascular space invasion (LVSI) (HR, 55.526; 95% CI, 1.454–2120.6; p=0.031) were associated with a shorter OS. Multivariate analysis showed that tumor stage (HR, 4.066; 95% CI, 1.227–13.467; p=0.022) and histologic grade (HR, 16.652; 95% CI, 4.430–62.589; p<0.001) were independent predictors for OS (Table 4). Univariate analysis showed that body mass index (BMI) (HR, 1.192; 95% CI, 1.036–1.372; p<0.014), increased serum CA-125 levels (HR, 1.451; 95% CI, 1.016–1.087; p<0.004), and histologic grade (HR, 4.830; 95% CI, 1.487–15.687; p=0.009) were associated with a shorter DFS. The results of multivariate analysis showed that increased serum levels of CA-125 and histologic grade were independent predictors for DFS (HR, 1.136; 95% CI, 0.995–1.653; p=0.047; and HR, 3.236; 95% CI, 1.107–15.156; p=0.015, respectively) (Table 5).

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Table 4. Logistic regression analysis of factors associated with overall survival (OS).

Variable	Univariate analysis			Multivariate analysis		
	HR	95% CI	P-value	HR	95% CI	P-value
Age	1.081	(1.023–1.142)	**0.005**	*		
BMI (≥30 kg/m^2 *vs.* <30 kg/m^2)	1.093	(0.985–1.212)	0.094			
CA-125 (≥35 U/ml *vs.* <35 U/ml)	1.059	(1.032–1.087)	**<0.001**	*		
Tumor diameter (<3 cm *vs.* ≥3 cm)	2.502	(0.835–7.496)	0.101			
Stage (II *vs.* others)	2.155	(1.188–3.910)	**0.011**	4.066	(1.227–13.467)	**0.022**
Grade (III *vs.* others)	16.391	(4.819–55.756)	**<0.001**	16.652	(4.430–62.589)	**<0.001**
LVSI (present *vs.* absent)	55.526	(1.454–2120.6)	**0.031**	*		
Type of adjuvant radiotherapy (external *vs.* brachytherapy)	1.259	(0.518–3.058)	0.612			

* Not significant; HR – hazard ratio; CI – confidence interval; BMI – body mass index; LVSI – lymphovascular space invasion; RT – radiotherapy.

Table 5. Logistic regression analysis of factors associated with disease-free survival (DFS).

Variable	Univariate analysis			Multivariate analysis		
	HR	95% CI	P-value	HR	95% CI	P-value
Age	1.135	(1.012–1.187)	0.109			
BMI (≥30 kg/m^2 *vs.* <30 kg/m^2)	1.192	(1.036–1.372)	**0.014**	*		
CA-125 (≥35 U/ml *vs.* <35 U/ml)	1.451	(1.016–1.087)	**0.004**	1.136	(0.995–1.653)	**0.047**
Tumor diameter (<3 cm *vs.* ≥3 cm)	3.182	(0.676–14.987)	0.143			
Stage (II *vs.* others)	1.051	(0.908–1.813)	0.313			
Grade (III *vs.* others)	4.830	(1.487–15.687)	**0.009**	3.236	(1.107–15.156)	**0.015**
LVSI (present *vs.* absent)	50.256	(0.285–8856.1)	0.138			
Type of adjuvant radiotherapy (external *vs.* brachytherapy)	1.056	(0.994–1.123)	0.078			

* Not significant; HR – hazard ratio; CI – confidence interval; BMI – body mass index; LVSI – lymphovascular space invasion; RT – radiotherapy.

In this study cohort, the OS at 3 years was 90.5% (95% CI, 88.2–92.5%). Patients who received external radiotherapy alone had an OS at 3 years of 92.5% (95% CI, 88–93%), whereas those who received brachytherapy alone had an OS of 89.5% (95% CI, 78–90%; log-rank p=0.611) (Figure 1). The DFS of the study population at 3 years was 89.1% (95% CI, 86.5–93.0%). Patients who received external radiotherapy alone had a DFS at 3 years of 88.4% (95% CI, 87–93%), whereas patients who received brachytherapy alone had a DFS of 89.3% (95% CI, 88–93.5%; log-rank p=0.365) (Figure 2). Adjuvant radiotherapy was not found to be associated with improved OS (HR, 1.259; 95% CI, 0.518–3.058; p=0.612) or DFS (HR, 1.056; 95% CI, 0.994–1.123; p=0.078).

Discussion

The findings of this retrospective study of 79 patients with high-grade early-stage endometrial adenocarcinoma showed that independent predictors for overall survival (OS) included the tumor stage and histologic grade. The main prognostic factor affecting survival was tumor stage. This study used the 2009 International Federation of Gynecology and Obstetrics (FIGO) staging system for endometrial cancer [4,6]. The 5-year survival rates for stage I, II, II, and IV endometrial cancer have previously been reported to be 83%, 75%, 42%, and 26%, respectively [7]. A further prognostic factor is tumor grade, and the 5-year survival rates for patients with endometrial

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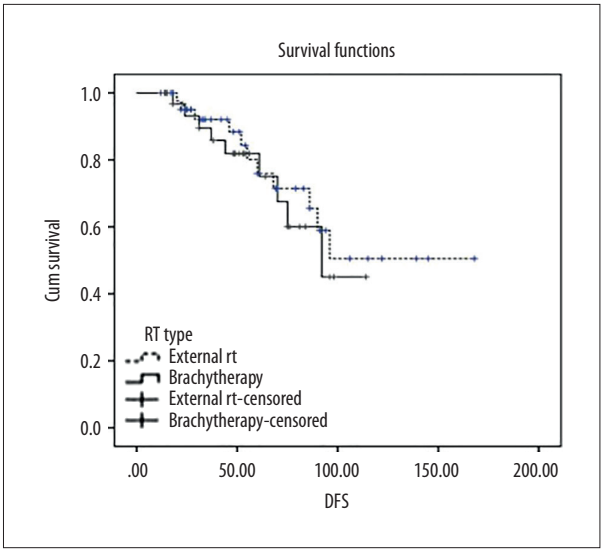

Figure 1. Kaplan-Meier curves for overall survival (OS) following adjuvant radiotherapy

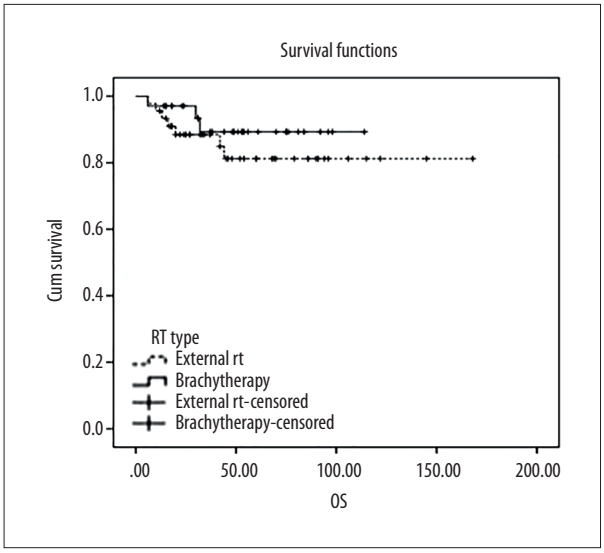

Figure 2. Kaplan-Meier curves for disease-free survival (DFS) following adjuvant radiotherapy

cancer have been reported to be 71–88% for grade 1, 60–79% for grade 2, and 32–65% for grade 3 endometrial cancer [8].

Also, in this study, the degree of lymphovascular space invasion (LVSI) and myometrial invasion were found to adversely affect prognosis in patients diagnosed with endometrial cancer. Pulgar et al. showed that the presence of LVSI was associated with reduced prognosis and a shorter survival rate [9]. Cusano et al. analyzed the prognostic significance of LVSI in patients with (T1N0) node-negative surgically staged endometrial cancer, and showed that LVSI was an independent factor of risk for reduced overall survival (OS), as were age, histologic grade, and tumor stage [10]. A recent retrospective study showed that increased patient age, advanced tumor stage, increased tumor grade, and the presence of LVSI were negative prognostic factors for patient survival in= high-grade endometrial cancer [11].

The findings of this study showed a 12.7% recurrence rate over an average period of follow-up of 51.7 months in patients diagnosed with high-grade early-stage endometrial carcinoma who received adjuvant radiotherapy following surgery. Also, tumor recurrence was significantly associated with increased serum levels of CA-125, increased histologic grade, and the presence of LVSI. Sozen et al. studied the relevant risk factors associated with survival and relapse rates in patients with early-stage endometrial cancer and showed that age >50 years, histological subtype, and treatment with adjuvant radiotherapy had a significant impact on tumor recurrence [12]. The data presented in the present study showed that increased serum CA-125 levels and increased histologic grade were independent predictors for disease-free survival (DFS). These findings are supported by those of Demiral and et al. who evaluated treatment outcomes of early-stage endometrial cancer in patients who received postoperative adjuvant radiotherapy [13]. These investigators reported that grade 3 endometrial cancers and age ≥71 years were associated with reduced OS, whereas histological type was an independent predictor for local recurrence and distant metastasis [13]. Recently, Kotowicz et al. studied the prognostic value of the measuring the preoperative level of CA-125 in patients with endometrial cancer and showed that CA-125 was a prognostic factor for decreased OS and DFS [14].

The use of adjuvant radiotherapy is a parameter that would be expected to have a positive effect on survival in patients with endometrial cancer. This study showed that adjuvant radiotherapy using external radiotherapy and brachytherapy alone was not found to be significantly associated with improved OS and DFS. According to the 2018 guidelines from the National Comprehensive Cancer Network (NCCN), no significant differences were found in OS and DFS in patients who had external radiotherapy and/or vaginal brachytherapy (VBT) performed in the postoperative period [15]. Kim et al. reported the outcomes of treatment in patients diagnosed with stage I endometrial cancer after adjuvant radiotherapy following surgery and showed that the type of adjuvant radiotherapy had no significant impact on OS and DFS [16]. Also, Hass et al. investigated the effect of vaginal brachytherapy compared with external beam pelvic radiotherapy and no radiotherapy on survival in patients diagnosed with endometrial cancer [17]. Hass et al. demonstrated the importance of VBT treatment in patients at risk recurrence of endometrial cancer and showed that external radiotherapy with or without VBT did not show any survival benefit when compared with VBT alone in patients with intermediate and high risk of recurrence [17].

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Nout et al. proposed VBT as the first-line adjuvant treatment for patients at intermediate or high risk of developing vaginal recurrence of endometrial and reported fewer gastrointestinal side effects when compared with external beam radiotherapy (EBRT) [18]. The results from a recently reported randomized study showed that VBT treatment alone was as effective as adjuvant EBRT combined with VBT in achieving loco-regional tumor control and resulted in similar survival rates, with fewer episodes of radiation toxicity in patients diagnosed with stage I intermediate-risk and high-risk endometrial carcinoma [19].

This study had several limitations. As this was a retrospective study that relied on the content of the patient medical records, the main limitation was the lack of data about other prognostic factors such as race, hormone receptor status, and gene mutations. Other limitations included the retrospective design of the study, the study data from a single center, and the small patient study sample size.

Conclusions

This retrospective study showed that in high-grade early-stage endometrial cancer treated with postoperative adjuvant radiotherapy, independent predictors for overall survival (OS) were tumor stage and tumor grade. Adjuvant radiotherapy was not significantly associated with improved OS or disease-free survival (DFS). These findings should be supported by further large-scale controlled studies to provide evidence to guide treatment decisions for patients with high-grade early-stage endometrial cancer.

Conflict of interest

None.

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