

## Original Article



# Are patients and physicians willing to accept less-radical procedures for cervical cancer?

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## ABSTRACT

**Objective:** To evaluate the opinions of women who underwent surgery for cervical cancer (CC) and physicians who treat CC about the acceptability of increased oncological risk after less-radical surgery.

**Methods:** One hundred eighty-two women who underwent surgery for CC and 101 physicians participated in a structured survey in 3 tertiary cancer centers in Czech Republic and Turkey. Patients and physicians were asked whether they would accept any additional oncological risks, which would be attributable to the omission of parametrectomy (radical hysterectomy/trachelectomy vs. simple hysterectomy/trachelectomy) or pelvic lymph node dissection (systematic resection vs. sentinel lymph node sampling).

**Results:** Although 52.2% of patients reported morbidity related to their previous treatment, the majority of patients would not accept less-radical surgical treatment if it was associated with any increased risk of recurrence (50%–55%, no risk; 17%–24%, risk <0.1%). Physicians tended to accept a significantly higher risk than patients in the Czech Republic, but not in Turkey. Patients with higher education levels, more advanced-stage of disease, or adverse events related to previous cancer treatment, and patients who received adjuvant therapy were significantly more likely to accept an increased oncological risk.

**Conclusion:** Patients, even if they suffered from morbidity related to previous CC treatment, do not want to choose between oncological safety and a better quality of life. Physicians tend to accept the higher oncological risk associated with less-radical surgical procedures, but attitudes differ regionally. Professionals should be aware of this tendency when counselling the patients before less-radical surgery.

**Keywords:** Uterine Cervical Neoplasms; Surgery; Morbidity; Quality of Life

## INTRODUCTION

Traditionally, radical hysterectomy (RH) combined with bilateral pelvic lymph node dissection (PLND) has been considered the standard surgical treatment for early-stage cervical cancer (CC) [1,2]. The salient part of RH is removal of the parametrial tissue adjacent

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No potential conflict of interest relevant to this article was reported.

### Author Contributions

Conceptualization: C.D.; Data curation: G.K., K.R., B.D., T.T., O.A., C.D.; Formal analysis: G.K., K.R., B.D., C.D.; Investigation: G.K., K.R., B.D., T.T., O.A., C.D.; Methodology: G.K., B.D., C.D., K.R.; Project administration: C.D.; Resources: G.K., K.R., B.D., C.D.; Software: G.K., B.D., C.D.; Supervision: C.D.; Validation: G.K., B.D., C.D.; Visualization: G.K., B.D., C.D.; Writing - original draft: G.K., B.D., C.D.; Writing - review & editing: G.K., B.D., C.D.

to the cervix and the upper part of the vagina. In patients interested in future fertility, a radical trachelectomy with PLND can be considered [3,4].

Although RH with PLND has been shown to offer excellent prognosis in terms of survival, the significant morbidity related with the procedure adversely affects patients' quality of life [5-7]. Thus, there is growing interest in and an increasing number of publications about the use of less-radical surgical procedures, including simple hysterectomy, simple trachelectomy, and conization to replace RH or sentinel lymph node (SLN) biopsy to replace systematic PLND [8-10]. In the majority of previous reports, the oncological outcome has not been evaluated, and the survival risk attributable to less-radical surgeries remains unclear. Thus, when considering less-radical treatments, patients should be counseled and play a role in the decision-making process. A previous study on SLN procedures in vulvar cancer showed that while physicians consider SLN to be a promising new tool, most patients would not recommend it over inguinal lymphadenectomy, even though they suffered from severe complications after previous radical treatment [11].

The aim of this prospective survey study was to determine the opinions of women who underwent surgery for CC and physicians who treat CC regarding the acceptability of increased oncological risk after less-radical procedures for the surgical treatment of CC.

## MATERIALS AND METHODS

This prospective survey study was conducted at 3 tertiary onco-gynecology centers located in 2 countries (2 in Turkey and 1 in the Czech Republic). Ethical approval was obtained for each center from local institutional ethical boards. The study group included women who underwent surgery for CC and physicians who surgically treated CC patients. Patients who received primary radiotherapy and patients with recurrence after the initial treatment were excluded. All treatment algorithms were carried out in accordance with the international guidelines however, institutional modifications were observed.

The patient questionnaire consisted of 3 major sections: 1) demographics and characteristics of the disease, including tumor stage, type of surgery, adjuvant treatment, and follow-up; 2) current quality of life of the patient and presence of any symptoms potentially related to previous surgical treatment (lymphedema, sexual dysfunction, and urinary bladder or anorectal dysfunction); and 3) assessment of the subjective acceptance of any additional oncological risk that could be attributable to less-radical surgery separately for the avoidance of parametrectomy and systematic pelvic lymphadenectomy (**Appendix 1**).

Patients were approached during a follow-up visit to outpatient clinics at the study centers and asked to participate in the study. One of the study investigators (K.K., R.K., or D.B.) completed the first part of the patient questionnaire (part 1), which included demographic and surgical information. An information brochure that include all medical definitions and surgical procedures were given to patients before filling the questionnaire. Moreover, all surgical procedures were explained to the patients by the primary investigators. The rest of the survey was completed by the patient. The study investigators did not supervise the participants while they were filling the questionnaires; however, they were present in the same room to answer patient questions. Patient anonymity was preserved in all data analyses.

Simultaneously, structured questionnaires were sent to gynecologic oncologists or specialists (gynecologists) in both countries who had at least 3 years of experience in treating patients with malignant pelvic gynecologic tumors.

The questionnaire for the physicians consisted of 2 sections: 1) personal training and experience in the treatment of CC and 2) questions identical to those of part 3 of the patient's questionnaire (**Appendix 1**).

Statistical analyses were performed using MedCalc software (ver. 16.0 for Windows; MedCalc Software, Mariakerke, Belgium) and SPSS software (ver. 23; IBM Corp., Armonk, NY, USA). The Mann-Whitney U test (for continuous parameters) and Fisher's exact test (for categorical variables) were used for statistical analyses. Unequal-variance t-tests and a one-way analysis of variance with Bonferroni post hoc tests were used. Continuous parameters (e.g., age) are presented as means and medians. The effect of individual parameters on risk acceptance was analyzed by a logistic regression for patients and physicians separately. The results are presented as odds ratios (ORs) and 95% confidence intervals (CIs). ORs in bold letters are statistically significant. Where zeros caused problems with computation of the OR, ORs, and CIs were calculated according to Deeks and Higgins [12] and Pagano et al. [13]. A p-value <0.05 was considered to indicate statistical significance.

## RESULTS

In total, 182 women (137 in Turkey and 45 in the Czech Republic) and 101 gynecologists (47 in Turkey and 54 in the Czech Republic) participated in the structured questionnaires. Patient and physician characteristics are presented in **Tables 1** and **2**. The mean age of the patients was 43 (range, 29–66) years. Most women (172/182, 94.5%) had undergone surgery >24 months ago. Nearly half (46.7%) of the patients were housewives, and their education level was below secondary school (47.8%). Moreover, 39.6% of patients received adjuvant therapy following surgical treatment. The mean age of the physicians was 45 (range, 32–60) years. Of the physicians, 59% practiced at a university or teaching hospital, and 51.5% had specialized in CC treatment for 10 (range, 5–25) years.

The questions for patients about their quality of life after surgery are presented in **Supplementary Table 1**. Of the patients, 45% (71/182) had swelling of the lower extremities or lower abdomen, and among them, 84% (58/71) reported that these symptoms negatively affected their daily life. Most patients (67.6%, 123/182) experienced voiding difficulties, including urinary incontinence or the need to use effort to void, and in 101 patients, this situation negatively affected their daily life. In all, 84 (46.2%) patients reported that they had defecation problems after surgery such as obstipation or fecal incontinence, and these problems negatively affected daily life in the majority of patients (71/84). Half of the patients experienced sexual problems after surgery.

The subjective oncological risk acceptance rates by patients and physicians are shown in **Tables 3** and **4**. More than half of patients (55.5%) would not recommend simple hysterectomy instead of a RH, even if it is associated with a higher postoperative complication rate. When the same question was posed to physicians, the majority (63.4%) would accept at least some level of risk (19.8% accepted an additional 0.1% risk, 32.7% an additional 1% risk, 8.9% an additional 5% risk, and 2.0% an additional 10% risk).

## Acceptance of less-radical surgery in CC

**Table 1.** Characteristics of patients

Characteristics	Total (n=182)	Turkey (n=137)	Czech (n=45)	p value*
Age at diagnosis	43; 40	41; 39	50; 49	<0.001
Age	48; 46	47; 45	53; 52	0.015
Parity	2; 2	2; 2	2; 2	0.016
Education level				<0.001
Primary school + illiterate	87 (47.8)	80 (58.4)	7 (15.6)	
Secondary school	64 (35.2)	35 (25.5)	29 (64.4)	
University certificate	31 (17.0)	22 (16.1)	9 (20.0)	
Social status				<0.001
Employed	49 (26.9)	29 (21.2)	20 (44.4)	
On sick leave	8 (4.4)	3 (2.2)	5 (11.1)	
Unemployed	12 (6.6)	8 (5.8)	4 (8.9)	
Retired	28 (15.4)	14 (10.2)	14 (31.1)	
Housewife	85 (46.7)	83 (60.6)	2 (4.4)	
RH/trachelectomy <sup>†</sup>				<0.001
Yes	166 (91.2)	131 (95.6)	35 (77.8)	
No	16 (8.9)	6 (4.4)	10 (22.2)	
Pelvic lymphadenectomy				<0.001
Yes	169 (92.9)	135 (98.5)	34 (75.6)	
No	13 (7.1)	2 (1.5)	11 (24.4)	
SLN ± pelvic lymphadenectomy	-	2 (1.5)	11 (24.4)	<0.001
Surgery date				<0.001
1997–2010	70 (38.5)	68 (49.6)	2 (4.4)	
2011–2016	112 (61.5)	69 (50.4)	43 (95.6)	
Years from surgery to 2016	6; 4	6; 5	3; 3	<0.001
Stage of the disease				0.012
IA	29 (15.9)	27 (19.7)	2 (4.4)	
IB1	109 (59.9)	79 (57.7)	30 (66.7)	
IB2	30 (16.5)	24 (17.5)	6 (13.3)	
IIA1	3 (1.6)	3 (2.1)	0	
IIA2	3 (1.6)	1 (0.7)	2 (4.4)	
IIB	8 (4.4)	3 (2.1)	5 (11.1)	
Adjuvant therapy				0.008
Brachytherapy + EBRT	19 (10.4)	17 (12.4)	2 (4.4)	
Concomitant RT + CT or CT	53 (29.1)	46 (33.6)	7 (15.6)	
None CT or RT	110 (60.4)	74 (54.0)	36 (80.0)	

Values are presented as mean; median or number (%).

RH, radical hysterectomy; SLN, sentinel lymph node mapping; EBRT, external beam radiation therapy; RT, radiotherapy; CT, chemotherapy.

\*In the statistical evaluation Turkey and the Czech Republic are compared. The Mann-Whitney U test (for continuous parameters) and Fisher's exact test (for categorical parameters) are applied; <sup>†</sup>One patient in Czech group underwent radical trachelectomy.

**Table 2.** Characteristics of physicians

Characteristics	Total (n=101)	Turkey (n=47)	Czech (n=54)	p value*
Age	45; 45	49; 49	41; 39	<0.001
Type of hospital				0.424
University or teaching hospital	60 (59.4)	30 (63.8)	30 (55.6)	
General hospital	41 (40.6)	17 (36.2)	24 (44.4)	
Years of experience in gynecologic oncology	10; 10	13; 12	7; 4	<0.001
Formal specialization				<0.001
Gynecology and obstetrics	49 (48.5)	9 (19.1)	40 (74.1)	
Gynecologic oncology	52 (51.5)	38 (80.9)	14 (25.9)	
Annual number of patients with invasive CC	37; 20	28; 20	45; 16	0.218
Average number of RHs per year	9; 8	14; 10	4; 10	<0.001
Average number of fertility-sparing procedures in CC performed per year	1; 0	1; 1	1; 0	0.037

Values are presented as mean; median or number (%).

CC, cervical cancer; RH, radical hysterectomy.

\*In the statistical evaluation Turkey and the Czech Republic are compared. The Mann-Whitney U test (for continuous parameters) and Fisher's exact test (for categorical parameters) are applied.

**Acceptance of less-radical surgery in CC**
**Table 3.** Subjective oncological risk acceptance of patients

Variables	Total (n=182)	Turkey (n=137)	Czech (n=45)
<b>Simple hysterectomy instead of RH*</b>			
No, never (0%)	101 (55.5)	76 (55.5)	25 (55.6)
Yes, if the maximum additional risk of treatment failure is 1 in 1,000 (0.1%)	31 (17.0)	22 (16.1)	9 (20.0)
Yes, if the maximum additional risk of treatment failure is 1 in 100 (1%)	27 (14.8)	18 (13.1)	9 (20.0)
Yes, if the maximum additional risk of treatment failure is 5 in 100 (5%)	12 (6.6)	11 (8.0)	1 (2.2)
Yes, if the maximum additional risk of treatment failure is 10 in 100 (10%)	11 (6.0)	10 (7.3)	1 (2.2)
<b>Removal of sentinel lymph nodes only instead of pelvic lymphadenectomy†</b>			
No, never (0%)	100 (54.9)	75 (54.7)	25 (55.6)
Yes, if the maximum additional risk of treatment failure is 1 in 1,000 (0.1%)	44 (24.2)	34 (24.8)	10 (22.2)
Yes, if the maximum additional risk of treatment failure is 1 in 100 (1%)	26 (14.3)	18 (13.1)	8 (17.8)
Yes, if the maximum additional risk of treatment failure is 5 in 100 (5%)	5 (2.7)	4 (2.9)	1 (2.2)
Yes, if the maximum additional risk of treatment failure is 10 in 100 (10%)	7 (3.8)	6 (4.4)	1 (2.2)
<b>Simple trachelectomy instead of radical trachelectomy‡</b>			
No, never (0%)	95 (52.2)	69 (50.4)	26 (57.8)
Yes, if the maximum additional risk of treatment failure is 1 in 1,000 (0.1%)	39 (21.4)	30 (21.9)	9 (20.0)
Yes, if the maximum additional risk of treatment failure is 1 in 100 (1%)	21 (11.5)	13 (9.5)	8 (17.8)
Yes, if the maximum additional risk of treatment failure is 5 in 100 (5%)	6 (3.3)	5 (3.6)	1 (2.2)
Yes, if the maximum additional risk of treatment failure is 10 in 100 (10%)	21 (11.5)	20 (14.6)	1 (2.2)

Values are presented as number (%).

RH, radical hysterectomy; SLN, sentinel lymph node.

The entire text of the question: \*Would you recommend to your relatives a simple hysterectomy instead of RH, if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same time, it may be associated with a higher risk of the treatment failure?; †Would you recommend to your relatives a removal of SLNs only instead of complete pelvic lymphadenectomy, if it significantly reduces the risk of postoperative complications such as swelling of lower extremities, but at the same, it may be associated with a higher risk of the treatment failure?; ‡If your relatives are diagnosed with a cervical cancer at a young age and they still plan future pregnancy, would you recommend to them a simple trachelectomy (less radical procedure aiming at partial removal of the cervix) instead of radical trachelectomy (radical procedure aiming at partial removal of the cervix together with the surrounding tissue), if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same, it may be associated with a higher risk of the treatment failure?

**Table 4.** Subjective oncological risk acceptance of physicians

Variables	Total (n=101)	Turkey (n=47)	Czech (n=54)
<b>Simple hysterectomy instead of RH*</b>			
No, never (0%)	37 (36.6)	24 (51.1)	13 (24.1)
Yes, if the maximum additional risk of treatment failure is 1 in 1,000 (0.1%)	20 (19.8)	11 (23.4)	9 (16.7)
Yes, if the maximum additional risk of treatment failure is 1 in 100 (1%)	33 (32.7)	10 (21.3)	23 (42.6)
Yes, if the maximum additional risk of treatment failure is 5 in 100 (5%)	9 (8.9)	1 (2.1)	8 (14.8)
Yes, if the maximum additional risk of treatment failure is 10 in 100 (10%)	2 (2.0)	1 (2.1)	1 (1.9)
<b>Removal of sentinel lymph nodes only instead of pelvic lymphadenectomy†</b>			
No, never (0%)	26 (25.7)	17 (36.2)	9 (16.7)
Yes, if the maximum additional risk of treatment failure is 1 in 1,000 (0.1%)	24 (23.8)	14 (29.8)	10 (18.5)
Yes, if the maximum additional risk of treatment failure is 1 in 100 (1%)	36 (35.6)	13 (27.7)	23 (42.6)
Yes, if the maximum additional risk of treatment failure is 5 in 100 (5%)	13 (12.9)	3 (6.4)	10 (18.5)
Yes, if the maximum additional risk of treatment failure is 10 in 100 (10%)	2 (2.0)	0	2 (3.7)
<b>Simple trachelectomy instead of radical trachelectomy‡</b>			
No, never (0%)	27 (26.7)	16 (34.0)	11 (20.4)
Yes, if the maximum additional risk of treatment failure is 1 in 1,000 (0.1%)	23 (22.8)	14 (29.8)	9 (16.7)
Yes, if the maximum additional risk of treatment failure is 1 in 100 (1%)	33 (32.7)	13 (27.7)	20 (37.0)
Yes, if the maximum additional risk of treatment failure is 5 in 100 (5%)	15 (14.9)	4 (8.5)	11 (20.4)
Yes, if the maximum additional risk of treatment failure is 10 in 100 (10%)	3 (3.0)	0	3 (5.6)

Values are presented as number (%).

RH, radical hysterectomy; SLN, sentinel lymph node.

The entire text of the question: \*Would you recommend to your relatives a simple hysterectomy instead of RH, if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same time, it may be associated with a higher risk of the treatment failure?; †Would you recommend to your relatives a removal of SLNs only instead of complete pelvic lymphadenectomy, if it significantly reduces the risk of postoperative complications such as swelling of lower extremities, but at the same, it may be associated with a higher risk of the treatment failure?; ‡If your relatives are diagnosed with a cervical cancer at a young age and they still plan future pregnancy, would you recommend to them a simple trachelectomy (less radical procedure aiming at partial removal of the cervix) instead of radical trachelectomy (radical procedure aiming at partial removal of the cervix together with the surrounding tissue), if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same, it may be associated with a higher risk of the treatment failure?

**Acceptance of less-radical surgery in CC**

**Table 5.** Comparison of risk acceptance between patients and physicians

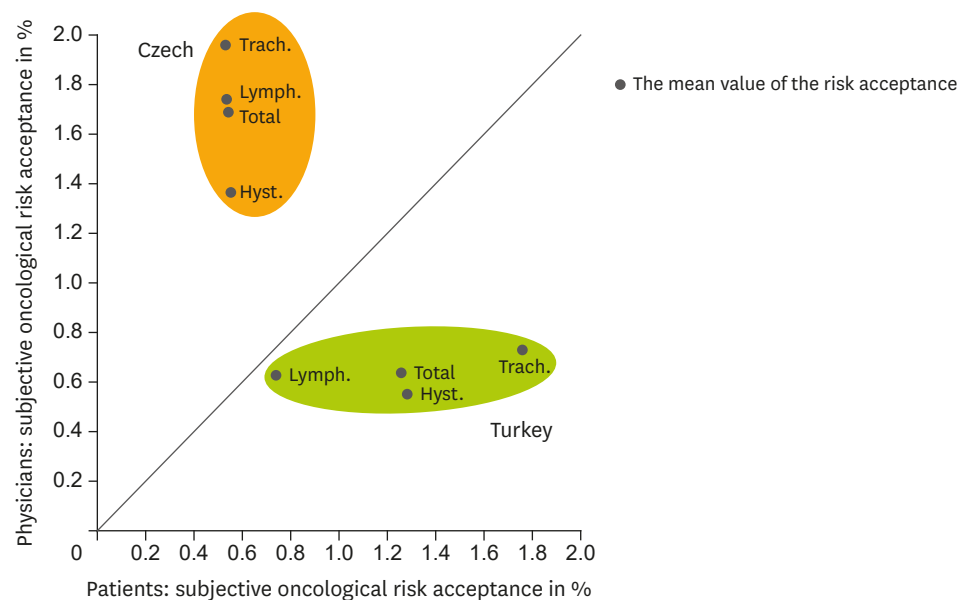
Subjective oncological risk acceptance in %	Total	Patients	Physicians	p value
<b>Turkey</b>				
Number of subject	184	137	47	
Simple hysterectomy instead of RH	1.1 (0.7–1.5)	1.3 (0.8–1.7)	0.6 (0.1–1.0)	0.033
Removal of SLNs only instead of pelvic lymphadenectomy	0.7 (0.4–1.0)	0.7 (0.4–1.1)	0.6 (0.3–1.0)	0.658
Simple trachelectomy instead of radical trachelectomy	1.5 (1.0–2.0)	1.8 (1.2–2.4)	0.7 (0.3–1.1)	0.005
Statistical evaluation: p value <sup>2</sup>	0.016 <sup>3</sup>	0.015 <sup>3</sup>	0.832	
Total	1.1 (0.9–1.3)	1.3 (1.0–1.5)	0.6 (0.4–0.9)	0.001
<b>Czech Republic</b>				
Number of subject	99	45	54	
Simple hysterectomy instead of RH	1.0 (0.6–1.4)	0.6 (0.1–1.0)	1.4 (0.8–1.9)	0.031
Removal of SLNs only instead of pelvic lymphadenectomy	1.2 (0.8–1.6)	0.5 (0.1–1.0)	1.7 (1.1–2.4)	0.004
Simple trachelectomy instead of radical trachelectomy	1.3 (0.8–1.8)	0.5 (0.0–1.0)	2.0 (1.2–2.7)	0.002
Statistical evaluation: p value <sup>2</sup>	0.592	0.998	0.434	
Total	1.2 (0.9–1.4)	0.5 (0.3–0.8)	1.7 (1.3–2.1)	<0.001

Values are presented as mean (95% CI).

CI, confidence interval; RH, radical hysterectomy; SLN, sentinel lymph node.

Concerning the method of lymph node surgical staging, 45% of patients and 74% of physicians would recommend the less-radical procedure (SLN biopsy only). Asking about fertility-sparing surgery (radical trachelectomy instead of simple trachelectomy), 52.2% of patients would accept no additional risk, but 74.3% of physicians would accept some additional risk to reduce treatment complications.

**Table 5** shows a comparison of risk acceptance between patients and physicians for both countries. Apart from the lymphadenectomy technique (SLN versus systematic pelvic lymphadenectomy), there was a significant difference between the patient and physician choices in both countries. Physicians tended to accept the higher oncological risk associated with less-radical surgical operations in the Czech Republic (**Fig. 1**).



**Fig. 1.** Visual comparison of the patients' and physicians' risk acceptance. The mean values of the subjective oncological risk acceptance are visualized. Hyst.=simple hysterectomy instead of RH; Lymph.=removal of SLNs only instead of pelvic lymphadenectomy; Trach.=simple trachelectomy instead of radical trachelectomy; Total=these three questions together. RH, radical hysterectomy; SLN, sentinel lymph node.

Patients with a higher education level (OR=1.7; 95% CI=1.7–4.6), International Federation of Gynecology and Obstetrics (FIGO) stage IB2 (OR=1.6; 95% CI=1.05–2.6), FIGO stage IIA–B (OR=2.2; 95% CI=1.1–4.4), patients who received adjuvant therapy (OR=2.1; 95% CI=1.5–3.0), and patients who had experienced symptoms such as swelling of the lower extremities (OR=1.5; 95% CI=1.1–2.1), voiding difficulties (OR=2.6; 95% CI=1.8–3.9), and sexual problems (OR=2.2; 95% CI=1.6–3.2) associated with previous treatment were significantly more likely to accept an increased oncological risk (**Tables 6 and 7**). Physician's risk acceptance increased with increasing age (OR=0.95; 95% CI=0.92–0.98).

**Table 6.** Factors influencing risk acceptance of patients

Predictor	Reference category	Tested category	Total (Y/N: 250/296)	Turkey (Y/N: 191/220)	Czech (Y/N: 59/76)
<b>Oncological risk acceptance</b>					
Age at diagnosis	—		0.985 (0.970–1.000)	0.989 (0.967–1.010)	0.979 (0.955–1.005)
Age	—		0.968 (0.953–0.983)	0.960 (0.941–0.980)	0.979 (0.954–1.004)
Parity	—		0.713 (0.612–0.829)	0.789 (0.675–0.923)	0.308 (0.189–0.500)
Education level	Primary school + illiterate	Secondary school University certificate	1.156 (0.792–1.686) 2.832 (1.728–4.642)	0.892 (0.560–1.420) 2.404 (1.364–4.237)	38.376 (2.254–653.546)* 83.737 (4.557–1 538.676)*
Social status	Employed	Housewife	0.808 (0.537–1.215)	0.565 (0.345–0.926)	1.857 (0.344–10.024)
		Other	1.100 (0.695–1.742)	0.755 (0.406–1.404)	1.912 (0.940–3.889)
RH	No	Yes	1.126 (0.629–2.014)	1.089 (0.421–2.818)	1.071 (0.485–2.369)
Pelvic lymphadenectomy	No	Yes	0.503 (0.258–0.981)	0.065 (0.004–1.156)*	0.560 (0.254–1.236)
Surgery date	2011–2016	1997–2010	0.683 (0.481–0.968)	0.581 (0.393–0.859)	1.304 (0.253–6.705)
Years from surgery to 2016	—		0.911 (0.870–0.954)	0.889 (0.844–0.936)	0.961 (0.718–1.285)
Stage of the disease	IB1	IA	1.141 (0.709–1.837)	1.023 (0.616–1.700)	1.812 (0.345–9.509)
		IB2	1.678 (1.050–2.684)	1.599 (0.940–2.718)	1.812 (0.654–5.025)
		II+	2.282 (1.179–4.418)	1.407 (0.575–3.439)	4.531 (1.601–12.826)
Adjuvant therapy	No	Yes	2.149 (1.517–3.044)	2.381 (1.601–3.542)	1.508 (0.647–3.514)
<b>Quality of life after surgery†</b>					
Swelling of lower extremities	No	Yes	1.555 (1.106–2.185)	1.545 (1.044–2.286)	1.586 (0.798–3.153)
Voiding difficulties	No	Yes	2.680 (1.830–3.923)	3.355 (2.154–5.228)	1.354 (0.633–2.894)
Defecation difficulties	No	Yes	1.217 (0.868–1.706)	1.064 (0.718–1.576)	2.050 (1.004–4.187)
Sexual problems	No	Yes	2.292 (1.617–3.248)	2.765 (1.830–4.180)	1.303 (0.641–2.648)

Statistical evaluation was done with logistic regression and values are presented as OR (95% CI). The answers on subjective oncological risk acceptance were recoded as yes or no.

Y/N, Yes/No; —, used when the predictor is continuous, without reference and tested category; RH, radical hysterectomy; OR, odds ratio; CI, confidence interval.

\*OR and CI were calculated, due to zero value in the table, according to Pagano et al. [13] and Deeks & Higgins [12]; †New appearance of symptoms after the surgery.

**Table 7.** Factors influencing risk acceptance of physicians

Predictor	Reference category	Tested category	Total (Y/N: 213/90)	Turkey (Y/N: 84/57)	Czech (Y/N: 129/33)
<b>Oncological risk acceptance</b>					
Age	—		0.957 (0.929–0.985)	0.901 (0.845–0.959)	1.009 (0.967–1.053)
Type of hospital	University or teaching hospital	General hospital	1.106 (0.668–1.831)	3.250 (1.508–7.003)	0.266 (0.117–0.607)
Years of experience in gynecologic oncology	—		0.993 (0.963–1.023)	0.919 (0.862–0.979)	1.121 (1.037–1.212)
Formal specialization	Gynecology and obstetrics	Gynecologic oncology	0.845 (0.515–1.385)	0.559 (0.226–1.381)	32.543 (1.947–544.011)*
Annual number of patients with invasive CC	—		1.016 (1.006–1.025)	1.007 (0.987–1.028)	1.022 (1.006–1.038)
Average number of RHs per year	—		0.989 (0.963–1.016)	0.992 (0.956–1.029)	p<0.001†
Average number of fertility-sparing procedures in CC perform per year	—		1.116 (0.985–1.264)	1.014 (0.826–1.245)	p=0.003†

Statistical evaluation was done with logistic regression and values are presented as OR (95% CI). The answers on subjective oncological risk acceptance were recoded as yes or no.

Y/N, Yes/No; —, used when the predictor is continuous, without reference and tested category; CC, cervical cancer; RH, radical hysterectomy; OR, odds ratio; CI, confidence interval.

\*OR and CI were calculated, due to zero value in the table, according to Pagano et al. [13] and Deeks & Higgins [12]; †Statistical evaluation performed with Mann-Whitney U test instead of logistic regression, due to high count of zero values.

## DISCUSSION

In our study, the majority of patients, even if they had suffered from morbidity caused by previous cancer treatment, such as swelling of the lower extremities, voiding dysfunction, anorectal dysfunctions, or sexual problems related to previous treatment of CC, did not want to trade between oncological safety and a better quality of life. Physicians were willing to accept a significantly higher oncological risk than patients in the Czech Republic but not in Turkey.

We are aware of several limitations of the study. Both patients and physicians in our trial group consisted of 2 different ethnic and cultural groups. The divergence of opinions between physicians may be the result of differences in physician subspecialty ratios in study countries. These differences can affect treatment choices and opinions about new surgical operations. Another limitation of this study is that the long follow-up period introduces the possibility of adaptation since women have had many years to adjust to the complications of previous treatments. It is also questionable that patients had a sound understanding of the surgical procedures. The retrospective nature of the survey in cancer patients can cause cognitive dissonance, where women are more likely to choose the treatment they have previously undergone to avoid psychological conflict.

Treatment strategies for CC have changed over time since traditional radical surgical procedures, such as RH, radical trachelectomy, and complete PLND, are associated with severe post-operative complications that can negatively affect the patient's quality of life. The rationale for less-than-standard radicality of the surgical treatment is mostly based on retrospective data and prospective trials powered to address survival are not available in all 3 fields. When the evidence is not available, proper counseling of patients and their role in the decision-making process is of increased importance. A large prospective trial is currently evaluating the role of more conservative procedures in patients with early-stage cervical carcinoma. In this multicenter study (Gynecologic Oncology Group [GOG]-0278) led by Alan Covens, is designed to evaluate the physical function and quality of life before and after non-radical surgical therapy (extrafascial hysterectomy or cone biopsy with pelvic lymphadenectomy) for stage IA1 (lymphatic vessel invasion positive [LVSI+]) and IA2–IB1 ( $\leq 2$  cm) CC [14].

Patient acceptance of less-radical procedures and potentially increased oncological risk was assessed previously in vulvar cancer. de Hullu et al. [11] evaluated women's opinions on acceptable false-negative rates for the SLN procedure in vulvar malignancies. Women who had undergone a vulvectomy with a complete inguinofemoral lymphadenectomy were asked what they would recommend to a friend or relative with vulvar malignancies: a less-radical technique (SLN) or the standard approach (inguinofemoral lymphadenectomy). Interestingly, most women would not recommend SLN, although they had themselves experienced severe complications and side effects of the radical management they had undergone. In another study by Oonk et al. [15], 2 groups of women in the GROningen International Study on Sentinel nodes in Vulvar cancer (GROINSS-V) were compared in terms of acceptance of SLN instead of a complete inguinofemoral lymphadenectomy. Remarkably, women who underwent inguinofemoral lymphadenectomy were more hesitant to accept a higher false-negative rate of a less-radical procedure. In a recent study by Farrell et al. [16], 60 women with vulvar cancer who underwent complete inguinofemoral lymphadenectomy completed questionnaires that included preferences for SLN or complete lymphadenectomy. Although women who underwent complete lymphadenectomy reported a reduced quality of life, most of them were not willing to sacrifice survival by choosing SLN.



Discrepancies between physicians and patients in the appreciation of management strategies is a well-known phenomenon. General practitioners showed that 87% of medically fit people but only 10% of physicians were of the opinion that it is better to perform a diagnostic procedure in 1,000 individuals than to miss disease in one patient [17]. In the study of de Hullu et al. [11], because of the high morbidity risk of complete lymphadenectomy, most physicians were willing to accept a 5%–20% false-negative rate of a less-radical procedure in vulvar malignancies. In contrast, most patients would not recommend this approach. In our study, although patients would choose radical procedures over less-radical techniques, physicians tend to consider less-radical surgery in women within the CC population in the Czech Republic, but not in Turkey. It can be hypothesized that multiple reasons are behind the differing opinions of physicians in the 2 geographical regions, such as socio-economic conditions in patients, and training in physicians. Interestingly, risk acceptance was not significantly modified by the type of the procedure (hysterectomy, trachelectomy, or lymphadenectomy).

It is not surprising that in our trial, women with a higher education level, more advanced stage of disease, those who had received adjuvant therapy, and those who experienced complications associated with primary surgical treatment were significantly more likely to accept an increased oncological risk. Interestingly, physicians' risk acceptance was not affected by the average number of patients with CC or the average number of surgical procedures, but instead increased with age.

In conclusion, patients, even if they suffer from morbidity related to previous CC treatment, do not want to trade between oncological safety and better quality of life. Physicians are willing to accept a higher oncological risk associated with less-radical surgical procedures, but their attitudes differ regionally. This tendency should be taken into consideration when counselling the patients especially before new procedures, in which the evidence is based on retrospective data, and the safety has not been fully established for groups of patients who carry various prognostic risk factors.

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## SUPPLEMENTARY MATERIAL

### Supplementary Table 1

Questions for patients: Quality of life after surgery

[Click here to view](#)

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Appendix 1. Patient and physician questionnaire forms

## Patients' Questionnaire

**Part A: Patient characteristics (To be filled in by the physician)**

Age:                      Parity:

**Education Level:** Primary School // Secondary School // University Certificate

**Social Status:** Employed // On sick leave // Unemployed // Retired // Housewife

**Surgery Type:** Radical Hysterectomy / Radical trachelectomy / Pelvic lymphadenectomy / other:

**Surgery Date** (month / year)

**Stage of the disease:** IA / IB1 / IB2 / IIA / IIB

**Adjuvant therapy:** Brachytherapy / External Beam Radiation / Concomitant chemotherapy / Chemotherapy / Hormonal treatment / other:

**Part B: Quality of life after surgery (should be completed by the patient)**

1) Swelling of lower extremities (new appearance after the surgery)

1a) Do you have newly appeared swelling of lower extremities or lower abdomen after the surgery?

- A. Yes, all the time
- B. Yes, almost always
- C. Yes, occasionally
- D. No, never

1b) If yes, how severe is the swelling?

- A. mild
- B. moderate
- C. severe

1c) If yes, does it affect your daily life?

- A. Yes, very much
- B. Yes, moderately
- C. Yes, a little
- D. No

2) Voiding difficulties (new appearance after the surgery)

2a) Do you have newly manifested voiding difficulties after the surgery, such as loss of urinary bladder sensation, urinary incontinence, need to use an effort to void, inability to void spontaneously?

- A. Yes, all the time
- B. Yes, almost always
- C. Yes, occasionally
- D. No, never

2b) If yes, how severe are your problems with voiding?

- A. mild
- B. moderate
- C. severe

2c) If yes, does it affect your daily life?

- A. Yes, very much
- B. Yes, moderately
- C. Yes, a little
- D. No

3) Defecation difficulties (new appearance after the surgery)

3a) Do you have newly manifested defecation difficulties after the surgery such as obstipation, flatulence, incontinence or fecal incontinence?

- A. Yes, all the time
- B. Yes, almost always
- C. Yes, occasionally
- D. No, never

3b) If yes, how severe are your problems with bowel habits?

- A. mild
- B. moderate
- C. severe

3c) If yes, does it affect your daily life?

- A. Yes, very much
- B. Yes, moderately
- C. Yes, a little
- D. No

4) Sexual problems (new appearance after the surgery)

4a) Do you have newly appeared sexual problems after the surgery, such as loss of sexual appetite, pain during sexual intercourse, inability to reach orgasm, loss of vaginal lubrication?

- A. Yes, all the time
- B. Yes, almost always
- C. Yes, occasionally
- D. No, never

4b) If yes, how severe are your problems with your sexual health?

- A. mild
- B. moderate
- C. severe

4c) If yes, does it affect your daily life?

- A. Yes, very much
- B. Yes, moderately
- C. Yes, a little
- D. No

**Part C: Subjective oncological risk acceptance**

1) Simple hysterectomy instead of radical hysterectomy

Would you recommend to your relatives a simple hysterectomy instead of radical hysterectomy, if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same time it may be associated with a higher risk of the treatment failure?

- A-No, never
- B-Yes, if the maximum additional risk of treatment failure is 1 in 1000 (0.1 %)
- C-Yes, if the maximum additional risk of treatment failure is 1 in 100 (1 %)
- D-Yes, if the maximum additional risk of treatment failure is 5 in 100 (5 %)
- E-Yes, if the maximum additional risk of treatment failure at 10 in 100 (10 %)

2) Removal of sentinel lymph nodes only instead of pelvic lymphadenectomy

Would you recommend to your relatives a removal of sentinel lymph nodes only instead of complete pelvic lymphadenectomy, if it significantly reduces the risk of postoperative complications such as swelling of lower extremities, but at the same it may be associated with a higher risk of the treatment failure?

- A-No, never
- B-Yes, if the maximum additional risk of treatment failure is 1 in 1000 (0.1 %)
- C-Yes, if the maximum additional risk of treatment failure is 100 (1 %)
- D-Yes, if the maximum additional risk of treatment failure is 5 in 100 (5 %)
- E-Yes, if the maximum additional risk of treatment failure is 10 in 100 (10 %)

3) Simple trachelectomy instead of radical trachelectomy

If your relatives are diagnosed with a cervical cancer at a young age and they still plan future pregnancy, would you recommend to them a simple trachelectomy (less radical procedure aiming at partial removal of the cervix) instead of radical trachelectomy (radical procedure aiming at partial removal of the cervix together with the surrounding tissue), if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same it may be associated with a higher risk of the treatment failure?

- A-No, never
- B-Yes, if the maximum additional risk of treatment failure is 1 in 1000 (0.1 %)
- C-Yes, if the maximum additional risk of treatment failure is 1 in 100 (1 %)
- D-Yes, if the maximum additional risk of treatment failure is 5 in 100 (5 %)
- E-Yes, if the maximum additional risk of treatment failure is 10 in 100 (10 %)

## Physicians' Questionnaire

### Part A: Demographics

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Age:

*Type of Hospital:* University Hospital // General Hospital // Teaching Hospital // Private Hospital

*Years of experience in gynecologic oncology:*

*Formal specialization:* Gynecology and obstetrics / Gynecologic oncology

*Annual number of patients with invasive cervical cancer at the department:*

*Average number of radical hysterectomies which I perform per year:*

*Average number of fertility-sparing procedures in cervical cancer patients which I perform per year:*

### Part B (Patients Questionnaire Part C): Subjective oncological risk acceptance

1) Simple hysterectomy instead of radical hysterectomy

Would you recommend to your relatives a simple hysterectomy instead of radical hysterectomy, if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same it may be associated with a higher risk of the treatment failure?

- A-No, never
- B-Yes, if the maximum additional risk of treatment failure is 1 in 1000 (0.1 %)
- C-Yes, if the maximum additional risk of treatment failure is 1 in 100 (1 %)
- D-Yes, if the maximum additional risk of treatment failure is 5 in 100 (5 %)
- E-Yes, if the maximum additional risk of treatment failure is 10 in 100 (10 %)

2) Removal of sentinel lymph nodes only instead of pelvic lymphadenectomy

Would you recommend to your relatives a removal of sentinel lymph nodes only instead of complete pelvic lymphadenectomy, if it significantly reduces the risk of postoperative complications such as swelling of lower extremities, but at the same it may be associated with a higher risk of the treatment failure?

- A-No, never
- B-Yes, if the maximum additional risk of treatment failure is 1 in 1000 (0.1 %)

- C-Yes, if the maximum additional risk of treatment failure is 1 in 100 (1 %)
- D-Yes, if the maximum additional risk of treatment failure is 5 in 100 (5 %)
- E-Yes, if the maximum additional risk of treatment failure is 10 in 100 (10 %)

3) Simple trachelectomy instead of radical trachelectomy

If your relatives are diagnosed with a cervical cancer at a young age and they still plan future pregnancy, would you recommend to them a simple trachelectomy instead of radical trachelectomy, if it significantly reduces the risk of postoperative complications such as voiding difficulties, defecation difficulties, and sexual problems, but at the same it may be associated with a higher risk of the treatment failure?

- A-No, never
- B-Yes, if the maximum additional risk of treatment failure is 1 in 1000 (0.1 %)
- C-Yes, if the maximum additional risk of treatment failure is 1 in 100 (1 %)
- D-Yes, if the maximum additional risk of treatment failure is 5 in 100 (5 %)
- E-Yes, if the maximum additional risk of treatment failure is 10 in 100 (10 %)