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Radical hysterectomy in early cervical cancer in Europe: characteristics, outcomes and evaluation of ESGO quality indicators

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HIGHLIGHTS

- In this European cohort, including 1156 cases from 126 institutions belonging to 29 European countries, the 5-year disease-free survival rate was 88.3%, and the overall survival rate at 5 years was 94.9%.
- Up to 44% of the patients received some type of adjuvant therapy treatment after radical hysterectomy (33.7% received either standard external radiation or concurrent chemoradiotherapy).
- In 2013 and 2014, 5 years before the publication of the ESGO quality indicators for surgical treatment of cervical cancer, 91% of them were accomplished in this cohort.

ABSTRACT

Introduction Comprehensive updated information on cervical cancer surgical treatment in Europe is scarce.

Objective To evaluate baseline characteristics of women with early cervical cancer and to analyze the outcomes of the ESGO quality indicators after radical hysterectomy in the SUCCOR database.

Methods The SUCCOR database consisted of 1272 patients who underwent radical hysterectomy for stage IB1 cervical cancer (FIGO 2009) between January 2013 and December 2014. After exclusion criteria, the final sample included 1156 patients. This study first described the clinical, surgical, pathological, and follow-up variables of this population and then analyzed the outcomes (disease-free survival and overall survival) after radical hysterectomy. Surgical-related ESGO quality indicators were assessed and the accomplishment of the stated recommendations was verified.

Results The mean age of the patients was 47.1 years (SD 10.8), with a mean body mass index of 25.4 kg/m^2 (SD 4.9). A total of 423 (36.6%) patients had a previous cone biopsy. Tumor size (clinical examination) <2 cm was observed in 667 (57.7%) patients. The most frequent histology type was squamous carcinoma (794 (68.7%) patients), and positive lymph nodes were found in 143 (12.4%) patients. A total of 633 (54.8%) patients were operated by open abdominal surgery. Intra-operative complications occurred in 108 (9.3%) patients, and post-operative complications during the first month occurred in 249 (21.5%) patients, with bladder dysfunction as the most frequent event (119 (10.3%) patients). Clavien-Dindo grade III or higher complication occurred in 56 (4.8%) patients. A total of 510 (44.1%) patients received adjuvant therapy. After a median follow-up of 58 months (range 0–84), the 5-year disease-free survival was 88.3%, and the overall survival was 94.9%. In our population, 10 of the 11 surgical-related quality indicators currently recommended by ESGO were fully fulfilled 5 years before its implementation.

Conclusions In this European cohort, the rate of adjuvant therapy after radical hysterectomy is higher than for most similar patients reported in the literature. The majority of centers were already following the European recommendations even 5 years prior to the ESGO quality indicator implementations.

INTRODUCTION

In 2018, approximately 570 000 cases and 311 000 deaths from cervical cancer occurred worldwide. In the same year in Europe, 66 000 new patients with cervical cancer were diagnosed, and 26 000 patients died.[1] To date, we have no data about the annual rate of radical hysterectomies performed in Europe. Historically, radical hysterectomy has been the primary treatment for early cervical cancer. The technical achievements in this procedure have been growing along with the development of new surgical improvements. For years, this operation was carried

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out by open or vaginal approaches,[2 3] and more recently, since 1992,[4] by minimally invasive surgery, either by laparoscopy or robotic surgery. In 2018, a prospective randomized trial conducted by Ramirez et al (LACC trial),[5] revealed higher rates of recurrence and deaths in patients who underwent minimally invasive surgery. Moreover, several recent retrospective studies[6–13] and a meta-analysis[14] confirmed these findings.

The SUCCOR study was a multicenter, retrospective cohort study aiming to determine the difference between the two surgical approaches in Europe for disease-free survival of patients undergoing radical hysterectomy. Our primary analyses showed that minimally invasive surgery in patients with IB1 cervical cancer was associated with a higher risk of relapse and death. Nevertheless, we also found as secondary objectives that avoiding the uterine manipulator and implementing protective maneuvers were associated with higher rates of disease-free survival and overall survival in patients who underwent minimally invasive surgery, leading to similar results as for those in patients who underwent open surgery.[15]

The European Society of Gynaecological Oncology (ESGO) aims to improve clinical practice in the treatment of patients with gynaecologic malignancies. In 2020, the ESGO quality indicators for surgical treatment of cervical cancer were published.[16] The main objective of this study was to describe the characteristics of women with early cervical cancer and to analyze the outcomes after radical hysterectomy in the SUCCOR database. Second, we evaluated the accomplishment of the surgical-related ESGO quality indicators 5 years before its implementation.

METHODS

Accrual and Data Source

All ESGO members were invited to participate in the SUCCOR database. Researchers from 126 institutions in 29 European countries were registered and contributed to the project. After obtaining ethical consent from our central institutional review board, we required a Certificate of Approval or a Letter of Exemption by the investigators' local ethics committees.

Inclusion and Exclusion Criteria

Patients were eligible if they had undergone radical hysterectomy for stage IB1 cervical cancer (FIGO 2009) in a European institution between January 1, 2013, and December 31, 2014. From May 15 to November 15, 2019, a total of 1272 patients were evaluated; however, 116 patients did not meet the inclusion criteria. The inclusion criteria were as follows: (1) age ≥18 years and (2) histologic type: squamous cell carcinoma, adenocarcinoma, or adenosquamous carcinoma. Pelvic MRI confirming a tumor diameter ≤4 cm with no parametrial invasion and a pre-operative CT scan, MRI, or positron emission tomography (PET) CT demonstrating no extracervical metastatic disease were mandatory. The operative report had to describe type B–C radical hysterectomy with bilateral pelvic lymphadenectomy by either minimally invasive surgery (laparoscopic or robotic) or open surgery, including at least 10 pelvic nodes. Women who underwent only sentinel lymph node mapping were included in the study, but data regarding tumor size, margins, and nodal status were required. Patients with any other histological type of cancer were excluded. Other exclusion criteria were as follows: (1) tumor size >4 cm, (2) final tumor stage IA, (3) history of any invasive tumor other than cervical cancer, (4) previous chemotherapy or radiation, and (5) conversion from minimally invasive surgery to open laparotomy (as it was stated in the SUCCOR database). It is important to note that unlike the SUCCOR study, patients who underwent cone biopsy for a suspected FIGO 2009 stage IB1 tumor were included (Online Supplemental Material 1).

Outcomes

Disease-free survival was defined as the time, in months, between the date of radical hysterectomy and the date of relapse or the date of last contact, whichever came first. Overall survival was calculated, in months, as the difference between the radical hysterectomy date and the date of death from cervical cancer or last contact, whichever came first.

Process and outcomes quality indicators (11 items in total) were calculated in our cohort and compared with the recommendations stated by the ESGO. All the required elements in surgical reports and in pathology reports recommended by the ESGO were previously included in our database.

Statistical Analysis

Quantitative variables are described with a mean (SD). Quantitative variables were compared using the Student t-test. Categorical variables are defined with frequencies or percentages. We described disease-free survival and overall survival using the Kaplan-Meier method. The analyses were performed with SPSS v26.0.

RESULTS

Baseline Characteristics

The final cohort was composed of 1156 patients. The mean age was 47.1 years (range 18–82) and the mean body mass index (BMI) was 25.44 kg/m^2 (range 15–68), and 1022 (88.3%) patients were considered to have an optimal performance status (ECOG PS 0). A total of 423 (36.6%) patients had undergone a cone biopsy before radical hysterectomy. The mean pre-operative maximum tumor diameter measured by MRI was 19.6 mm (SD 12.6) (Table 1).

Surgical Procedure and Pathologic Findings

A senior surgeon with more than 10 years of experience was the first surgeon in 881 (76.2%) procedures. A total of 633 (55%) radical hysterectomies were performed by laparotomy, and 523 (45%) by minimally invasive surgery. Among patients who underwent minimally invasive surgery, 377 (72%) had a laparoscopic approach, 139 (27%) had robotic surgery, and only 7 (1.3%) underwent a vaginal-assisted laparoscopy. The surgical procedure was described as type III or type C radical hysterectomy in 789 (68.2%) cases. The nerve-sparing technique was performed in 558 (48.3%) cases. Sentinel lymph node biopsy was performed in 224 (19.4%) patients with a bilateral detection rate of 81.2%.

The median duration of surgery was 210 min (range 80–720). The average length of stay in hospital was 6.7 days (SD 4.2). The mean length of stay in hospital for the minimally invasive surgery group was lower than in the open surgery group (4.8 vs 8.4 days, p<0.001) (Table 1).

The most common histologic tumor type was squamous carcinoma (794 (68.7%)). Lymphovascular space invasion was present

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Table 1 Baseline characteristics and complications

Baseline characteristics	n=1156
Age, years (SD)	47.1 (10.8)
Race (%)	
Caucasian	962 (83.2)
Asian	35 (3.0)
Latin-American	18 (1.6)
African	6 (0.5)
Other	69 (6.0)
Not reported	66 (5.7)
Body mass index kg/m^2 (SD)	25.44 (4.9)
Performance status ECOG (%)	
PS 0	1022 (88.4)
PS 1	78 (6.7)
Not reported	56 (4.8)
Tumor clinical size, mm (SD)	19.58 (11.4)
<20 mm (%)	667 (57.7)
>20 mm (%)	473 (40.9)
Not reported (%)	16 (1.4)
Previous cone biopsy (%)	
No	733 (63.4)
Yes	423 (36.6)
Pre-operative max diameter MRI mm (SD)	19.58 (12.6)
Pre-operative max diameter US,mm (SD)	17.66 (13.3)
Surgical procedure	**n=1156**
Surgical approach (%)	
Open	633 (54.8)
Laparoscopic	377 (32.6)
Robotic	139 (12.0)
Vaginal-assisted laparoscopic	7 (0.6)
Type of radical hysterectomy (%)	
Type II	330 (28.5)
Type III	789 (68.3)
Type II on one side and III on the other	37 (3.2)
Uterine manipulator (%)	
No	754 (65.2)
Yes	252 (21.8)
Not reported	150 (13.0)
Vaginal protective maneuver (%)	
No	713 (61.7)
Yes	443 (38.3)
Nerve-sparing technique (%)	
No	345 (29.8)
Yes	558 (48.3)
Not reported	253 (21.9)
Nodal assessment (%)	
Bilateral pelvic lymphadenectomy	910 (78.7)
Pelvic and para-aortic lymphadenectomy	22 (2.3)
SLNB and bilateral pelvic lymphadenectomy	224 (19.4)
Sentinel lymph node biopsy (%)	
No	872 (75.4)
Yes	224 (19.4)
Not reported	60 (5.2)
SLNB tracer (%)	
Blue dye and technetium	95 (42.4)
Blue dye alone	61 (27.2)
Technetium alone	24 (10.7)
Indocyanine green	14 (6.3)
Technetium and indocyanine green	5 (2.2)
Not reported	25 (11.2)
SLNB Identification (%)	
Bilateral	182 (81.3)
Unilateral	22 (9.8)
None	20 (8.9)
Duration of procedure, min (SD)	217.4 (75.0)
Estimated blood loss, cc (SD)	317.5 (170.6)
Length of stay, days (SD)	6.7 (4.2)
Complications	
Intra-operative complications (%)	
No	1012 (87.5)
Yes	108 (9.3)
Not reported	36 (3.1)
Type of complication (%)	
Bleeding	83 (7.2)
Ureteral injury	32 (2.8)
Bladder injury	47 (4.1)
Bowel injury	22 (1.9)
Vascular injury	35 (3.0)
Nerve injury	22 (1.9)
Other	18 (1.6)
Post-operative complications, 30-day (%)	
No	875 (75.7)
Yes	249 (21.5)
Not reported	32 (2.8)

PS, performance status; SLNB, sentinel lymph node biopsy; US, ultrasound.

in 437 (37.8%) tumors. Parametrial invasion was observed only in 33 (2.9%) patients. A total of 143 (12.4%) patients had nodal metastasis. All pathology analysis is shown in Table 2. Patients were reclassified following the new 2018 FIGO staging. A total of 163 (14.1%) cases were upstaged, based on pathology report.

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Table 2 Final pathology results

Histologic subtype (%)	
Squamous	794 (68.7)
Adenocarcinoma	323 (27.9)
Adenosquamous	39 (3.4)
Tumor measurements, mm (SD)	
Lateral extension	18.75 (11.7)
Anterior-posterior extension	14.86 (10.5)
Depth of invasion	9.67 (7.8)
Uninvolved stroma	7.65 (5.8)
Tumor maximum diameter by pathology (%)	
<2 cm	656 (56.7)
≥2 cm	500 (43.3)
Grade (%)	
Well differentiated	192 (16.6)
Moderately differentiated	519 (44.9)
Poorly differentiated	336 (29.1)
Not reported	109 (9.4)
Lymphovascular space invasion (%)	
No	588 (50.9)
Yes	437 (37.8)
Not reported	131 (11.3)
Depth of Invasion (%)	
Superficial (invades <1/3 of the stroma)	269 (23.3)
Intermediate (invades between 1/3 and 2/3 of the stroma)	307 (26.6)
Deep (invades >2/3 of the stroma)	278 (24.0)
Not reported	302 (26.1)
Parametrial invasion (%)	
No	1090 (94.3)
Yes	33 (2.9)
Not reported	33 (2.9)
Vaginal infiltration in the specimen (%)	
No	1085 (93.9)
Yes	30 (2.6)
Not reported	41 (3.5)
Margin status (%)	
Free margins	1070 (92.6)
Free but close margins (<2 mm)	63 (5.4)
Positive margins (invasive disease)	16 (1.4)
Positive margins (pre-invasive disease)	7 (0.6)
Number of lymph nodes (SD)	23.51 (12.4)
Nodal status (%)	
Negative	1013 (87.6)
Positive	143 (12.4)
FIGO 2018 stage (%)	
IB1	510 (44.1)
IB2	480 (41.5)
IIA1	9 (0.8)
IIB	14 (1.2)
IIIC1	140 (12.1)
IIIC2	3 (0.3)

Complications and Long-Term Sequelae

One hundred and eight (9.3%) patients experienced at least one intra-operative complication. Intra-operative bleeding (7.2%), bladder injury (4.1%), and vascular injury (3.0%) were the most common complications. Two hundred and forty-nine (21.5%) patients had at least one post-operative complication during the first month after surgery. Bladder dysfunction (10.3%), urinary infection (6.1%), and fever (6.7%) were the most common complications. Clavien-Dindo grade III or higher complications occurred in 56 (4.8%) patients. At last contact, 97 (8.4%) patients complained of chronic sequelae, with leg lymphedema and bladder dysfunction being the most common (37.4% and 16.2%, respectively) (Table 1).

Adjuvant Therapy

Five hundred and ten (44.1%) patients received adjuvant therapy (Table 3). A total of 390 (33.7%) patients received either standard external radiation or concurrent chemoradiotherapy. Standard external radiation and brachytherapy were the most frequently used modalities of adjuvant treatment (215 (18.6%) and 251 patients (21.7%), respectively), while concomitant chemoradiation was used in 174 (15.1%) of cases. A total of 366 of these 510 patients (71.8%) had positive pelvic lymph nodes, parametrial extension, positive surgical margins, and/or were considered patients at intermediate risk by Sedlis criteria.[17] In the remaining 144 (28.2%) patients the indications for adjuvant treatment were

Table 3 Adjuvant therapy

Adjuvant therapy (%)	
No	634 (54.8)
Yes	510 (44.1)
Not reported	12 (1.0)
Median time to adjuvant therapy, days	48
Reasons for adjuvant therapy (%)	
Tumor size	193 (37.8)
Grade	187 (36.7)
LVSI	203 (39.8)
Depth of invasion	219 (42.9)
Parametrial invasion	34 (6.7)
Vaginal infiltration	21 (4.1)
Positive margins	57 (11.2)
Positive nodes	127 (24.9)

LVSI, lymphovascular space invasion.

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Table 4 Follow up

Recurrence (%)	
No	990 (85.6)
Yes	126 (10.9)
Not reported	40 (3.5)
Time to relapse, months (SD)	
Mean	22.94 (17.32)
Median	19
Type of recurrence (%)	
Local (vagina, parametrial area, and pelvic retroperitoneum)	69 (54.8)
Distant metastases (any other location)	34 (27.0)
Both local and distant	16 (12.7)
Not reported	7 (5.6)
Time of follow-up, months (SD)	
Mean	53.35
Median	58
Status at last follow-up (%)	
Alive with disease	37 (3.2)
Alive without disease	1019 (88.1)
Death with disease	53 (4.6)
Death without disease	12 (1.0)
Lost to follow-up	35 (3.0)
Disease-free survival at 5 years (%)	88.3
Overall survival at 5 years (%)	94.9
Overall survival at 3 years after relapse (%)	51.7
Overall survival at 5 years after relapse (%)	40.7
Median survival after relapse, months	33.8
Median follow-up after relapse, months	19.6

depth of invasion (41.7%), lymphovascular space invasion (20.8%), histological grade (56.3%), and tumor size (52.1%).

Oncologic Outcomes

After a median follow-up of 58 months (range 0–84), 1019 (88.1%) patients remained free of disease, 37 (3.2%) were alive with disease, and 5.6% (n=65) had died. The 5-year disease-free survival rate was 88.3%, and the cervical cancer overall survival rate at 5 years was 94.9%. The 5-year disease-free survival and overall survival rate in the open surgery group were respectively 92.2% and 95.2%, respectively, and 86.2% and 92.1% in the minimally invasive surgery group. A total of 126 (10.9%) of the 1156 patients in the study relapsed. The median time to relapse was 19 months (range 2–72). Pelvic recurrence was the most frequent form of relapse (54.8%), while distant metastases without local relapse were diagnosed in 27.0% of cases (Table 4). Among the 126 patients who relapsed, the median time of post-recurrence survival was 33.8 months (range 2–66), with a median follow-up after recurrence of 19.8 months (range 1–66) Online Supplemental Material 1.

Surgical ESGO Quality Indicators

Accomplishment of the process and outcomes ESGO quality indicators was achieved in 10 of the 11 items assessed. The required preoperative investigation, surgical report, minimum elements in the pathology report defined by the ESGO-ESTRO-ESP guidelines[18–20] were achieved in 100% of the patients (recommended 100%).

Structured prospective reporting of the follow-up and 30-day post-operative morbidity using a validated surgical complication scoring system was conducted in 100% of the cases (recommended 100%). Urological fistula rate within 30 post-operative days after a radical parametrectomy was 1.5% (recommended ≤3%). Proportion of patients after primary surgical treatment who had clear vaginal (invasive disease) and parametrial margins was 98.6% (recommended ≥97%). Proportion of patients with a stage T1b disease T-upstaged after surgery was 4.1% (recommended <10%). T-upstaging refers to detection of any involvement of parametria or vagina found on pathology which was unknown before surgery, or a stage shift from T1b1 to T1b2 or higher, from preoperative assessment to post-operative pathology. Detection of positive lymph nodes is not included.

Recurrence rate at 2 years in patients with a stage pT1b1 with negative lymph nodes after primary surgical treatment was 5.6% (recommended <10%). Proportion of patients with a stage T1 disease treated by primary surgery who have undergone lymph node staging according to the ESGO-ESTRO-ESP Guidelines was 100% (recommended ≥98%).

Surgery was performed or supervised by a certified gynecologic oncologist or a trained surgeon dedicated to gynecological cancer in 99.1% of cases (recommended 100%). Proportion of patients receiving adjuvant chemoradiotherapy after a primary surgical treatment for a stage pT1b1 pN0 disease was 7.7% (recommended <15%). It is important to notice that in this section evaluating the quality indicator we are only looking at the 510 patients who are stage IB1 in the final pathology and have negative nodal status. However, of 1013 patients with pT1b1 (FIGO 2009) with negative nodal status, up to 193 patients (19.1%) received standard external radiotherapy without chemotherapy (Table 5).

DISCUSSION

Summary of Main Results

In 2013 and 2014, 1156 women were operated in this European cohort as part of their treatment for cervical cancer FIGO stage IB1 (2009). The 5-year disease-free survival rate was 88.3%, and the overall survival rate at 5 years was 94.9%. In addition, we noted that 5 years before the publication of the ESGO quality indicators for surgical treatment of cervical cancer, the vast majority of centers participating in our study were already following the stated recommendations. However, 44% of patients received adjuvant therapy after radical hysterectomy and, in addition, a total of 144 (12.5%) patients received adjuvant therapy without meeting routine criteria for such treatment.

Results in the Context of Published Literature

In our study, patients underwent a higher rate of adjuvant treatment than described previously in the literature. In a prospective study, the LACC trial,[5] adjuvant therapy was administered to 28% of the patients and chemoradiation was indicated in 18%. In retrospective

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Table 5 Evaluation of quality indicators

Quality indicators	Target	Result
1. Certified gynecologic oncologist	100%	99.1%
2. Pre-operative work-up	100%	100%
3. Required elements in surgical reports	100%	100%
4. Required elements in pathology reports	≥90%	100%
5. Prospective reporting of the follow-up and 30-days post-operative morbidity	≥90%	100%
6. Urological fistula 30 days post-operative	≤3%	1.5%
7. Negative vaginal and parametrial margins	≥97%	98.6%
8. T1b upstaged after surgery	<10%	4.1%
9. Recurrence rate at 2 years 1b1	<10%	5.6%
10.Lymph node staging according to guidelines	≥98%	100%
11.Adjuvant chemoradiotherapy in pT1b1N0	<15%	7.7%

studies adjuvant treatment varied from 18% to 33%.[8 12 13 21–23] All these studies included tumors with FIGO stage IA, which could imply lower rates of adjuvant therapy. In our study, as a descriptive retrospective study, the selection criteria for adjuvant therapy were applied individually at each center. After these findings, we reviewed all our data searching for indications for adjuvant treatment. After excluding standard indications of adjuvant therapy (positive nodal status, positive surgical margins, parametrial infiltration, or intermediate risk in Sedlis criteria), we identified 144 patients who did not fulfill any of the standard criteria, representing 28.2% of the patients who received adjuvant therapy and 12.5% of the entire cohort. Out of the 126 patients that recurred, 63 (50%) patients have had adjuvant therapy after surgery. Further investigation is needed to estimate if we are overtreating our patients in Europe.

Sentinel lymph node biopsy was performed in 224 (19.4%) patients, with a bilateral identification of 81.2%. The SENTIX trial found a higher bilateral identification rate of sentinel lymph node of 91%.[24] In that trial, previous experience with sentinel lymph node biopsy was needed to participate, which might explain the different results and highlights the importance of surgical training in complex techniques, such as sentinel lymph node biopsy. The ABRAX trial recently showed that surgery must be abandoned if a positive node is found at frozen section.[25] In 25.5% of the patients of our cohort, lymph nodes (with or without sentinel lymph node biopsy) were sent for frozen section, with a positive rate of 8.4%. However, no procedure was abandoned due to nodal positivity.

In our study, which included a time before publication of the LACC trial, over half of the patients (54%) underwent open surgery for radical hysterectomy. Among the patients who underwent a minimally invasive approach, only 26% (n=139) underwent robotic surgery, which highlights the infrequent use of this approach across Europe. Melamed et al recently published a cohort study[13] of women who underwent radical hysterectomy for stage IA2 or IB1 cervical cancer in the 2010–2013 period at US Commission on Cancer-accredited hospitals. With 2461 patients followed up for a median of 45 months, they found an overall survival of 94.4%. These results are similar to those obtained in our study.

The mean length of stay in our cohort was 4.8 days for the minimally invasive group and 8.4 for the open group. This represents a longer length of stay than other series reported previously, such as the LACC trial (3 and 5 days, respectively).[5] However, the length of stay reported for radical hysterectomy varies considerably depending on the region where the study is done. As an example, in this Korean series length of stay reported for radical hysterectomy was 12 days in the minimally invasive group and 20 days in the open group.[22]

This could be influenced by cultural and sociodemographic differences affecting the different healthcare services.

Study Limitations

Our study has several weaknesses, including the fact that there was no formal auditing of the data. To account for these limitations, we provided the participating sites with a strict list of inclusion and exclusion criteria, and all investigators declared that the reported information adhered to the data in the reviewed charts. In addition, there is no information regarding indications for surgical approach. Similarly, indications for adjuvant treatment were at the discretion of the physicians in each center and such indications might have varied from one institution to another. Lastly, there are no data on the regimen used for surveillance or information as to whether recurrences were documented by clinical suspicion, imaging studies, or pathologic confirmation.

Implications for Practice and Future Research

The current study has demonstrated that in Europe, patients with early cervical cancer are undergoing adjuvant therapy after radical hysterectomy at a higher rate than those published in the literature. Further research is needed to investigate the indications for adjuvant treatment and if such high rates of adjuvant treatment are indicated. Our study also provides valuable information, in that it provides updated survival outcomes to be set as the expected benchmark for overall survival outcomes.

CONCLUSIONS

In summary, in this European cohort, we found that 5-year disease-free survival and overall survival were 88.3% and 94.9%; respectively. We also noted a higher proportion of patients receiving adjuvant treatment in comparison with those previously reported in the literature. In 2013 and 2014, 5 years before the publication of the

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ESGO quality indicators for surgical treatment of cervical cancer, 91% of the indicators were accomplished in this cohort.

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Correction notice This article has been corrected since it was first published. The third affiliation has been updated to include 'IRCCS'.

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REFERENCES

1 Arbyn M, Weiderpass E, Bruni L, *et al*. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. *Lancet Glob Health* 2020;8:e191–203.
2 Wertheim E. Zur Frage Der Radicaloperation beim Uteruskrebs. *Arch Gynak* 1900;61:627–68.
3 Querleu D. [Radical hysterectomies by the Schauta-Amreich and Schauta-Stoeckel techniques assisted by celioscopy]. *J Gynecol Obstet Biol Reprod* 1991;20:747–8.
4 Nezhat CR, Burrell MO, Nezhat FR, *et al*. Laparoscopic radical hysterectomy with paraaortic and pelvic node dissection. *Am J Obstet Gynecol* 1992;166:864–5.
5 Ramirez PT, Frumovitz M, Pareja R, *et al*. Minimally invasive versus abdominal radical hysterectomy for cervical cancer. *N Engl J Med* 2018;379:1895–904.
6 Kim SI, Lee M, Lee S, *et al*. Impact of laparoscopic radical hysterectomy on survival outcome in patients with FIGO stage Ib cervical cancer: a matching study of two institutional hospitals in Korea. *Gynecol Oncol* 2019;155:75–82.
7 Chen B, Ji M, Li P, *et al*. Comparison between robot-assisted radical hysterectomy and abdominal radical hysterectomy for cervical cancer: a multicentre retrospective study. *Gynecol Oncol* 2020;157:429–36.
8 Cusimano MC, Baxter NN, Gien LT, *et al*. Impact of surgical approach on oncologic outcomes in women undergoing radical hysterectomy for cervical cancer. *Am J Obstet Gynecol* 2019;221:619.e1–619.e24.
9 Doo DW, Kirkland CT, Griswold LH, *et al*. Comparative outcomes between robotic and abdominal radical hysterectomy for IB1 cervical cancer: results from a single high volume institution. *Gynecol Oncol* 2019;153:242–7.
10 Paik ES, Lim MC, Kim M-H, *et al*. Comparison of laparoscopic and abdominal radical hysterectomy in early stage cervical cancer patients without adjuvant treatment: ancillary analysis of a Korean Gynecologic Oncology Group study (KGOG 1028). *Gynecol Oncol* 2019;154:547–53.
11 Yuan Z, Cao D, Yang J, *et al*. Laparoscopic vs. open abdominal radical hysterectomy for cervical cancer: a single-institution, propensity score matching study in China. *Front Oncol* 2019;9:1107.
12 Uppal S, Gehrig PA, Peng K, *et al*. Recurrence rates in patients with cervical cancer treated with abdominal versus minimally invasive radical hysterectomy: a multi-institutional retrospective review study. *J Clin Oncol* 2020;38:1030–40.
13 Melamed A, Margul DJ, Chen L, *et al*. Survival after minimally invasive radical hysterectomy for early-stage cervical cancer. *N Engl J Med* 2018;379:1905–14.
14 Nitecki R, Ramirez PT, Frumovitz M, *et al*. Survival after minimally invasive vs open radical hysterectomy for early-stage cervical cancer: a systematic review and meta-analysis. *JAMA Oncol* 2020;6:1019–27.
15 Chiva L, Zanagnolo V, Querleu D, *et al*. SUCCOR study: an international European cohort observational study comparing minimally invasive surgery versus open abdominal radical hysterectomy in patients with stage IB1 cervical cancer. *Int J Gynecol Cancer* 2020;30:1269–77.
16 Cibula D, Planchamp F, Fischerova D, *et al*. European Society of Gynaecological Oncology quality indicators for surgical treatment of cervical cancer. *Int J Gynecol Cancer* 2020;30:3–14.
17 Sedlis A, Bundy BN, Rotman MZ, *et al*. A randomized trial of pelvic radiation therapy versus no further therapy in selected patients with stage Ib carcinoma of the cervix after radical hysterectomy and pelvic lymphadenectomy: a Gynecologic Oncology Group study. *Gynecol Oncol* 1999;73:177–83.
18 Cibula D, Pötter R, Planchamp F, *et al*. The European Society of Gynaecological Oncology/European Society for Radiotherapy and Oncology/European Society of Pathology guidelines for the management of patients with cervical cancer. *Int J Gynecol Cancer* 2018;28:641–55.
19 Cibula D, Pötter R, Planchamp F, *et al*. The European Society of Gynaecological Oncology/European Society for Radiotherapy and Oncology/European Society of Pathology guidelines for the management of patients with cervical cancer. *Radiother Oncol* 2018;127:404–16.
20 Cibula D, Pötter R, Planchamp F, *et al*. The European Society of Gynaecological Oncology/European Society for Radiotherapy and Oncology/European Society of Pathology guidelines for the management of patients with cervical cancer. *Virchows Arch* 2018;472:919–36.
21 Alfonzo E, Wallin E, Ekdahl L, *et al*. No survival difference between robotic and open radical hysterectomy for women with early-stage cervical cancer: results from a nationwide population-based cohort study. *Eur J Cancer* 2019;116:169–77.
22 Nam J-H, Park J-Y, Kim D-Y, *et al*. Laparoscopic versus open radical hysterectomy in early-stage cervical cancer: long-term survival outcomes in a matched cohort study. *Ann Oncol* 2012;23:903–11.
23 Rodriguez J, Rauh-Hain JA, Saenz J, *et al*. Oncological outcomes of laparoscopic radical hysterectomy versus radical abdominal hysterectomy in patients with early-stage cervical cancer: a multicenter analysis. *Int J Gynecol Cancer* 2021;31:504–11.
24 Cibula D, Kocian R, Plaikner A, *et al*. Sentinel lymph node mapping and intraoperative assessment in a prospective, international, multicentre, observational trial of patients with cervical cancer: the SENTIX trial. *Eur J Cancer* 2020;137:69–80.
25 Dostalek L, Runnebaum I, Raspagliesi F, *et al*. Oncologic outcome after completing or abandoning (radical) hysterectomy in patients with cervical cancer and intraoperative detection of lymph node positivity; ABRAX (abandoning Rad hyst in cerviX cancer). *Int J Gynecol Cancer* 2020;30:261–4.

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