Patient characteristics and treatment patterns in patients with persistent, recurrent, or metastatic (P/R/M) cervical cancer: a real-world data analysis in the US

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BACKGROUND

- Cervical cancer is the fourth most common cancer in women worldwide. In the US, an estimated 13,240 women were diagnosed with cervical cancer in 2018, and 4,170 died from the disease[1]
- At the time of study initiation in 2021, paclitaxel and cisplatin combined with bevacizumab was the preferred 1L regimen in metastatic or recurrent cervical cancer[2]
- In the event of failure of or intolerance to 1L treatment, no 2L therapy for cervical cancer has been established as the standard of care, except in a subset of patients with programmed death ligand 1–positive or microsatellite instability-high/mismatch repair deficient tumors[2]
- Real-world data follow the evolving landscape and can provide valuable information on current treatment patterns in routine clinical practice
- The Tempus real-world database contains information from the electronic medical records of a nationwide network of community and academic oncology practices in the US
- This study aims to describe real-world patient characteristics and treatment patterns in patients with persistent, recurrent, or metastatic (P/R/M) cervical cancer in the US

METHODS

Study design

- This study included patients aged ≥18 years diagnosed with P/R/M cervical cancer from the Tempus real-world database between 2000 and 2020
- Deidentified, structured, electronic health record data were integrated with unstructured curated data from a network of US oncology practices
- Treatment lines for systemic therapy relied on algorithms built around 30-day treatment regimens, leading to a change in line when a significant change occurred between 2 treatment regimens (eg, addition or removal of an agent)
- A sensitivity analysis of patients diagnosed after 2014 was used to evaluate the integration of bevacizumab into clinical practice

Statistical analyses

- Descriptive statistics were used for baseline characteristics and treatment patterns
- For continuous variables, the mean, SD, median, first and third quartile, and minimum and maximum values were reported
- For categorical variables, counts and percentages with the corresponding 95% CIs were reported
- All data preparation and analysis have been done in R (version 4.0.5 or later)

RESULTS

Patient characteristics

- 844 women with P/R/M cervical cancer were included (**Table 1**)
- Mean age was 51.9 years; the predominant histological type was squamous cell carcinoma (60.7%)
- 58.6% of patients were White, and 16.5% were African American (**Table 2**)
- The most commonly reported comorbidities were diabetes (6.3%), chronic renal disease (3.7%), and chronic obstructive pulmonary disease (2.5%)
- Of 126 patients with reported HPV test results prior to cancer diagnosis, 71.4% were HPV positive
- Most patients had metastases at the index date (93.5%)

Table 1. Patient selection based on inclusion/exclusion criteria

No.	Inclusion criteria	Patients, n
1 i.	Metastatic disease diagnosis of stage IVB disease or evidence of distant metastases based on ICD-10 secondary malignancies	825
1 ii a.	Recurrence of disease as recorded in the data source any time after a diagnosis of stage III or stage IVA disease, or	+10
1 ii b.	Initiation of ≥1 systemic anticancer agent >90 days after an occurrence of radiotherapy (including external beam radiation therapy) or surgery not associated with chemotherapy and following the diagnosis of stage III or stage IVA disease, or	+6
1 ii c.	The initiation of ≥1 systemic anticancer agent corresponding to the start of a new treatment line after chemoradiation or adjuvant therapy and following the diagnosis of stage III or stage IVA disease	+9
2	Patients aged ≥18 years at index date	0
	Exclusion criteria	
1	Evidence of metastases prior to index date	0
2	Diagnosis of or receipt of treatment for other primary cancer(s) in the 3 years up to and including the index date, with the exception of basal or squamous cell carcinoma of the skin or bladder carcinoma in situ	–6
3	Male or unspecified sex	0
Total included patient population		**844**

Table 2. Patient characteristics

	N=844
Age at index date, years	
Mean (SD)	51.9 (12.4)
Median	51.0
IQR	43.0-61.0
Range	28.0-87.0
Age groups, n (%)	
≥18 to <50 years	407 (48.2)
≥50 to <65 years	313 (37.1)
≥65 years	124 (14.7)
Race, n (%)	
White	495 (58.6)
African American	139 (16.5)
Other	90 (10.7)
Not available	120 (14.2)
Body mass index, n (%)	
Underweight (<18.5 kg/m^2)	39 (4.6)
Normal (18.5-24.9 kg/m^2)	130 (15.4)
Overweight (25.0-29.9 kg/m^2)	103 (12.2)
Obese (≥30 kg/m^2)	128 (15.2)
Not available	444 (52.6)
ECOG performance status at index date, n (%)*	
0	59 (7.0)
1	67 (7.9)
2	24 (2.8)
≥3	45 (5.3)
Not available	649 (76.9)
ECOG performance status at 2L initiation, n (%)†	
0	33 (14.3)
1	47 (20.4)
2	14 (6.1)
≥ 3	7 (3.0)
Not available	129 (56.1)

*The time frame for ECOG performance status at the index date was from 365 days prior to the index date to 28 days post index date. †The denominator is 230, the number of patients who had 2L initiation.

Treatment patterns

- 68.6% of patients received 1L systemic anticancer treatment within a median of 1.1 months after cancer diagnosis (**Table 3**)
- The most common 1L systemic anticancer regimens were platinum-based cisplatin monotherapy (23.8%) and combination therapy with cisplatin/carboplatin + paclitaxel ± bevacizumab (46.8%; 25.0% with bevacizumab) (**Table 3** and **Figure 1**)
- 88.4% of patients receiving 1L cisplatin monotherapy had radiotherapy within 30 days
- 39.7% of patients treated with 1L therapy received subsequent 2L systemic treatment
- The most frequently prescribed 2L regimens were cisplatin/carboplatin + paclitaxel ± bevacizumab (33.9%), pembrolizumab (11.3%), or topotecan (5.2%) monotherapies
- Median time to treatment discontinuation was 4.0 months in both 1L and 2L
- In a sensitivity analysis of 511 patients diagnosed after 2014, the most common 1L systemic anticancer regimens were platinum-based cisplatin monotherapy (21.3%) and combination therapy with cisplatin/carboplatin + paclitaxel ± bevacizumab (52.2%; 36.0% with bevacizumab) (**Table 4**)

Table 3. Treatment patterns in the primary analysis (2000-2020)

	N=844
Line of therapy status, n (%)	
With systemic treatment	579 (68.6)
Without systemic treatment	265 (31.4)
Line of therapy, n (%)*	
1	579 (68.6)
2	230 (27.3)
3	104 (12.3)
4	44 (5.2)
Systemic anticancer agent, n (%)	
Paclitaxel	384 (45.5)
Carboplatin	308 (36.5)
Cisplatin	298 (35.3)
Bevacizumab	255 (30.2)
Topotecan	84 (10.0)
Pembrolizumab	60 (7.1)
Gemcitabine	47 (5.6)
Docetaxel	37 (4.4)
Pemetrexed	34 (4.0)
Etoposide	28 (3.3)
Other	108 (12.8)
Time from index date to systemic anticancer agent initiation*	
n (%)	579 (68.6)
Missing, n (%)	265 (31.4)
Mean, months (SD)	2.9 (8.2)
Median, months	1.1
IQR	0.5-2.2
Range	0.0-115.9
Top 1L systemic anticancer regimens, n (%)†	
n	579
Cisplatin	138 (23.8)
Carboplatin + paclitaxel	106 (18.3)
Carboplatin + paclitaxel + bevacizumab	82 (14.2)
Cisplatin + paclitaxel + bevacizumab	63 (10.9)
Cisplatin + paclitaxel	20 (3.5)
Top 2L systemic anticancer regimens, n (%)‡	
n	230
Carboplatin + paclitaxel	33 (14.3)
Carboplatin + paclitaxel + bevacizumab	27 (11.7)
Pembrolizumab	26 (11.3)
Cisplatin + paclitaxel + bevacizumab	18 (7.8)
Topotecan	12 (5.2)
Top 3L systemic anticancer regimens, n (%)§	
n	104
Pembrolizumab	14 (13.5)
Topotecan	8 (7.7)
Pemetrexed	7 (6.7)
Carboplatin + paclitaxel + bevacizumab	6 (5.8)
Bevacizumab	5 (4.8)
Cisplatin + topotecan	5 (4.8)
Gemcitabine	5 (4.8)
Top 4L systemic anticancer regimen, n (%)‖	
n	44
Gemcitabine ± bevacizumab	8 (18.2)
Pemetrexed	7 (15.9)
Other monotherapies	6 (13.6)
Platinum combinations	4 (9.1)

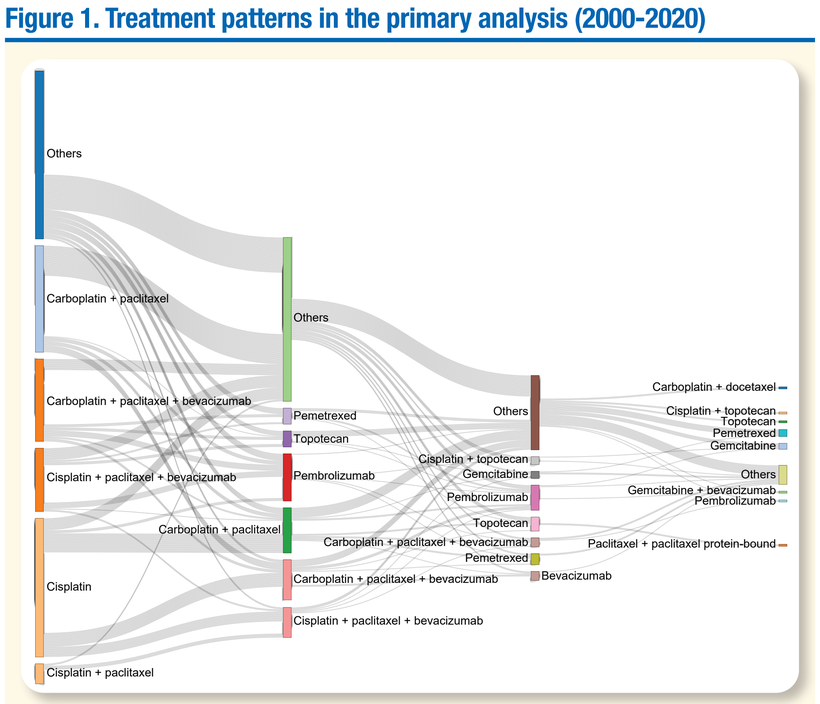
*One patient was excluded and counted toward missing data because of an extreme result (about 400 months to initiation). †The denominator is 579, the number of patients who had 1L initiation of systemic treatment. ‡The denominator is 230, the number of patients who had 2L initiation of systemic treatment. §The denominator is 104, the number of patients who had 3L initiation of systemic treatment. ‖The denominator is 44, the number of patients who had 4L initiation of systemic treatment.

Table 4. Treatment patterns in the sensitivity analysis (after 2014)

	n=511
Line of therapy status, n (%)	
With systemic treatment	356 (69.7)
Without systemic treatment	155 (30.3)
Line of therapy, n (%)	
1	356 (69.7)
2	133 (26.0)
3	54 (10.6)
4	19 (3.7)
Systemic anticancer agent, n (%)	
Paclitaxel	251 (49.1)
Carboplatin	199 (38.9)
Bevacizumab	198 (38.7)
Cisplatin	170 (33.3)
Pembrolizumab	56 (11.0)
Topotecan	33 (6.5)
Gemcitabine	22 (4.3)
Docetaxel	19 (3.7)
Etoposide	16 (3.1)
Paclitaxel (protein bound)	12 (2.3)
Pemetrexed	12 (2.3)
Other	45 (8.8)
Time from index date to systemic anticancer agent initiation	
n (%)	356 (69.7)
Missing (%)	155 (30.3)
Mean, months (SD)	2.1 (3.6)
Median, months	1.0
IQR	0.5-2.0
Range	0.0-28.9
Top 1L systemic anticancer regimens, n (%)*	
n	356
Cisplatin	76 (21.3)
Carboplatin + paclitaxel + bevacizumab	74 (20.8)
Carboplatin + paclitaxel	58 (16.3)
Cisplatin + paclitaxel + bevacizumab	54 (15.2)
Topotecan + paclitaxel + bevacizumab	9 (2.5)
Top 2L systemic anticancer regimens, n (%)†	
n	133
Pembrolizumab	26 (19.5)
Carboplatin + paclitaxel + bevacizumab	21 (15.8)
Carboplatin + paclitaxel	13 (9.8)
Cisplatin + paclitaxel + bevacizumab	12 (9.0)
Topotecan	7 (5.3)
Top 3L systemic anticancer regimens, n (%)‡	
n	54
Pembrolizumab	11 (20.4)
Carboplatin + paclitaxel + bevacizumab	4 (7.4)
Gemcitabine + bevacizumab	4 (7.4)
Gemcitabine	4 (7.4)
Bevacizumab	3 (5.6)
Top 4L systemic anticancer regimen, n (%)§	
n	19
Bevacizumab combinations	6 (31.5)
Others	5 (26.3)
Gemcitabine	4 (21.1)
Pembrolizumab ± other therapies	4 (21.1)

*The denominator is 356, the number of patients who had 1L initiation. †The denominator is 133, the number of patients who had 2L initiation. ‡The denominator is 54, the number of patients who had 3L initiation. §The denominator is 19, the number of patients who had 4L initiation.

Figure 1. Treatment patterns in the primary analysis (2000-2020)



Top 5 most frequently used line of therapy is considered. "Others" refer to other line of therapy regimens.

STRENGTHS AND LIMITATIONS

- Data from the Tempus real-world database come from the American Society of Clinical Oncology CancerLinQ network, which includes >300 community health systems, 2,500 oncologists, and >2 million patients across the US
- The treatment line definition is based on algorithms that might lead to some misclassifications; however, the definition was consistent with that used in other real-world database studies[3]
- Several variables, including disease stage at initial cervical cancer diagnosis, comorbidities, biomarkers, and ECOG status, had a high proportion of missing values in the extracted data
- In the situation of incomplete information on disease stage, patients with recurrent or persisent cervical cancer were identified using proxies of unknown sensitivity and specificity

CONCLUSIONS

- The results of this analysis were consistent with those of other real-world data analyses of P/R/M cervical cancer
- US patients with P/R/M cervical cancer receive 1L care concordant with guidelines
- Approximately 70% of patients receive ≥1 dose of a systemic anticancer agent; over 60% of those patients receive platinum-based chemotherapy with or without bevacizumab in 1L
- A sensitivity analysis of treatment patterns after 2014 showed that the use of bevacizumab in clinical practice increased following trial data[4] indicating that bevacizumab improves outcomes in cervical cancer patients
- This study is a snapshot of US real-world clinical practice. Further studies are needed to validate the findings, particularly in patients with persistent or recurrent cervical cancer

Abbreviations

1L, first line; **2L** second line; **3L**, third line; **4L**, fourth line; **CI**, confidence interval; **ECOG**, Eastern Cooperative Oncology Group; **HPV**, human papillomavirus; **IQR**, interquartile range; **P/R/M**, persistent, recurrent, or metastatic; **SD**, standard deviation.

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Disclosures

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