PCN93

Health Resource Utilization in Advanced Ovarian and Endometrial Cancer in a United States Insurance Claims Database

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Background

- Ovarian and endometrial cancers are 2 of the most prevalent female genitourinary (FGU) cancers.
- Despite recent innovations in immuno-oncology, cytotoxic platinum and taxane therapies remain a mainstay of standard treatment for FGU cancers.
- These malignancies, once advanced, continue to represent significant unmet need.[1,2]

Objectives

- To assess recent changes in treatment patterns and health resource utilization (HRU) in patients with advanced ovarian and endometrial cancers after initiation of antineoplastic therapy

Methods

Data Source

- Data was derived from Electronic Medical Record (EMR) and health plan claims data sources.
  - De-identified Oncology EMR data was sourced from the Guardian Research Network™ (GRN) of integrated delivery systems from Jan 1990 to July 2018.
  - Health plan claims were obtained from the HealthVerity™ Marketplace platform of data suppliers from Feb 2014 to Dec 2018.
    - HealthVerity™ has the most complete coverage of United States (US) healthcare, consumer, and purchase data, with access to over 330 million patients and 30 billion transactions.[3]
    - PS (Private Source) 14 data was derived from an institutional medical claims provider of predominantly Medicare Fee-For-Service population, and PS34 data was from medical claims of a mostly commercially insured population.
- Dataset was converted to the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM), version 5.0.
- Analyses were conducted in SHYFT Quantum v7.1.1

Study Design

- Inclusion/exclusion criteria (Table 1):
  - Patients with ≥1 ovarian cancer (International Classification of Diseases [ICD]-9-Clinical Modification [CM] 183.xx or ICD-10 C56.xx) or endometrial cancer (ICD 9-CM 182.xx or ICD-10 C54.xx) diagnosis with ≥1 claim for antineoplastic therapy during the observation period
  - Age ≥18 years
  - Female gender at index
  - ≥ 6 months continuous enrollment (activity) pre-index

Table 1: Study Cohort Selection

EMR database	GRN	PS14	PS34
N	20,920	13,086	29,480
≥ 1 diagnoses of endometrial or ovarian cancer and ≥ 1 antineoplastic therapy, N	2,999	8,464	2,862
Female gender, N	2,994	8,373	2,843
Age ≥ 18 years, N	2,990	8,373	2,841
≥ 6 months continuous enrollment pre-index, N	2,548	5,915	1,645
Patients included in the analysis, N	2,548	5,915	1,645

Study Measures and Analyses

- Descriptive statistics were assessed for baseline demographics and clinical characteristics.
- Treatment patterns were assessed for common antineoplastic therapies for patients with FGU cancers
  - Utilization rates by line of therapy, defined as > 30 day gap in treatment
  - Mean, standard deviation (SD) of lines of therapy per patient
  - Treatment duration, defined as mean, SD of days in line of therapy
- Inpatient and outpatient visits for ovarian and endometrial cancer-related causes across all data sets
  - Number and duration of inpatient hospitalizations in the first and second year post-index
    - Percentage of patients with 1-day, 2-5 days, > 5 days hospitalizations
    - Hospitalizations per patient
    - Measured for years 1 and 2 post-index
  - Number of outpatient and emergency room visits
    - Percentage of patients
    - Mean, SD number of visits per patient
    - Measured for years 1 and 2 post-index
- Patient procedures for ovarian and endometrial cancer-related causese across all data sets
  - Radiation therapy, surgery (overall, debulking, hysterectomy/oophorectomy)
    - Percentage of patients
    - Mean, SD number of procedures per patient
    - Measured for years 1 and 2 post-index

Results

Table 2: Baseline Demographics and Clinical Characteristics

Characteristic	GRN	PS14 Claims	PS34 Claims
Age at index, mean (SD)	62.2 (12.7)	70.4 (7.6)	65.7 (11.6)
Age at index, median	64	71	67
Female gender, N (%)	2,548 (100)	5,915 (100)	1,645 (100)
Ovarian cancer, N (%)	1,552 (60.9)	1,975 (33.4)	1,068 (64.9)
Endometrial cancer, N (%)	996 (39.1)	3,940 (66.6)	577 (35.1)
Inpatient visit post-index, N (%)	2,350 (92.2)	2,854 (48.3)	700 (42.6)
Outpatient visit post-index, N (%)	2,517 (98.8)	5,819 (98.4)	1,612 (98.0)
Emergency room visit post-index, N (%)	119 (4.7)	2,579 (43.6)	91 (5.5)
Radiation therapy pre-index, N (%)	9 (0.4)	480 (8.1)	52 (3.2)
Gyn. oncol. surgery pre-index, N (%)	42 (1.7)	1,342 (22.7)	264 (16.1)
Radiation therapy post-index, N (%)	23 (0.9)	887 (15.0)	81 (4.9)
Gyn. oncol. surgery post-index, N (%)	11 (0.4)	226 (3.8)	21 (1.3)

Table 3: Treatment Patterns by Line of Therapy, Percentage of Patients per Treatment – Endometrial Cancer

Treatment type		GRN	PS14	PS34
Chemo agents	No. of lines of therapy, mean (SD)	1.7 (1.2)	1.7 (1.1)	2.2 (1.4)
	Days in line 1, mean (SD)	54.1 (41.5)	49.4 (46.1)	51.9 (48.0)
	Days in line 2, mean (SD)	41.6 (40.9)	38.8 (39.1)	41.2 (39.4)
	Days in line 3, mean (SD)	39.4 (49.6)	33.9 (45.4)	36.4 (42.3)
PARP inhibitors	No. of lines of therapy, mean (SD)	1.9 (2.1)	–	–
	Days in line 1, mean (SD)	2.5 (4.2)	–	–
	Days in line 2, mean (SD)	1.0 (0)	–	–
	Days in line 3, mean (SD)	23 (–)	–	–
Bevacizumab/ Avastin (VEGF)	No. of lines of therapy, mean (SD)	1.6 (1.2)	1.6 (1.2)	1.8 (1.3)
	Days in line 1, mean (SD)	66.7 (81.5)	57.8 (66.1)	54.1 (62.0)
	Days in line 2, mean (SD)	52.4 (66.9)	40.3 (58.3)	43.3 (52.7)
	Days in line 3, mean (SD)	38.9 (49.3)	36.7 (40.7)	36.3 (42.1)
Immune oncology	No. of lines of therapy, mean (SD)	1.5 (1.2)	1.3 (0.6)	1.6 (1.0)
	Days in line 1, mean (SD)	82.1 (81.7)	54.2 (59.2)	57.8 (100.9)
	Days in line 2, mean (SD)	40.4 (58.1)	83.9 (94.6)	63.5 (64.8)
	Days in line 3, mean (SD)	40.4 (58.1)	83.9 (94.6)	63.5 (64.8)

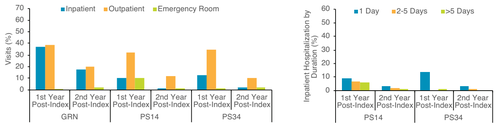
PARP, poly ADP ribose polymerase; VEGF, vascular endothelial growth factor

Table 4: Treatment Patterns by Line of Therapy, Percent of Patients per Treatment – Ovarian Cancer

Treatment type		GRN	PS14	PS34
Chemo agents	No. of lines of therapy, mean (SD)	2.5 (1.9)	2.3 (1.6)	2.8 (2.0)
	Days in line 1, mean (SD)	66.3 (58.3)	58.5 (58.2)	61.0 (52.7)
	Days in line 2, mean (SD)	50.6 (49.5)	43.2 (49.6)	45.3 (46.7)
	Days in line 3, mean (SD)	52.8 (62.2)	38.7 (45.7)	43.8 (53.8)
PARP inhibitors	No. of lines of therapy, mean (SD)	1.8 (1.4)	–	–
	Days in line 1, mean (SD)	4.3 (8.3)	–	–
	Days in line 2, mean (SD)	3.6 (7.5)	–	–
	Days in line 3, mean (SD)	7.8 (15.3)	–	–
Bevacizumab/ Avastin (VEGF)	No. of lines of therapy, mean (SD)	1.7 (1.1)	1.8 (1.5)	2.2 (2.1)
	Days in line 1, mean (SD)	84.7 (95.8)	74.1 (91.4)	75.8 (80.8)
	Days in line 2, mean (SD)	69.5 (79.3)	54.0 (67.3)	75.3 (112.9)
	Days in line 3, mean (SD)	63.0 (81.0)	42.5 (51.4)	56.5 (73.5)
Immune oncology	No. of lines of therapy, mean (SD)	1.4 (0.8)	1.4 (0.7)	1.4 (0.8)
	Days in line 1, mean (SD)	58.9 (73.7)	64.4 (83.8)	29.7 (25.7)
	Days in line 2, mean (SD)	65.4 (90.0)	27.6 (49.6)	48.3 (81.1)
	Days in line 3, mean (SD)	65.4 (90.0)	27.6 (49.6)	48.3 (81.1)

Figure 1: Percentage of Patients by Visit by Cancer Type, Year 1 and 2 Post-index

a. Endometrial Cancer



b. Ovarian Cancer

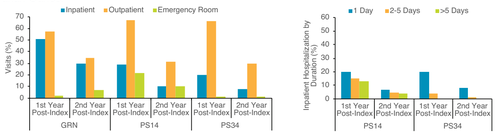


Table 5: Visits per Patient, by Cancer Type, Year 1 and 2 Post-index

a. Endometrial Cancer

	GRN		PS14		PS34	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Visit (%)						
Inpatient	35.0	19.0	11.9	3.0	13.7	3.2
Outpatient	37.9	22.7	32.8	14.9	34.2	13.4
Emergency Room	1.0	0.3	11.5	3.1	2.2	0.4
Inpatient hospitalization, by duration (%)						
1 Day	–	–	8.7	2.3	13.7	3.3
2-5 Days	–	–	6.5	1.5	–	0.1
> 5 Days	–	–	5.2	1.0	0.1	–

b. Ovarian Cancer

	GRN		PS14		PS34	
	Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
Visit (%)						
Inpatient	54.8	36.0	28.1	10.1	20.0	8.1
Outpatient	58.6	41.4	65.5	33.5	63.7	31.3
Emergency Room	3.0	0.8	24.3	9.9	2.1	1.4
Inpatient hospitalization, by duration (%)						
1 Day	–	–	19.9	7.6	20.0	8.3
2-5 Days	–	–	14.9	5.3	0.5	0.1
> 5 Days	–	–	12.7	4.1	–	–

Table 6: Percentage of Patients by Procedure, By Cancer Type, Year 1 and 2 Post-index

a. Endometrial Cancer

	PS14		PS34	
Procedure (%)	Year 1	Year 2	Year 1	Year 2
Radiation Therapy	10.3	0.7	3.4	–
Ovarian/Endometrial Surgery (General)	0.3	0	0.3	–
Debulking Surgery	0.1	0	–	–
Oophorectomy/Hysterectomy	0.1	–	0.1	–

b. Ovarian Cancer

	PS14		PS34	
Procedure (%)	Year 1	Year 2	Year 1	Year 2
Radiation Therapy	3.0	1.3	0.9	0.4
Ovarian/Endometrial Surgery (General)	3.4	0.2	0.8	0.1
Debulking Surgery	1.9	0.1	0.2	0.1
Oophorectomy/Hysterectomy	2.5	0	0.5	0.1

Table 7: Procedure Volume per Patient, By Cancer Type, Year 1 and 2 Post-index

a. Endometrial Cancer

	PS14		PS34	
Count of Procedure, mean (SD)	Year 1	Year 2	Year 1	Year 2
Radiation Therapy	11.6 (27.5)	0.6 (5.9)	3.1 (13.0)	–
Ovarian/Endometrial Surgery (General)	0.0 (0.2)	0	0.0 (0.1)	–

b. Ovarian Cancer

	PS14		PS34	
Count of Procedure, mean (SD)	Year 1	Year 2	Year 1	Year 2
Radiation Therapy	1.5 (9.8)	0.7 (11.9)	0.4 (4.1)	0.1 (1.7)
Ovarian/Endometrial Surgery (General)	0.1 (0.5)	0.0 (0.1)	0.0 (0.2)	0

Summary

- Population ages were similar in EMR and commercial claims data, with slightly younger populations diagnosed with endometrial than ovarian cancer (Table 2).
  - The average age was higher among patients with ovarian and endometrial cancers in Medicare claims data.
- The average lines of therapy measurable per patient were 2.5 and 1.7 for ovarian and endometrial cancer, respectively (Table 3,4).
  - Platins and taxols featured prominently across treatment lines 1-3, with average time on therapy approximately 50-60 days in first line, and shorter for subsequent therapy lines.
  - Across both cancer types, VEGF usage was 3 times higher in ovarian cancer across all data sources, with highest usage rates in the first line setting.
  - Immuno-oncology agent use, although limited in the data, was also highest in first line treatment.
  - In EMR data, PARP inhibitor (PARPi) and immune-oncology agent usage was low overall, which is consistent with the recent approval of these agents and timeframe of data assessed. For PARPi, somewhat higher utilization was seen in ovarian cancer over endometrial cancer.
- Hospitalization rates were highest in the first year post-index across both cancer types, with most patients averaging 1 day length-of-stay in the EMR and commercial claims data, and somewhat higher in Medicare claims data, with over a fifth of patients having stays of 2-5 days across both tumor types (Figure 1, Table 5).
  - For ovarian cancer, the mean hospital days for PS14, an older, predominantly Medicare population, were 6 days per visit (median=4) in first and second years post-index, with total annual hospital days of 18.6-21 days.
  - Findings were similar for PS14 for endometrial cancer at 5.6-6.1 days per visit (median=4), and total annual hospital days of 20 and 22 days, respectively, in year 1 and year 2.
  - For PS34, a younger, commercially-insured population, the mean hospital days per visit were lower at 2.3 days (median=0.5) for ovarian and 5.4 (median=5) days for endometrial cancer.
  - Inpatient, outpatient, and emergency room visits were all higher in Medicare claims than in the EMR and commercial claims populations.
- Radiation therapy in the first 2 years was relatively low across all data sources. More patients with endometrial cancer received radiation than patients with ovarian cancer, with the highest rate in approximately 10% of patients in year 1 post-index in Medicare claims (Table 6).
  - Post-index surgery rates were also low, consistent with the presumably advanced disease status of patients studied. (Table 7).

Limitations

Study Limitations

- Pharmacological treatment data in institutional claims data sources was limited to in-hospital administered drugs or those reimbursed as medical claims (injectables, infusibles).
- EMR data extract had limited procedure administration and duration of stay information. Future refinements will incorporate this data from source providers.
- EMR data showed higher rates of hospitalization than claims datasets, likely due to a high proportion of data coming from specialized cancer centers.
- Staging data was not available in claims data, so antineoplastic therapy was used as a proxy for advanced disease.

Conclusions

- Despite new and targeted treatments available, cytotoxic chemotherapy remains a mainstay of ovarian and endometrial cancer.
- Both of these difficult-to-treat diseases continue to drive substantial HRU for patients.
- Future studies will incorporate cost burden from claims data sources, as well as a more detailed characterization of patient populations and sub-groups in the EMR data.

References

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Disclosures

- AG, AS, ER, JR, and BL are employees of Medidata Solutions. MB provided consultancy to Medidata Solutions.

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