Real-World Study Finds Patients with Primary Hyperoxaluria Have Greater Health Care Resource Utilization, Incur Higher Costs

Primary hyperoxalurias (PH; types 1, 2, and 3, each caused by a unique gene) are a family of severe, rare, genetic liver disorders, for which there are no FDA-approved treatments. PH is characterized by oxalate overproduction, which often manifests initially in the form of kidney complications. High levels of systemic oxalate in PH results in recurrent kidney stones, nephrocalcinosis, and chronic kidney disease, which may progress to end-stage renal disease (ESRD). Rising oxalate levels also impact organ systems beyond the kidneys, including the skin, bones, eyes, and heart.[1]

Researchers conducted a claims review to assess the real world clinical and economic burden associated with this rare condition and found that patients with PH utilize more health care resources and have increased health care-related costs compared with patients without PH. They performed a retrospective claims analysis of the IQVIA PharMetrics® Plus database from January 2014 to December 2019 to determine the clinical, economic, and health care resource utilization burden associated with PH (irrespective of PH type) over a 12-month period. The study only included claims from commercial payers; Medicare and Medicaid claims were excluded due to a limited sample size.

Patients with PH (n=324) were included if they had at least one claim with an *International Classification of Diseases, 10th revision* (ICD) code of E72.53 after October 2018, which is when a code was created specifically for PH. Patients had to have at least one year of continuous enrollment in medical and prescription benefits. Those with a claim for secondary hyperoxaluria (SH) or any SH-associated conditions were excluded. In the PH cohort, data were assessed over a 12-month period of continuous enrollment with an E72.53 diagnosis code identified after October 2018.

Patients with PH were matched—based on age, sex, and insurance type—1:5 to a cohort of patients without PH (n=1,620),[2] which was drawn from a random 5% sample of patients who did not have a diagnosis of any type of hyperoxaluria. The non-PH cohort had continuous enrollment in medical and prescription benefits from October 2018 to September 2019.

All costs were adjusted to 2019 using the changes in the Medical Care Component of the Consumer Price Index. Descriptive analyses were performed to summarize demographics, clinical outcomes, costs, and health care resource utilization.

The demographics of both cohorts showed a mean age of 48.1 years and a majority of male patients (58% for both). Given these were the variables the cohorts were matched on, the identical demographics indicate a successful match.

Cost results showed that mean costs were 2.9 times higher in patients

> Patients with primary hyperoxaluria (PH) utilize more health care resources and have increased health care-related costs compared with patients without PH.

TABLE 2 Median and Mean Costs for PH versus non-PH Patients

	PH N=324	Non-PH N=1,620	P-value	Magnitude of difference
Median Costs				
Total Costs	$11,017	$1,685	<0.001	6.5
Inpatient Stay	$0	$0	-	-
Outpatient Care	$7,681	$1,153	<0.001	6.7
Outpatient Surgery	$707	$0	<0.001	-
Emergency Department	$0	$0	-	-
Physician Office Visit	$1,122	$411	<0.001	2.7
Prescription Costs	$826	$146	<0.001	5.7
Out-of-pocket Costs	$1,860	$425	<0.001	4.4
Mean Costs				
Total Costs	$22,549	$7,853	<0.001	2.9
Inpatient Stay	$4,530	$1,605	<0.001	2.8
Outpatient Care	$13,894	$3,784	<0.001	3.7
Outpatient Surgery	$3,379	$785	<0.001	4.3
Emergency Department	$651	$211	<0.001	3.1
Physician Office Visit	$1,759	$684	<0.001	2.6
Prescription Costs	$4,125	$2,464	0.012	1.7
Out-of-pocket Costs	$2,737	$1,145	<0.001	2.4

Significant differences highlighted in orange

with PH ($22,549) compared with those without PH ($7,853; *P*<0.001). Median total costs were 6.5 times higher for PH patients ($11,017) compared with non-PH patients ($1,685; *P*<0.001). Outpatient care accounted for a majority of the median costs for both patients with ($7,681) and without ($1,153) PH (*P*<0.001). Median prescription drug costs were $826 and $146, respectively (*P*<0.001), and median out-of-pocket costs were $1,860 and $425, respectively (*P*<0.001). See **TABLE 2*** for all costs related to care.

Drugs were grouped into therapeutic classes based on the Medi-Span® Generic Product Identifier.[3,4] Patients with PH were significantly more likely to receive ophthalmic preparations (10%, $69 vs. 7%, $18, respectively; *P* for cost=0.004), other cardiovascular preparations (21%, $65 vs. 16%, $24, respectively; *P*=0.036), lipotropics (30%, $80 vs. 22%, $38, respectively; *P*<0.001), electrolytes/miscellaneous preparations (7%, $56 vs. 1%, $2, respectively; *P*<0.001), adrenergics (3%, $69 vs. 1%, $4, respectively; *P*=0.012), anticoagulants (5%, $107 vs. 4%, $35, respectively; *P*=0.012), and antiarthritics (33%, $1,077 vs. 20%, $278, respectively; *P*=0.02).

Nearly half of patients with PH (47%; $25) received opioids and narcotic analgesics, a significantly higher proportion compared with the non-PH cohort (15%; $11; *P*=0.32). "While the mean costs for opioid/analgesic drugs are higher in the PH group, the differential in the magnitude of the number of PH patients with at least one drug claim in this class relative to non-PH groups is significant," the researchers wrote. "The high rate of opioid/

The management of primary hyperoxaluria results in a significant clinical and economic burden to both the patient and the health care system.

TABLE 3 Prescription Costs and Percent of Patients With At Least One Prescription

	PH (N=324)		Non-PH (N=1,620)		Patient Percent P-value	Cost P-value
	Patients, %	Mean Cost	Patients, %	Mean Cost		
Drug groups with highest mean costs in PH cohort						
Antiarthritics	33%	$1,077	20%	$278	<0.001	0.02
Diabetic therapy	13%	$325	10%	$341	0.065	0.924
Anticonvulsants	10%	$232	7%	$34	0.014	0.072
Antivirals	8%	$171	7%	$121	0.477	0.624
Anticoagulants	5%	$107	4%	$35	0.215	0.012
Bronchial dialators	12%	$105	12%	$98	0.975	0.888
Lipotropics	30%	$80	22%	$38	0.002	<0.001
Antiparkinson	2%	$70	1%	$2	0.098	0.16
Adrenergics	3%	$69	1%	$4	0.004	0.012
Ophthalmic preparations	10%	$69	7%	$18	0.064	0.004
Other cardiovascular preps	21%	$65	16%	$24	0.029	0.036
Electrolytes/Misc. preparations	7%	$56	1%	$2	<0.001	<0.001
Glucocorticoids	30%	$52	23%	$33	0.004	0.3
Hematinics and blood cell stimulators	1%	$49	0%	$0	0.009	0.056
Mean costs in additional drug group of clinical relevance to PH patients						
Opioid and narcotic analgesics	47%	$25	15%	$11	<0.001	0.032

Significant differences highlighted in orange

analgesic use in the PH cohort may be associated with pain management of renal sequelae, such as kidney stones,[1,5] but additional research is needed to establish causality." See **TABLE 3*** for all prescription drug costs associated with the PH and non-PH patient cohorts.

Comorbidities were assessed via the Charlson-Quan Comorbidity Index (CCI).[6] Patients with PH experienced higher rates of select comorbidities compared with non-PH patients. Mean CCI score was 0.79 for those with PH and 0.37 for those without PH ($P<0.001$). The following comorbidities were observed at significantly higher rates in patients with PH compared with patients without PH: diabetes (without chronic complications; 18.0% vs. 10.0%, respectively; $P<0.001$), myocardial infarction (2.2% vs. 0.9%, respectively; $P=0.032$), moderate or severe renal disease (10.0% vs. 1.3%, respectively; $P<0.001$), mild liver disease (9.9% vs. 3.5%, respectively; $P<0.001$), peripheral vascular disease (5.2% vs. 2.0%, respectively; $P<0.001$), and cerebrovascular disease (4.3% vs. 1.4%, respectively; $P<0.001$). See **TABLE 4*** for all comorbidities reported in both patient cohorts. "Longitudinal research is needed to assess the ongoing clinical and economic impact of these comorbidities in [patients with] PH," the researchers noted.

Most patients (80%; n=259) in the PH cohort had one kidney stone, of which 59% of patients (n=152) had two or more kidney stone occurrences in a 12-month period. Among the PH cohort, 18% of patients (n=57) had a urinary tract infection (UTI), of which 30% of those patients (n=17) had two or more UTIs within a 12-month period.

"While there are no approved pharmacologic treatments for PH, these results indicate that even with the current standard of care, the management of PH results in a significant clinical and economic burden to both the patient and the health care system," the researchers concluded.

The study is limited because ICD codes did not distinguish PH from SH prior to October 2018, thereby limiting inclusion to those with a PH-specific ICD-10 code after this date. Also, per ICD coding, researchers could not distinguish what type of PH patients had. In addition, the use of claims data only provides information on patients who have been diagnosed and does not provide information on PH severity. Pa-

TABLE 4 Comorbidities Associated with PH versus non-PH Patients

Charlson Comorbidity Index	PH N=324	Non-PH N=1,620	P-value
Mean Total Score	0.79	0.37	<0.001
Individual Charlson Comorbidities			
Myocardial infarction	2.2%	0.9%	0.032
Congestive heart failure	2.8%	1.5%	0.122
Peripheral vascular disease	5.2%	2.0%	<0.001
Cerebrovascular disease	4.3%	1.4%	<0.001
Dementia	0.6%	0.1%	0.073
Chronic pulmonary disease	10%	8.0%	0.116
Connective tissue (rheumatic) disease	2.5%	1.2%	0.069
Peptic ulcer disease	0.9%	0.4%	0.13
Mild liver disease	9.9%	3.5%	<0.001
Diabetes without chronic complications	18%	10.0%	<0.001
Hemiplegia or paraplegia	2.2%	0.2%	<0.001
Moderate or severe renal disease	10%	1.3%	<0.001
Diabetes with chronic complications	3.7%	3.1%	0.564
Moderate or severe liver disease	0.6%	0.1%	0.069
Metastatic solid tumor	0.3%	0.6%	0.571
AIDS (not just HIV positive)	0.6%	0.3%	0.235

Significant differences highlighted in orange

tients with ESRD and those on dialysis were underrepresented in this study due to the transition of these more severe patients to Medicare coverage.

**Tables are numbered as shown in original poster.*

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FEATURED POSTER

Mucha L, Hoppe B, Silber A, et al. A Retrospective Claims Analysis of Primary Hyperoxaluria: Clinical and Economic Outcomes. Poster E17. Presented at the AMCP Nexus 2020 Virtual.

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