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Characterizing the Morbidity of Postchemotherapy Retroperitoneal Lymph Node Dissection for Testis Cancer in a National Cohort of Privately Insured Patients

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Abstract

OBJECTIVE—To characterize morbidity of postchemotherapy retroperitoneal lymph node dissection (PC-RPLND) for testis cancer, we analyze a contemporary national database. PC-RPLND is the standard for residual radiographic masses ≥ 1 cm (nonseminoma) and positron emission tomography-avid masses ≥ 3 cm (seminoma). Morbidity for PC-RPLND is greater than primary RPLND, which may be mitigated by performing surgery at a high-volume cancer center.

METHODS—Current Procedural Terminology and International Classification of Diseases, Ninth Edition codes identified men with testis cancer undergoing PC- or primary RPLND in MarketScan (2007–2012). Multivariable logistic regression assessed factors associated with receiving adjunctive procedures (ie, nephrectomy, vascular reconstruction), prolonged hospitalization, and 90-day readmission. Geographic variables assessed regionalization of PC-RPLND.

RESULTS—Of 559 men with claims for PC- or primary RPLND (206, 37% PC-RPLND), 19% of PC-RPLND underwent adjunctive procedures (vs 1% among RPLND, $P < .01$). For PC-RPLND, the nephrectomy rate was 10% and the vascular reconstruction rate was 8%. On multivariable analysis, PC-RPLND was associated with undergoing adjunctive procedures (odds ratio 41.9; 95% confidence interval 11.7, 150) and prolonged hospitalization (odds ratio 3.75; 95% confidence interval 1.68, 8.42) compared to primary RPLND. PC-RPLND was not associated with 90-day readmission. Up to 29% of PC-RPLNDs are performed in centers, billing just a single case through MarketScan in the 6 years studied.

CONCLUSION—PC-RPLND is associated with adjunctive procedures and longer hospitalizations. Given the morbidity of PC-RPLND in this young patient population, efforts are needed to establish quality benchmarks for, reduce the morbidity of, and to accurately discriminate risk during patient discussions prior to this complex, specialized surgery.

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Testis cancer is relatively rare (25th among men in the United States) and has a good prognosis, with over 99% 5-year survival for localized disease.¹ However, 30% of men present with regional or distant metastases which confer lower 5-year survival of 96% and 73%, respectively.¹ The favorable prognosis for testis cancer is due to the availability of effective treatments. Yet chemotherapy and surgery for advanced disease are associated with significant morbidity burden to a young population, given peak disease incidence in the 20–45-year-old age group.¹

Postchemotherapy retroperitoneal lymph node dissection (PC-RPLND), which guidelines² recommend in cases of residual radiographic masses at least 1 cm in size for nonseminomatous germ cell tumors and positron emission tomography avid masses at least 3 cm for previously treated seminoma, may be associated with improved survival.^{3,4} However, a number of factors contribute to the known morbidity of PC-RPLND, including the need for concomitant procedures at the time of RPLND. The primary exposure adding to morbidity and complexity is chemotherapy itself, which induces a desmoplastic reaction between lymph tissue and vascular and other vital structures in the retroperitoneum, described in numerous institutional series.^{5–7} This desmoplasia makes surgical dissection lengthier⁷ and increases the chance of injury to vital vascular structures⁵ compared with primary RPLND. This scarring, or alternatively, direct tumor involvement of vital anatomic structures, leads to unexpected and/or oncologically necessary adjunctive procedures at the time of PC-RPLND. Some of the more common adjunctive procedures performed include major vascular repair⁶ and nephrectomy.⁸

Several studies describe adjunctive procedures in single-institution series of PC-RPLND.^{8–10} Surgical quality of PC-RPLND may be improving over time¹¹; however, given the rarity of PC-RPLND, these institutional series complicate assessment of trends in surgical morbidity. Increasingly, quality metrics like readmission rates are scrutinized when considering reimbursement for delivery of surgical care.^{12,13} Similarly, decreased willingness to reimburse for complications related to care has contributed to regionalization of high-risk cancer resections.¹⁴

Finally, primary RPLND may be decreasing, given the possible trend in guidelines toward observation for stage IA/B seminoma and IA nonseminomatous germ cell tumors, and as a result, RPLND will be most likely to occur after chemotherapy.^{2,15} Although PC-RPLND is a rare procedure, its relative utilization may be on the rise. Thus, clarification of the morbidity of PC-RPLND could inform patient and payer expectations and provide a framework for quality improvement efforts. We therefore sought to examine the morbidity of PC-RPLND in a contemporary cohort of insured patients treated at centers with varying case volume, with a focus on receipt of concomitant adjunctive procedures. We additionally examined length of stay (LOS), discharge disposition, and index all-cause readmission within 90 days.

METHODS

Cohort Selection

After determining that this study was institutional review board exempt due to complete de-identification of patient information, subjects were selected from the MarketScan commercial databases calendar years 2007–2012. MarketScan includes inpatient and outpatient insurance billing claims for over 34 million privately insured enrollees from 150 employers and 13 commercial health plans in the United States. All billing and diagnostic codes for this analysis were selected with input from local interdisciplinary experts and a careful review of billing manuals (Current Procedural Terminology [CPT] from the American Medical Association and International Classification of Diseases, Ninth Edition [ICD-9] from the World Health Organization). The cohort was selected based on an index hospital admission with a primary diagnosis of testis cancer (ICD-9 186.9, 186, 186.0, 158.0, 197.6, 211.8, 235.4) and a procedure code during that visit for RPLND (CPT: 38780, 38562, 38564, 38747, 58958, 50230). To minimize misclassification, additional exclusions were implausible sites of care (eg, laboratory or pathology), major diagnostic category other than diseases of the male reproductive system, and female gender. To describe results in postpubertal males, who have a different disease natural history than prepubertal males, we limited the sample to those aged 16 and over. To minimize uncaptured Medicare claims among patients ≥65, we limited the sample to men aged 64 and under, which aligns well with peak incidence of testis cancer, with 50% of new cases detected in those aged 20–34 years and 38% in those aged 35 to 54 years.¹

Outcomes

The primary outcome of interest was receipt of an adjunctive procedure during PC-RPLND based on billing codes. Secondary outcomes included length of index hospital admission, discharge disposition (ie, self-care, other acute/subacute facility or skilled nursing facility [SNF], and deceased), and all-cause readmission in the 90 days following index surgical admission.

We identified 9 possible adjunctive procedures that may be undertaken at the time of PC-RPLND a priori based on anticipated surgeries that may be necessary to ensure oncologic control, for the unexpected management of intraoperative complications, or for unexpected disease burden based on a literature review.^{5,8–11,16} We supplemented this with review of observed secondary procedure codes. These procedures included vena cava resection, repair, or reconstruction (CPT codes: 34502, 37799, 37660, 37620, 34520, 34151-201, 35351, 35563, 35632-34, 35663), aortic repair or reconstruction (CPT: 33320-2, 35537-40, 35633-8, 33803), nephrectomy (CPT: 50220, 50225, 50230, 50234, 50236, 50240, 50250), splenectomy (CPT: 3800-1, 38115, 38192), pancreatic resection (CPT: 48140-6, 48150, 48152, 48154, 48155-9, 48105, 48545, 48548, 48999), hepatic resection or repair (CPT: 47120, 47122, 47125-30, 47351-62), bowel resection or repair without ostomy (CPT: 44661, 44140-1, 44145-6, 44160, 44120), bowel resection or repair with ostomy (CPT: 44310, 44320, 44322, 44141-4, 44125), thoracotomy (CPT: 38746, 32505-6, 32096-7, 32110, 32098, 32100, 32480, 32482, 32484, 32486, 32310, 32320), and thrombectomy (CPT: 34151-201, 34401-51, 50230).

We were specifically interested in determining rates of adjunctive procedures among PC-RPLND and used primary RPLND as a conceptual comparison, given the concordance of the anatomic dissection and age distribution of the population. The distinction serves as an imperfect proxy for stage as primary RPLND should be restricted to stage I and IIa patients and PC-RPLND suggests at least stage II testis cancer. However, it should be noted that billing claims are not reliable in determination of disease stage. PC-RPLND was defined by billing codes for receipt of antineoplastic therapy in the 180 days leading up to RPLND. This interval was selected as it was felt to be a reasonable time frame for a typical patient to complete presurgical treatment. Chemotherapy status was assessed by MarketScan pharmacy codes as well as CPT: 96413, 96415-7, 96409, 96411, and ICD-9: V58.11, E930.7, E933.1, 963.1, 99.25 (procedural codes for chemotherapy infusion).

Covariates

Covariates for multivariable models were selected a priori with the intention of retaining all in the final models. Given the limited covariates available in MarketScan apart from billing codes, the models were intended as hypothesis generating. For example, hospital level data in MarketScan were missing in over 60% of cases which severely limited our ability to estimate the effects of center volume in this cohort.

Available geographic variables included metropolitan statistical area (MSA) and 3-digit zip codes. MSA divides the United States into 381 divisions characterized by an urban core of at least 50,000 individuals and a surrounding area with a high degree of economic interdependency.¹⁷ The United States Postal Service maintains 3-digit zip codes that are linked 1-to-1 or few-to-one to a sectional center facility responsible for distributing mail in a geographic region.¹⁸ For crude descriptive purposes, frequency of unique MSA and 3-digit zip codes were calculated, allowing for presentation of geographic areas billing only 1 PC-RPLND during the 6-year study period. Given the nonspecificity of these geographic units as well as the high likelihood that MarketScan does not capture all procedures performed in these geographic units, they are not included in our final models.

Additional covariates were selected a priori based on their potential association with primary and secondary outcomes. Although granular data such as residual mass size and anatomic location were not available, we were able to adjust for demographic data (age, region), comorbidity (derived from Elixhauser et al¹⁹), administrative variables (beneficiary type, insurance plan type), and temporal variables (2007–2009 compared with 2010–2012).

Statistical Analyses

Characteristics of the cohort were calculated, stratified by receipt of PC-RPLND. Significant differences in patient characteristics by type of RPLND were assessed using chi-squared tests for categorical variables and K-sample tests for equality of medians for continuous variables. Unadjusted and multivariable logistic regression was used to assess for associations between PC-RPLND and receipt of an adjunctive procedure. Additional unadjusted and multivariable logistic regression was used to identify factors independently associated with prolonged LOS (defined as >7 days, representing the 75th percentile for the entire cohort), the odds of non-self-care (ie, discharge to SNF), and readmission within 90 days of PC-RPLND. The

same covariates were used in all models; however, in the model analyzing prolonged LOS, an additional adjustment was made for receipt of an adjunctive procedure, given this was likely to affect admission duration.

RESULTS

Among 1606 individuals screened exclusions included the following: 538 women, 471 men with major diagnostic category other than disorder of male reproductive system, and 38 men who were documented as receiving care in an implausible location (ie, laboratory, ambulance). This resulted in 559 cases for analysis. Of these, 37% (206) were categorized PC-RPLND. Study patient characteristics are displayed in Table 1. The median age was 31 (IQR 25–39) and did not differ by chemotherapy status. The proportion of patients undergoing PC-RPLND relative to primary RPLND increased by 11% over the study period. Other patient characteristics did not differ by RPLND type with the exception that those undergoing PC-RPLND were healthier, with 58% having no comorbidities compared with 20% of primary RPLND patients.

Table 2 describes the distribution of additional outcomes by type of RPLND. For the entire RPLND cohort, both PC- and primary RPLND, discharge to non-self-care was 9.8% (55), 90-day readmission was 5% (30), and prolonged LOS occurred in 14% (76). Among those meeting the “prolonged” cut-point, median stay was 9 days (range 8 to 71). Median LOS was greater among PC-RPLND patients. More patients undergoing PC-RPLND were discharged to an SNF compared with primary RPLND patients. Readmission rates did not differ by RPLND type.

Adjunctive procedures (Table 3) occurred in 8% of men overall and were significantly more common during PC-RPLND (19% compared with 1%). Of the 40 men who underwent adjunctive procedures at the time of PC-RPLND, 27 men (68%) underwent an isolated adjunctive procedure, 12 men (30%) underwent 2 procedures, and 1 man underwent 3 (2.5%). The most common adjunctive procedure during PC-RPLND was nephrectomy, followed by procedures involving the vena cava. Among primary RPLND, all adjunctive procedures were isolated.

Table 4 displays results of unadjusted logistic regression models of factors associated with receipt of adjunctive procedures. Only chemotherapy status and comorbidity count were associated with adjunctive procedures. On multivariable analysis, both PC-RPLND and comorbidity count were independently associated with receipt of a secondary procedure. Additionally, men aged 35 and over had higher odds of undergoing an adjunctive procedure compared with younger men.

With respect to secondary outcomes, on unadjusted analysis PC-RPLND was associated with greater than 3-fold increased odds of prolonged LOS defined as >7 days (odds ratio [OR] 3.75; 95% confidence interval [CI] 1.75, 7.67). Within this prolonged group, median LOS was 9 days (interquartile range 8–11 days). On multivariable analysis controlling for the covariates in Table 1, this remained significant (OR 3.56; 95% CI 1.68, 8.42), but after an additional adjustment for receipt of an adjunctive procedure, this was no longer

significant. Disposition outcomes did not differ by RPLND type on multivariable analysis (OR 1.46; 95% CI 0.76, 2.82). Finally, unadjusted and multivariable logistic regression revealed no significant association between PC-RPLND and 90-day readmissions. However, increasing comorbidity burden was associated with progressively increased odds of readmission.

There were 196 unique MSAs billing PC-RPLND of which 52 (27%) contributed 1 case during the 6-year study period. Similarly, there were 89 unique 3-digit zip codes, of which 26 (29%) contributed 1 case during the 6-year study period. The median number of cases per MSA was 2 (range 1 to 13), with 2 areas completing more than 6 cases, or 1 case per year over 6 years. The median number of cases per 3-digit zip code was 2.5 (range 1 to 18), with 3 zip codes contributing 6 cases (equivalent to 1 case per year over the study period).

DISCUSSION

We evaluated the relationship between chemotherapy status and morbidity following RPLND in a contemporary cohort of men with testis cancer using MarketScan data. We observed several important findings. First, PC-RPLND was associated with increased need for adjunctive procedures, most commonly nephrectomy. Second, PC-RPLND was associated with longer hospitalization and discharge to SNF. Finally, despite the complexity and morbidity of PC-RPLND, we capture PC-RPLND from 89 unique 3-digit zip codes, likely representing a diverse range of center experience. Although the geographic data are limited in this dataset, and likely under-sample total cases performed, many cases are likely completed at centers with little institutional experience.

Prior literature describes the increased morbidity of PC-RPLND compared with primary RPLND. For example, postoperative complication rates have been reported to be as high as 25%.^{5,20} However, more specific risk factors for PC-RPLND complexity are incompletely described. One series associates a component of seminoma in the primary tumor being associated with a 38% rate of adjunctive procedures of which 68% were nephrectomies.²⁰ The same group noted a 22% decrease in the need for adjunctive procedures over a 20-year period at their institution, likely reflecting a learning curve on renal and other organ-sparing techniques.¹¹ The rate of adjunctive procedures noted in MarketScan of 19% is similar to institutional series. For example, Nash and colleagues report a 19% en bloc nephrectomy rate in a 20-year series with 848 PC-RPLND cases.⁸ The present study represents a contemporary cohort drawn from numerous settings (89 different 3-digit zip codes and 196 different MSAs) in the United States and validates the morbidity of PC-RPLND described at the institutional level in tertiary referral centers. Additional multicenter studies are needed to identify modifiable risk factors for complications related to PC-RPLND.

Nephrectomy, the most common adjunctive procedure, may be particularly undesirable. The long-term implications of renal loss in the PC-RPLND population are not well understood. However, some suggest that up to 30% of those receiving cisplatin-based chemotherapy will suffer measurable renal impairment²¹ and that this is likely dose dependent.²² The most common reasons cited for nephrectomy include involvement of perinephric structures, renal vein thrombosis, and less commonly, poor renal function.⁸

Techniques for complex hilar and ureteral dissection that promote renal preservation may offer salvage options for the estimated 10% of young men at risk for renal loss during PC-RPLND. Given the direct link between cisplatin-based chemotherapy and renal toxicity, it seems prudent to advocate techniques to spare the kidney in PC-RPLND and to inform men planning PC-RPLND of the risk and implications of possible renal loss.

In this analysis, PC-RPLND was associated with longer index admission, which appeared to be driven by the adjunctive procedures. This finding is not surprising, given the increased complexity of PC-RPLND. Furthermore, at baseline in the MarketScan cohort, those having PC-RPLND had significantly higher comorbidity burden. PC-RPLND use increased over the study period, concordant with changes in guidelines published by the National Comprehensive Cancer Network.² Interestingly, over the same time period, the odds of an adjunctive procedure also increased by 86%. This contrasts with a series from a well-established PC-RPLND center of excellence, where a decrease in LOS and complications were noted over time.¹¹ It is unclear if our observations are related to surgeon experience or increased complexity of retroperitoneal masses over time. Having established an expected LOS in this analysis, we would propose a more in-depth analysis of the modifiable factors in those with prolonged admissions. Furthermore, a standardized approach to describe PC-RPLND complexity may guide preoperative counseling and allow comparison of surgical complexity across series. Finally, given the intrinsic morbidity of PC-RPLND, it would be reasonable to implement a more specific postchemotherapy billing code with ICD-10 rollout so that PC-RPLND cases and ensuing outcomes are captured accurately in administrative data seeking to detect quality improvement opportunities and surgeons and hospitals are fairly compensated for the added complexity.

Prior reports on the morbidity of PC-RPLND emanate from single institutional experiences at tertiary centers of excellence. These case series are valuable, given that hospital and surgeon volume are inversely associated with complications and poor oncologic outcomes in a variety of urologic cancers.^{23–26} A recent review of case logs among urologists in the United States demonstrated that although oncologically trained urologists at academic centers perform the most RPLNDs on a per-surgeon basis, a large number of urologists logging a single case represent the majority of RPLNDs performed.²⁷ Our study suggests this to be true, although given our reliance on billing claims based on membership in insurance plans captured by MarketScan, it is likely that reported case volume per geographic unit is significantly underestimated.

There are several important limitations that place this work in an appropriate context. This is a retrospective cohort study in which diagnoses and procedures are inferred from billing claims, which are subject to misclassification. Administrative data such as these lack clinical information that may affect risk estimates (eg, mass size, histology, and anatomic location). Many factors affect variation in complexity among PC-RPLND cases. Exclusions were designed to construct a more stringent cohort that, when combined with the rarity of advanced testis cancer, limited our cohort size. Similarly, adjunctive procedures, readmissions, and discharge to location other than home were relatively rare and the multivariable models may be overfit. Furthermore, a number of covariates that may have been more useful in surgical decision-making (ie, mass characteristics, key laboratory

values, etc) were not available. Additionally, negative findings cannot reliably be taken to mean lack of association, given the models are underpowered to detect small differences. Also, primary and PC-RPLND represent a similar demographic of men, but are inherently different procedures both technically and in terms of the underlying disease process. These differences at baseline, which are likely only partially captured by available covariates, may affect our model estimates. Lastly, geographic data were limited, and only crudely estimate trends in geographic case volume. Despite these limitations, we believe that our study can direct future analyses with greater granularity and inform quality improvement efforts in testis cancer surgery.

CONCLUSION

PC-RPLND is becoming more common as guidelines reflect an increasing need to observe stage I testis cancer. However, PC-RPLND is associated with high morbidity including the frequent need for adjunctive procedures and longer index hospitalizations. We clarify the unique risks of PC-RPLND among insured men treated at a variety of centers to inform patient and payer expectations and identify opportunities for improvement, particularly with regard to renal unit preservation. The electronic medical record and big data generate increasing quality improvement initiatives at the national scale; therefore, we advocate the use of specific procedural coding to distinguish PC-RPLND from primary RPLND to better capture outcomes moving forward.²⁸ Additionally, our results may inform preoperative discussions with patients. Quality improvement efforts should be directed at determining clinical factors predictive of PC-RPLND complexity and identification of technical factors associated with safer PC-RPLND surgery.

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Table 1

Demographic, insurance, comorbidity, and surgical-volume characteristics of cohort stratified by type of RPLND

	Substrata (N)	P-RPLND N (%) (N = 353 [†])	PC-RPLND N (%) (N = 206 [†])	P Value [*]
Age (years)	16–25 (167)	110 (31)	57 (28)	.42
	26–35 (194)	125 (35)	69 (33)	
	35–64 (198)	118 (34)	80 (39)	
Study year	2007–2009	178 (51)	77 (39)	<.01
	2010–2012	175 (49)	122 (61)	
Beneficiary type	Employee (361)	232 (66)	129 (63)	.92
	Spouse (85)	55 (16)	30 (15)	
	Child/dependent (112)	66 (18)	46 (22)	
Plan type	Provider network (428)	276 (78)	152 (74)	.33
	Other (62)	36 (10)	26 (13)	
Elixhauser comorbidity index	0 (245)	204 (58)	41 (20)	<.01
	1 (225)	122 (34)	103 (50)	
	2 (89)	27 (8)	62 (30)	

P-RPLND, primary RPLND; PC-RPLND, postchemotherapy RPLND; RPLND, retroperitoneal lymph node dissection.

^{*} Chi-squared test for categorical variables and K-sample test for equality of medians for continuous variables.

[†] Missing values result in numbers not summing to column total (statistical tests applied to available cases).

Table 2

Outcomes of interested stratified by RPLND chemotherapy status

		P-RPLND N (%) (N = 353)	PC-RPLND N (%) (N = 206)	P Value*
Adjunctive procedure	Yes	5 (1)	40 (19)	<.01
	No	348 (99)	166 (81)	
Median hospital stay (IQR) in days		4 (3–5)	5 (4–7)	<.01
Disposition after index admission	Home, self-care	325 (92)	177 (86)	.02
	Other facility	28 (8)	27 (13)	
	Expired	0 (0)	2 (1)	
Readmitted (90 days)	No	308 (87)	172 (83)	.22
	Yes	45 (13)	34 (17)	
Length of index stay	7 days	328 (93)	155 (75)	<.01
	>7 days	25 (7)	51 (25)	

IQR, interquartile range; other abbreviations as in Table 1.

* Chi-squared test for categorical variables and K-sample test for equality of medians for continuous variables.

Table 3

Adjunctive procedures at the time of RPLND stratified by type of RPLND

Characteristic	P-RPLND N (%) (N = 353)	PC-RPLND N (%) (N = 206)	P Value *
Any procedure [†]	5 (1)	40 (19)	<.01
Vascular [‡]	0 (0)	16 (8)	<.01
Nonvascular [§]	5 (1)	33 (16)	<.01
Caval repair/reconstruction/resection	0 (0)	14 (7)	<.01
Aortic repair/reconstruction	0 (0)	2 (1)	.06
Nephrectomy	3 (1)	20 (10)	<.01
Splenectomy	1 (0.3)	4 (2)	.05
Pancreatic resection	0 (0)	1 (0.5)	.19
Hepatic resection	1 (0.3)	2 (1)	.28
Bowel resection	0 (0)	7 (3)	<.01
Bowel resection with stoma	0 (0)	1 (0.5)	.19
Thoracotomy	0 (0)	2 (1)	.06
Thrombectomy	2 (0.6)	12 (6)	<.01

Abbreviations as in Table 1.

* Statistical tests as in Table 1.

[†] Includes vena cava resection/reconstruction/repair[‡], aortic reconstruction/repair[‡], nephrectomy[§], splenectomy[§], pancreatic resection[§], hepatic resection[§], bowel resection[§], bowel resection with stoma[§], thrombectomy[§], thoracotomy[§].

[‡] Includes those from prior list with [‡].

[§] Includes those from prior list with [§].

Table 4

Factors associated with receipt of adjunctive procedures during RPLND

Covariate	Sub-stratum	Unadjusted OR (95% CI)	MV OR (95% CI)
RPLND type	Primary	Ref	Ref
	Post-chemotherapy	16.8 (6.5, 43.3)	41.9 (11.7, 150)
Age (years)	16–25	Ref	Ref
	26–35	0.6 (0.22, 1.67)	0.65 (0.18, 2.38)
	>35	1.41 (0.49, 3.98)	3.69 (1.04, 13.1)
Study year	2007–2009	Ref	Ref
	2010–2012	1.68 (1.02, 2.76)	1.86 (1.07, 3.24)
Beneficiary type	Employee	Ref	Ref
	Spouse	1.91 (0.91, 4.05)	1.68 (0.71, 4.01)
	Child/dependent	1.05 (0.46, 2.40)	1.01 (0.54, 5.47)
Plan type	Provider network	Ref	Ref
	Other	0.78 (0.27, 2.26)	0.84 (0.27, 2.62)
Elixhauser comorbidity index	0	Ref	Ref
	1	6.2 (2.10, 18.4)	2.84 (0.77, 10.4)
	2	17.4 (5.78, 40.2)	9.39 (2.37, 37.2)

CI, confidence interval; MV, multivariable; OR, odds ratio; other abbreviations as in Table 1.