Original Article

Increased Readmission Rates but No Difference in Complication Rates in Patients Undergoing Inpatient Versus Outpatient Hip Arthroscopy: A Large Matched-Cohort Insurance Database Analysis

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Purpose: To compare the early postoperative outcomes of patients undergoing inpatient versus outpatient hip arthroscopy and identify any characteristics that may serve as predictors of these complications **Methods:** The PearlDiver Mariner insurance database was queried for all patients who underwent hip arthroscopy from 2010 to 2019. Patients were matched based on Charlson Comorbidity Index, age, and sex. Outcomes recorded included postoperative complications and return to care within 90 days. Predictors of complications were assessed via multivariable logistic regression controlling for age, sex, Charlson Comorbidity Index, comorbidities, surgical setting, and procedure type **Results:** The final matched cohort included 832 inpatients and 1,356 matched patients. Fifty-eight patients (7.0%) who underwent inpatient surgery versus 25 patients (1.8%) who underwent outpatient surgery were readmitted ($P < .01$). Of the readmitted patients, 31 inpatients (3.7%) and 5 outpatients (0.4%) were readmitted for hip-related reasons ($P < .01$). No significant differences were observed in emergency department visits (67 inpatients [8.1%] vs 84 outpatients [6.2%], $P = .11$), intensive care unit admissions (3 [0.4%] vs 1 [0.1%], $P = .31$), or revision hip arthroscopies (43 [5.2%] vs 65 [4.8%], $P = .77$). A multivariable model of complications correcting for baseline differences in chronic obstructive pulmonary disease, coronary artery disease, diabetes, hypertension, ischemic heart disease, tobacco use, and inpatient status found that age (adjusted odds ratio [OR], 0.92; 95% confidence interval [CI], 0.85-0.99; $P = .03$), coronary artery disease (adjusted OR, 12.82; 95% CI, 1.18-140.02; $P = .03$), and inpatient setting (adjusted OR, 20.59; 95% CI, 3.48-401.65; $P = .01$) were significantly associated with complications. No procedure type was associated with complication rates **Conclusions:** Compared with the outpatient setting, inpatient hip arthroscopy is associated with higher rates of readmission in a cohort matched for age, sex, and comorbidities. Complications after inpatient hip arthroscopy appear to be related to comorbidities rather than procedure-related factors. The decision to conduct an inpatient hip arthroscopy should prioritize consideration of patient comorbidities over the type of procedure **Level of Evidence:** Level III, retrospective cohort study.

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Hip arthroscopy is a relatively new, increasingly common procedure that grew by 3.5-fold to 25-fold in the early 2000s, according to representative epidemiologic studies.[1-3] This procedure is conducted for a variety of indications including femoroacetabular impingement (FAI), labral tears, hip synovitis, early osteoarthritis, or intra-articular loose bodies.[4] Hip arthroscopy has overwhelmingly shown excellent outcomes and low complication rates.[1-3]

The decision to conduct a surgical procedure in the hospital versus in an outpatient surgical center depends on patient factors (e.g., comorbidities, anesthesia concerns, and body habitus) and surgical factors (e.g., surgical complexity, expected blood loss and possible transfusion requirement, and need for special equipment). These factors should be carefully considered to mitigate the risk of postoperative complications that may occur after hip arthroscopy, such as nerve injury,[5] infection,[6] readmission or emergency department (ED) visits,[7] recurrence of symptoms,[8] or conversion to hip arthroplasty.[9] Because hip arthroscopy is a relatively new procedure, research is still ongoing to identify evidence-based factors that would contribute to a surgeon's decision to choose the appropriate surgical setting.

Although previous studies have identified factors associated with long-term patient-reported outcomes after hip arthroscopy,[10] there are limited data addressing the differences in the complication rates of outpatient versus inpatient hip arthroscopy in the immediate postoperative period. Furthermore, little is known about risk factors associated with these complications and how their effects may vary between inpatient and outpatient settings. The purpose of this study was to compare the early postoperative outcomes of patients undergoing inpatient versus outpatient hip arthroscopy and identify any characteristics that may serve as predictors of these complications. Our hypotheses were that the matched cohort of patients undergoing inpatient surgery would have similar complication rates to patients undergoing outpatient surgery and that patients with chronic disease would be at an increased risk of postoperative complications regardless of where their initial surgical procedure was conducted.

Methods

Data Collection

Data were extracted using the M91Ortho data set of PearlDiver Technologies (Colorado Springs, CO), which contains data from 91 million orthopaedic patients enrolled in the Mariner commercial insurance database and Medicare Standard Analytical Files from 2007 to 2020. The Mariner database overall includes 144 million patients insured by commercial, Medicare, Medicaid, government, and cash payers. The database was queried for all patients who underwent hip arthroscopy (Current Procedural Terminology [CPT] codes 29860, 29861, 29862, 29863, 29914, 29915, and 29916). Patients were matched based on age, sex, Charlson Comorbidity Index (CCI), comorbidities, and procedure type at a 1:2 ratio.

Variables collected included age, sex, region, cost, and comorbidities. Early postoperative complications were identified by assessing for concomitant surgical-site infection (SSI), acute kidney injury, myocardial infarction, cardiac arrest, deep venous thrombosis, wound disruption or seroma, hematoma, nerve injury, pneumonia, pulmonary embolism, anemia requiring transfusion, urinary tract infection, avascular necrosis of the femoral head, sepsis, joint infection, or death within 90 days. We also recorded any ED visits (in general and for hip-related issues), readmissions, intensive care unit (ICU) admissions, or reoperations within 90 days of discharge. Hip-related issues were defined by an admission or ED visit with an *International Classification of Diseases, Ninth Revision* (ICD-9) or *International Classification of Diseases, Tenth Revision* (ICD-10) code for a broad range of hip pathologies (Appendix Table 1).

Statistical Analysis

Categorical data were reported as counts and percentages. Continuous data were reported as medians and interquartile ranges. Analysis of hip arthroscopy over time was reported by normalizing the annual procedure counts to the number of persons in the M91 data set each year and conducting a Pearson correlation between hip arthroscopy utilization and year. The year 2020 was excluded from this time-series analysis to avoid the known effects of the COVID-19 (coronavirus disease 2019) pandemic on elective surgery rates.[11] Differences between groups were analyzed using the Fisher exact test for categorical data and the Wilcoxon rank sum test for continuous data.

Predictors of complication rates were assessed using a multivariable logistic regression model controlling for age, sex, CCI, inpatient versus outpatient setting, procedure type, and factors previously reported to be linked to measured complications in the literature: diabetes mellitus, chronic kidney disease, obesity, tobacco use, chronic obstructive pulmonary disease (COPD), and coronary artery disease (CAD).[10] A second predictive model was performed controlling for age, sex, CCI, and procedure type via CPT code. To better elucidate the reasons for ED visits, readmissions, or ICU admissions if significant differences were found, we used the "association track" code, which lists the frequency of other *International Classification of Diseases* (ICD) or CPT codes applied to the same visit, to identify the most common reasons for the return to hospital-level care. The type I error rate was set at .05. Our

sample size of 2,188 hip arthroscopy procedures gave our study over 90% power to detect a 10% difference in complication rates between the inpatient and outpatient groups. Analyses were performed using Bellwether (version 2.0; PearlDiver Technologies).

Results

Baseline Demographic Characteristics

A total of 46,867 hip arthroscopy procedures were performed during the study period; 1,677 patients (0.4%) were excluded for loss to follow-up within 90 days. Of the remaining 45,190 hip arthroscopies, 1,401 (3.1%) were performed in the inpatient setting. After matching, the final cohort comprised 832 patients who underwent inpatient hip arthroscopy and 1,356 matched patients who underwent outpatient hip arthroscopy (Fig 1). Baseline demographic characteristics were similar between groups regarding age, sex, CCI, insurance plan, and hip arthroscopic procedures (Table 1). Despite matching, inpatients were more likely to have COPD (177 inpatients [21.3%] vs 241 outpatients [17.8%], $P = .05$), CAD (51 inpatients [6.1%] vs 53 outpatients [3.9%], $P = .02$), diabetes (110 inpatients [13.2%] vs 130 outpatients [9.6%], $P = .01$), hypertension (229 inpatients [27.5%] vs 300 outpatients [22.1%], $P < .01$), and ischemic heart disease (38 inpatients [4.6%] vs 39 outpatients [2.9%], $P = .05$) and to use tobacco (176 inpatients [21.2%] vs 239 outpatients [17.6%], $P = .05$). Notably, the length of stay was 0 days for all patients in both groups.

Inpatient Versus Outpatient Hip Arthroscopy

Inpatient history and outpatient history are shown in Figure 2. From 2010 to 2019, the prevalence of outpatient hip arthroscopy increased from 47 operations to 72 operations per 1 million person-years ($r^2 = 0.77$; 95% confidence interval [CI], 0.28-0.94; $P = .009$) (Fig 1). By contrast, the prevalence of inpatient hip arthroscopy decreased from 119 operations to 43 operations per 1 million person-years ($r^2 = -0.69$; 95% CI, −0.92 to −0.11; $P = .03$). Overall, outpatient procedures comprised most hip arthroscopies.

Complication Rates After Inpatient Versus Outpatient Hip Arthroscopy

Complication rates were similar within the first 90 days between the inpatient and outpatient hip arthroscopy groups. No significant differences were observed between groups regarding SSI, acute kidney injury, cardiac arrest, deep venous thrombosis, wound disruption or seroma, hematoma, nerve injury, pneumonia, pulmonary embolism, urinary tract infection, avascular necrosis of the femoral head, sepsis, joint infection, or death (Table 2). However, inpatients were more likely to have anemia requiring a transfusion (6 inpatients [0.7%] vs 1 outpatient [0.1%], $P = .03$).

ED Visits, Readmissions, ICU Admissions, and Reoperations

We observed no difference between groups pertaining to overall ED visits ($P = .11$), hip-related ED visits ($P = .56$), and ICU admissions ($P = .31$) within 90 days of discharge after surgery. There were 43 revision hip arthroscopies in the inpatient group (5.2%) and 65 revisions in the outpatient group (4.8%, $P = .77$). The groups differed, however, in the rates of overall readmission and readmission for a hip-related issue. Readmission to the hospital within 3 months of discharge occurred in 58 patients in the inpatient cohort (7.0%) versus 25 patients in the outpatient cohort (1.8%, $P < .01$). Of those patients who were readmitted for hip-related reasons, 31 (3.7%) were from the inpatient group whereas 5 (0.4%) were from the outpatient group ($P < .01$, Table 3).

An exploratory analysis of ICD codes associated with readmissions found that the most common diagnosis codes applied to readmissions included other specific congenital deformities of the hip (91 instances), sprain in the hip region (87 instances), and joint pain (83 instances). No non−hip-related diagnoses exceeded the censoring threshold of 11 counts in either group. A similar analysis of ICD codes associated with readmissions for hip-related reasons found that the top diagnoses associated with readmissions for hip-related reasons were other specific congenital deformities of the hip (80 instances), sprain in the hip region (47 instances), and joint pain (33 instances).

Risk Factors for 90-Day Complications

Two multivariable models were used to identify risk factors for complications: one assessing patient-related risk factors and the other assessing procedure-related risk factors. A multivariable analysis of complications correcting for baseline differences in age, sex, CCI, COPD, CAD, diabetes, hypertension, ischemic heart disease, tobacco use, and inpatient status found that age (adjusted odds ratio [OR], 0.92; 95% CI, 0.85-0.99; $P = .03$), CAD (adjusted OR, 12.82; 95% CI, 1.18-140.02; $P = .03$), and inpatient setting (adjusted OR, 20.59; 95% CI, 3.48-401.65; $P = .01$) were significantly associated with complications (Table 4). Stepwise addition of congenital hip abnormalities as an independent risk factor found that inpatient status (adjusted OR, 20.51; 95% CI, 3.18-429.45; $P = .008$) and congenital hip abnormalities (adjusted OR, 8.38; 95% CI, 1.46-61.09; $P = .02$) were significant predictors of complications (Appendix Table 2). A multivariable analysis of complications correcting for procedure type, sex, age, inpatient status, and CCI found that no

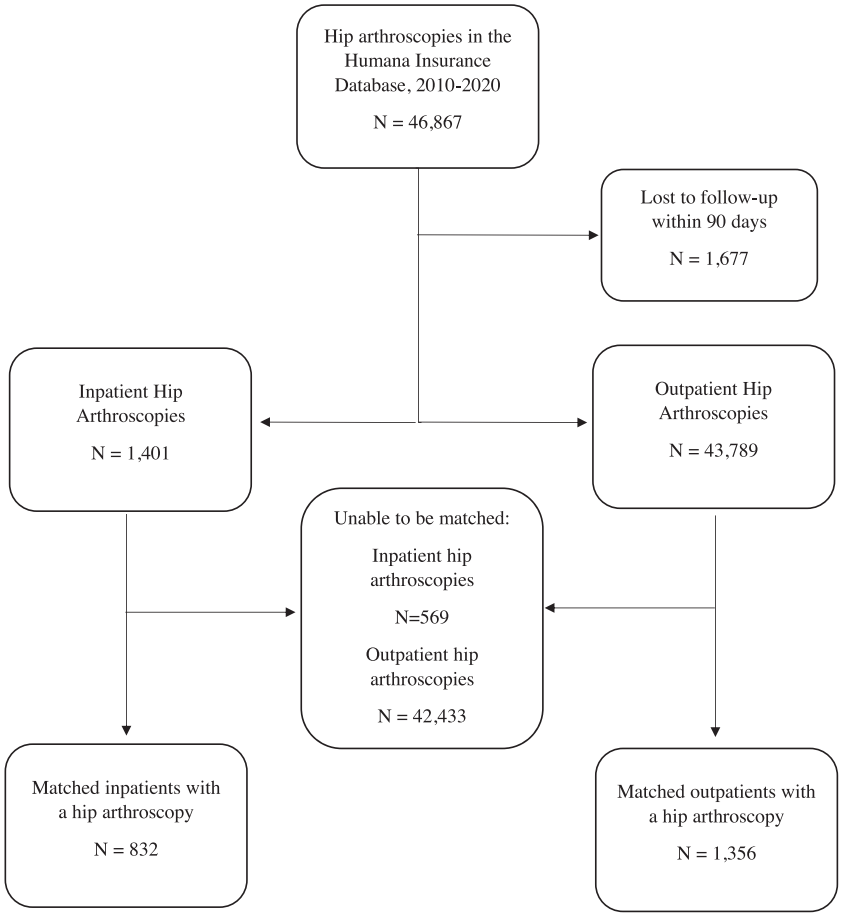

Fig 1. STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) diagram of patients included in matched-cohort study of inpatient versus outpatient hip arthroscopy.

procedure type was significantly associated with a risk of a complication (Table 5).

Discussion

The principal findings of this study are as follows: (1) In a patient cohort matched for age, sex, and comorbidities, inpatient hip arthroscopy was associated with higher rates of readmission compared with outpatient hip arthroscopy, even when correcting for baseline differences in comorbidities. (2) There were no significant differences in ED visits, ICU admissions, or medical complications between the inpatient and outpatient groups. (3) Inpatient status was a significant predictor of medical complications in the 90-day postoperative period when correcting for baseline comorbidities. (4) No procedure type significantly affected the risk of complications.

Despite matching on age and comorbidities, patients who underwent inpatient hip arthroscopy were more likely than patients who underwent outpatient hip arthroscopy to be readmitted within 90 days. In the current literature, the most common risk factors for readmission are increasing age, obesity, hypertension, corticosteroid use, perioperative blood transfusions, SSIs, wound complications, and thromboembolic events.[12-15] Inpatient hip arthroscopy was still a significant risk factor for readmission despite controlling for baseline differences in comorbidities, suggesting that local rather than systemic pathology may contribute to these differences in readmission rates.[16] An exploratory analysis found that the leading diagnosis codes associated with readmissions were congenital hip deformity, hip sprain, and hip pain, which suggests that inpatients are being readmitted at higher rates specifically for hip derangements. This finding is limited by the coding of diagnoses in the administrative database; for example, it is possible that FAI may have been coded as a congenital hip disorder. Still, the potential for poorer outcomes associated with congenital hip deformities is supported by the literature. Several studies have shown that patients with developmental dysplasia of the hip experience higher failure rates and poorer outcomes after FAI arthroscopy compared with patients without dysplasia.[17-20]

There may be factors related to the hospital recovery setting partially driving the higher readmission rates of inpatient procedures. Because patients are less mobile

Table 1. Demographic Characteristics, Comorbidities, and Procedure Comparison of Inpatient and Outpatient Matched Cohorts

	Inpatient (n = 832)	Outpatient (n = 1,356)	*P* Value
Female sex*	615 (73.9)	1,029 (75.9)	.33
Age, yr	33 (20-45)	36 (23-47)	.07
CCI*			.58
0	559 (67.2)	964 (71.1)	
1	187 (22.5)	285 (21.0)	
2	58 (7.0)	77 (5.7)	
≥3	28 (3.4)	30 (2.2)	
Insurance plan			.07
Commercial	723 (86.9)	1,212 (89.4)	
Government	27 (3.2)	36 (2.7)	
Medicare	38 (4.6)	66 (4.9)	
Medicaid	28 (3.4)	31 (2.3)	
Unknown	16 (1.9)	11 (0.8)	
Comorbidities			
Asthma	117 (14.1)	156 (11.5)	.09
COPD	177 (21.3)	241 (17.8)	.05
CKD	20 (2.4)	20 (1.5)	.16
CHF	8 (1.0)	8 (0.6)	.46
CAD	51 (6.1)	53 (3.9)	.02†
Diabetes	110 (13.2)	130 (9.6)	.01†
HTN	229 (27.5)	300 (22.1)	<.01†
Ischemic HD	38 (4.6)	39 (2.9)	.05
Obesity	173 (20.8)	236 (17.4)	.06
OA	357 (42.9)	532 (39.2)	.10
Pulmonary HD	18 (2.2)	20 (1.5)	.30
RA	16 (1.9)	17 (1.3)	.29
Tobacco use	176 (21.2)	239 (17.6)	.05
Procedure			
CPT code 29860	26 (3.1)	29 (2.1)	.20
CPT code 29861	63 (7.6)	82 (6.0)	.19
CPT code 29862	304 (36.5)	470 (34.7)	.40
CPT code 29863	119 (14.3)	159 (11.7)	.09
CPT code 29914	439 (52.8)	720 (53.1)	.91
CPT code 29915	234 (28.1)	354 (26.1)	.32
CPT code 29916	445 (53.5)	741 (54.6)	.63
Length of stay, d	0 (0-0)	0 (0-0)	>.99

NOTE. Data are presented as number (percentage) or median (interquartile range).

CAD, coronary artery disease; CCI, Charlson Comorbidity Index; CHF, congestive heart failure; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; CPT, Current Procedural Terminology; HD, heart disease; HTN, hypertension; OA, osteoarthritis.

*Patients were matched for these variables.

†Statistically significant ($P < .05$).

while in the hospital, they may be significantly less active overall in the postoperative period, thus increasing the risk of fibrosis and pain. Recovery in the familiar home environment may play a psychological role in helping the patient recover compared with an unfamiliar hospital setting, surrounded by other patients who are sick or recovering.

Because there was no significant difference between the inpatient and outpatient cohorts in the rate of any of the most common medical complications driving readmission, it is possible that nonmedical reasons underlie the differences in readmission rates. One important feature to consider is the socioeconomic status of included patients. It is well established that higher socioeconomic status positively influences patient outcomes after other hip and arthroscopic procedures, both short term and long term.[21-22] There were no differences between groups in the proportion of patients using public insurance, which is often used as a proxy for socioeconomic status in the orthopaedic literature. In addition, social support may play a role in the differences found in readmission rates for patients undergoing inpatient versus outpatient hip arthroscopy. Social support, which includes assistance with postoperative care, nutrition, and physical comfort, as well as emotional support, may improve patient outcomes in the recovery period.[23] In fact, social support is often a primary factor considered for outpatient surgery selection by the physician or patient[23] and thus may contribute to the higher rate of readmission in the inpatient group. Patients with less social support at home will need to be readmitted sooner or for less serious presentations simply because they have fewer options for at-home care. Finally, patients may elect to undergo surgery in the highly monitored inpatient setting because of anxiety about undergoing surgery away from specialized resources and staff available at a hospital. A higher degree of anxiety or lower self-efficacy has been associated with worse outcomes after hip arthroscopy.[24]

There is a paucity of data examining the safety outcomes of inpatient versus outpatient hip arthroscopy. However, our results are consistent with similar studies in the literature comparing the complication rates of other arthroscopic and hip procedures in the inpatient versus outpatient setting. In a database study on anterior cruciate ligament reconstruction, Lu et al.[25] suggested that inpatient surgery is associated with a greater risk of SSI and readmission. By contrast, a systematic review and meta-analysis by Ferrari et al.[26] found no difference in complication rates after anterior cruciate ligament reconstruction conducted in the inpatient versus outpatient setting. In a matched-cohort analysis of patients undergoing inpatient versus outpatient rotator cuff repair, Khazi et al.[27] reported increased rates of complications for inpatient surgical procedures. Although few studies have compared minimally invasive hip procedures in inpatient versus outpatient settings, similar studies have been conducted in hip arthroplasty patients. A study by Rosinsky et al.[28] found that there were no differences reported in inpatient versus outpatient complication rates, ED visits, or ICU visits. However, their arthroplasty study did not find differences in readmission rates after hip replacement by surgical setting as we did in our arthroscopy study. Notably, compared with hip arthroscopy, hip arthroplasty is a procedure with much greater morbidity that

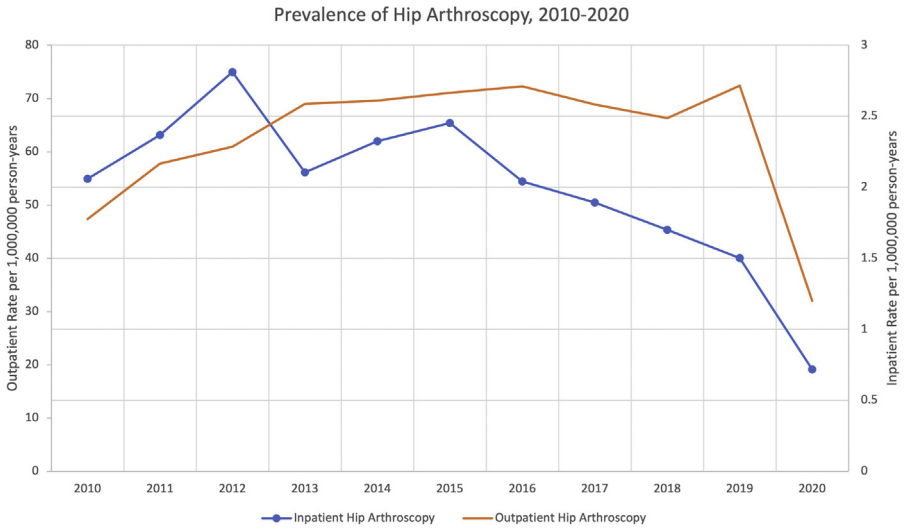

Fig 2. Prevalence of patients undergoing hip arthroscopy as inpatient versus outpatient from 2010 to 2020 within large insurance database, reported as number of cases per 1 million person-years.

is often conducted in patients who are older and more ill. Therefore, a surgeon's criteria to identify patients appropriate for outpatient hip arthroplasty may be much stricter than his or her criteria for hip arthroscopy. Ultimately, this may lead to a selection bias that leads to fewer differences in complication rates after this procedure.

There are several strengths of this study. By matching the patients based on age, sex, and comorbidities, we have mitigated some of the established confounding effects of these variables on postsurgical outcomes.[10] Our study also has strong generalizability because we studied a large cohort of patients representing multiple practice settings, surgeons, and environments. Finally, by analyzing specific safety outcomes (i.e., various medical complications, ICU visits, ED visits, and readmissions) and identifying their associated diagnoses, we were able to more specifically address how the inpatient

Table 2. Complications of Matched Patients Who Underwent Inpatient and Outpatient Hip Arthroscopy

	Inpatient (n = 832)		Outpatient (n = 1,356)		
Complication	n	%	n	%	*P* Value
ED visit	67	8.1	84	6.2	.11
ED visit for hip	11	1.3	13	1.0	.56
Readmission	58	7.0	25	1.8	<.01*
Readmission for hip	31	3.7	5	0.4	<.01*
ICU admission	3	0.4	1	0.1	.31
Reoperation	43	5.2	65	4.8	.77
Conversion to THA	1	0.1	4	0.3	.71
AVN	6	0.7	4	0.3	.27
Any medical complication	35	4.2	40	2.9	.15
AKI	2	0.2	1	0.1	.67
Cardiac arrest	1	0.1	1	0.1	>.99
DVT	3	0.4	3	0.2	.85
Wound disruption	2	0.2	2	0.1	>.99
Hematoma	1	0.1	0	0.0	.81
Joint infection	1	0.1	0	0.0	.81
Nerve injury	0	0.0	0	0.0	>.99
Pneumonia	7	0.8	8	0.6	.67
PE	1	0.1	2	0.1	>.99
Sepsis	2	0.2	1	0.1	.67
SSI	1	0.1	1	0.1	>.99
Transfusion	6	0.7	1	0.1	.03*
UTI	14	1.7	26	1.9	.82

AKI, acute kidney injury; AVN, avascular necrosis; DVT, deep venous thrombosis; ED, emergency department; ICU, intensive care unit; PE, pulmonary embolism; SSI, surgical-site infection; THA, total hip arthroplasty; UTI, urinary tract infection.

*Statistically significant ($P < .05$).

Table 3. ED Visits, Readmissions, ICU Admissions, Reoperations, Revisions to THA, and Cases of Avascular Necrosis for Inpatient Versus Outpatient Hip Arthroscopy

	Inpatient (n = 832)		Outpatient (n = 1,356)		
Complication	n	%	n	%	*P* Value
ED visit	67	8.1	84	6.2	.11
ED visit for hip	11	1.3	13	1.0	.56
Readmission	58	7.0	25	1.8	<.01*
Readmission for hip	31	3.7	5	0.4	<.01*
ICU admission	3	0.4	1	0.1	.31
Reoperation	43	5.2	65	4.8	.77
Conversion to THA	1	0.1	4	0.3	.71
AVN	6	0.7	4	0.3	.27

AVN, avascular necrosis; ED, emergency department; ICU, intensive care unit; THA, total hip arthroplasty.
*Statistically significant ($P < .05$).

versus outpatient setting affects complications that may arise in the short-term postoperative period.

Limitations

This study has several limitations common to database studies. Despite matching on the CCI and comorbidities, there were baseline differences in the rates of COPD, CAD, diabetes, hypertension, and ischemic heart disease. However, in a multivariable analysis correcting for these baseline differences, inpatient arthroscopy was still a significant risk factor for readmission. There also may have been baseline differences between populations not well captured within the CCI that led to an imbalance in the risk of readmission between groups.[29] Matching on the CCI may have led to balanced rates of complications related to cardiovascular, pulmonary, and renal disease but would not capture pre-existing musculoskeletal or pain-related pathology that may help explain differences between these groups.

In addition, the only procedural factor we could analyze in our data set was procedure code, or type of arthroscopy. Within a given procedure type, the complexity of the procedure may vary. For example, arthroscopy for removal of loose bodies may vary in the procedure duration, depth of invasion, and complication rates based on the size of the loose bodies and their accessibility within the hip region.[10] Because we could not capture these case specifics in our analysis, this may have contributed to the wide CI of the OR for surgical complications within each procedure type. Assessing procedure-specific differences in complication rates was also difficult because of a lower sample size within each arm, limiting our statistical power.

Finally, as with all large insurance database studies, our study relies on appropriate application and specificity of administrative claims coding. Administrative codes are generally broad rather than specific, leading to a loss of granularity in the data assessed by database studies. The choice of a given administrative code is user dependent and may lead to variations in data collection. For example, a patient with right-sided FAI may be coded as having "other specific joint derangements of right hip, not otherwise specified" (ICD-10 code D-M24851), "osteophyte, right hip" (ICD-10 code D-M25751), "chondrolysis, right hip" (ICD-10

Table 4. Risk of Complications Within 90 Days, Corrected for Baseline Comorbidities

Risk Factor	OR	95% CI	*P* Value
Age	0.92	0.85-0.99	.03*
CCI	0.58	0.13-1.34	.38
Male sex	0.54	0.07-2.69	.50
Diabetes	2.30	0.28-15.58	.41
Chronic kidney disease	10.11	0.29-213.35	.14
Obesity	3.47	0.63-18.37	.14
Tobacco use	2.00	0.30-11.28	.44
COPD	0.50	0.05-3.32	.51
Coronary artery disease	12.82	1.18-140.02	.03*
Inpatient hip arthroscopy	20.59	3.48-401.65	.01*

CCI, Charlson Comorbidity Index; CI, confidence interval; COPD, chronic obstructive pulmonary disease; OR, odds ratio.
*Statistically significant ($P < .05$).

Table 5. Significant Surgery-Related Risk Factors for 90-Day Complications in Patients Undergoing Hip Arthroscopy

Risk Factor	OR	95% CI	*P* Value
Male sex	0.68	0.09-3.37	.67
Age	0.97	0.92-1.02	.30
CCI	0.51	0.03-3.45	.56
CPT code 29860 (diagnostic arthroscopy)	0.68	0.11-3.64	.66
CPT code 29861 (removal of loose bodies)	0.68	0.09-3.37	.67
CPT code 29862 (chondroplasty)	0.97	0.92-1.02	.30
CPT code 29863 (synovectomy)	2.31	0.10-20.82	.50
CPT code 29914 (femoroplasty)	0.68	0.09-3.37	.67
CPT code 29915 (osteoplasty of acetabulum)	0.97	0.92-1.02	.30
CPT code 29916 (labral repair)	0.51	0.03-3.45	.56
Inpatient hip arthroscopy procedure	0.68	0.11-3.64	.66

CCI, Charlson Comorbidity Index; CI, confidence interval; CPT, Current Procedural Terminology; OR, odds ratio.

code D-M94351), or "right hip pain" (ICD-10 code D-M25551), among other options. Our study attempts to mitigate some of the variability in diagnostic coding by defining our inclusion criteria using CPT codes, which are less heterogeneous and more specific. Furthermore, the severity of a particular pathology cannot be determined by the administrative code alone, and retrospective studies incorporating radiographic and arthroscopic information are warranted to better understand the factors underlying complications after inpatient or outpatient hip arthroscopy. Although the possibility of miscoding cannot be excluded, PearlDiver Technologies has dedicated staff who conduct regular quality checks to ensure the accuracy of the data set to mitigate this risk.

Conclusions

Compared with the outpatient setting, inpatient hip arthroscopy is associated with higher rates of readmission in a cohort matched for age, sex, and comorbidities. Complications after inpatient hip arthroscopy appear to be related to comorbidities rather than procedure-related factors. The decision to conduct an inpatient hip arthroscopy should prioritize consideration of patient comorbidities over the type of procedure.

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Appendix Table 1. Codes Used for Querying PearlDiver Database

Variable	Code
Hip arthroscopy	CPT-29860, CPT-29861, CPT-29862, CPT-29863, CPT-29914, CPT-29915, CPT-29916
Hip-related issue	ICD-10-D-M05051, ICD-10-D-M05151, ICD-10-D-M05251, ICD-10-D-M05351, ICD-10-D-M05451, ICD-10-D-M05551, ICD-10-D-M05651, ICD-10-D-M05751, ICD-10-D-M05851, ICD-10-D-M06051, ICD-10-D-M06251, ICD-10-D-M06351, ICD-10-D-M06851, ICD-10-D-M07651, ICD-10-D-M08051, ICD-10-D-M08251, ICD-10-D-M08451, ICD-10-D-M08851, ICD-10-D-M08951, ICD-10-D-M10051, ICD-10-D-M10151, ICD-10-D-M10251, ICD-10-D-M10351, ICD-10-D-M10451, ICD-10-D-M11051, ICD-10-D-M11151, ICD-10-D-M11251, ICD-10-D-M11851, ICD-10-D-M12051, ICD-10-D-M12151, ICD-10-D-M12251, ICD-10-D-M12351, ICD-10-D-M12451, ICD-10-D-M12551, ICD-10-D-M12851, ICD-10-D-M13151, ICD-10-D-M13851, ICD-10-D-M14651, ICD-10-D-M14851, ICD-10-D-M21051, ICD-10-D-M21151, ICD-10-D-M21251, ICD-10-D-M24051, ICD-10-D-M24151, ICD-10-D-M24251, ICD-10-D-M24351, ICD-10-D-M24451, ICD-10-D-M24551, ICD-10-D-M24651, ICD-10-D-M24851, ICD-10-D-M25051, ICD-10-D-M25151, ICD-10-D-M25251, ICD-10-D-M25351, ICD-10-D-M25451, ICD-10-D-M25551, ICD-10-D-M25651, ICD-10-D-M25751, ICD-10-D-M25851, ICD-10-D-M160, ICD-10-D-M1611, ICD-10-D-M162, ICD-10-D-M1631, ICD-10-D-M164, ICD-10-D-M1651, ICD-10-D-M166, ICD-10-D-M1A0510, ICD-10-D-M1A0511, ICD-10-D-M1A3510, ICD-10-D-M1A3511, ICD-10-D-M1A4510, ICD-10-D-M1A4511, ICD-10-D-M65151, ICD-10-D-M66151, ICD-10-D-M67351, ICD-10-D-M67451, ICD-10-D-M67851, ICD-10-D-M67853, ICD-10-D-Q6501, ICD-10-D-Q651, ICD-10-D-Q6531, ICD-10-D-Q654, ICD-10-D-M7061, ICD-10-D-M7071, ICD-10-D-M71351, ICD-10-D-M71051, ICD-10-D-M71151, ICD-10-D-M71351, ICD-10-D-M71451, ICD-10-D-M71551, ICD-10-D-M71851, ICD-10-D-M7601, ICD-10-D-M7611, ICD-10-D-M7621, ICD-10-D-M9121, ICD-10-D-M9131, ICD-10-D-M9141, ICD-10-D-M9181, ICD-10-D-M9191, ICD-10-D-M93001, ICD-10-D-M93011, ICD-10-D-M93021, ICD-10-D-M93031, ICD-10-D-M93251, ICD-10-D-M94251, ICD-10-D-M94351, ICD-10-D-S73031A, ICD-10-D-S73031D, ICD-10-D-S73031S, ICD-10-D-S73001A, ICD-10-D-S73001D, ICD-10-D-S73001S, ICD-10-D-S73004A, ICD-10-D-S73004D, ICD-10-D-S73004S, ICD-10-D-S73011A, ICD-10-D-S73011D, ICD-10-D-S73011S, ICD-10-D-S73014A, ICD-10-D-S73014D, ICD-10-D-S73014S, ICD-10-D-S73021A, ICD-10-D-S73021D, ICD-10-D-S73021S, ICD-10-D-S73024A, ICD-10-D-S73024D, ICD-10-D-S73024S, ICD-10-D-S73031A, ICD-10-D-S73031D, ICD-10-D-S73031S, ICD-10-D-S73034A, ICD-10-D-S73034D, ICD-10-D-S73034S, ICD-10-D-S73041A, ICD-10-D-S73041D, ICD-10-D-S73041S, ICD-10-D-S73044A, ICD-10-D-S73044D, ICD-10-D-S73044S, ICD-10-D-S73101A, ICD-10-D-S73101D, ICD-10-D-S73101S, ICD-10-D-S73111A, ICD-10-D-S73111D, ICD-10-D-S73111S, ICD-10-D-S73121A, ICD-10-D-S73121D, ICD-10-D-S73121S, ICD-10-D-S73191A, ICD-10-D-S73191D, ICD-10-D-S73191S, ICD-10-D-S76001A, ICD-10-D-S76001D, ICD-10-D-S76001S, ICD-10-D-S76011A, ICD-10-D-S76011D, ICD-10-D-S76011S, ICD-10-D-S76021A, ICD-10-D-S76021D, ICD-10-D-S76021S, ICD-10-D-S76091A, ICD-10-D-S76091D, ICD-10-D-S76091S, ICD-10-D-S79811A, ICD-10-D-S79811D, ICD-10-D-S79811S, ICD-10-D-S79911A, ICD-10-D-S79911D, ICD-10-D-S79911S
Comorbidities	
Asthma	ICD-9-D-49300, ICD-9-D-49399, ICD-10-D-J452: ICD-10-D-J45988
COPD	ICD-9-D-490: ICD-9-D-49699, ICD-10-D-J44: ICD-10-DJ449
Coronary artery disease	ICD-9-D-4110: ICD-9-D-4149, ICD-10-D-I25: ICD-10-D-I259
Congestive heart failure	ICD-9-D-39891, ICD-9-D-4280, ICD-9-D-4281, ICD-9-D-42820, ICD-9-D-42821, ICD-9-D-42822, ICD-9-D-42823, ICD-9-D-42830, ICD-9-D-42831, ICD-9-D-42832, ICD-9-D-42833, ICD-9-D-42840, ICD-9-D-42841, ICD-9-D-42842, ICD-9-D-42843, ICD-9-D-4289, ICD-10-D-I150: ICD-10-D-I159
Chronic kidney disease	ICD-9-D-585, ICD-9-D-5851, ICD-9-D-5852, ICD-9-D-5853, ICD-9-D-5854, ICD-9-D-5855, ICD-9-D-5856, ICD-9-D-5859, ICD-9-D-7925, ICD-10-D-N18: ICD-10-D-N189
Diabetes	ICD-9-D-24900: ICD-9-D-25099, ICD-9-D-7902, ICD-9-D-79021, ICD-9-D-79022, ICD-9-D-79029, ICD-9-D-7915, ICD-9-D-7916, ICD-10-D-E090: ICD-10-D-E139
Hypertension	ICD-9-D-4010: ICD-9-D-4059, ICD-10-D-I10: ICD-10-D-I159
Obesity	ICD-9-D-2780, ICD-9-D-27800, ICD-9-D-27801, ICD-9-D-27802, ICD-9-D-27803, ICD-10-D-E660: ICD-10-D-E669
Osteoarthritis	ICD-9-D-71500: ICD-9-D-71599, ICD-10-D-M1911: ICD-10-D-M1993
Pulmonary heart disease	ICD-9-D-4150: ICD-9-D-41799, ICD-10-D-I26: ICD-10-D-I279
Rheumatoid arthritis	ICD-9-D-7140, ICD-9-D-7142, ICD-10-M0520: ICD-10-D-M061
Tobacco use	ICD-9-D-3051, ICD-9-D-V1582, ICD-10-D-F17220, ICD-10-D-F17221, ICD-10-D-F17223, ICD-10-D-F17228, ICD-10-D-F17229, ICD-10-D-F17290, ICD-10-D-F17291, ICD-10-D-F17293, ICD-10-D-F17298, ICD-10-D-F17299, ICD-10-D-Z720
Complications	
SSI	ICD-9-D-99859, ICD-9-D-99851, ICD-10-D-T814XXA

(continued)

Appendix Table 1. Continued

Variable	Code
AVN of hip	ICD-9-D-73342, ICD-10-M-87059
Sepsis	ICD-9-D-99591, ICD-10-A4100-ICD-10-A4189, ICD-10-T8144
Hip joint infection	ICD-9-71105, ICD-10-D-M01X0, ICD-10-D-M00859, ICD-10-DM009
Acute kidney injury	ICD-9-D-5845, ICD-9-D-5846, ICD-9-D-5847, ICD-9-D-5848, ICD-9-D-5849, ICD-10-D-N17: ICD-10-D-N179
Cardiac arrest	ICD-9-D-4275, ICD-9-D-42741, ICD-10-D-I46: ICD-10-D-I469
Deep venous thrombosis	ICD-9-D-4532, ICD-9-D-4533, ICD-9-D-4534, ICD-9-D-45382, ICD-9-D-45384, ICD-9-D-45385, ICD-9-D-45386, ICD-10-D-I26: ICD-10-D-I2699
Hematoma	ICD-9-D-99811, ICD-9-D-99812, ICD-9-D-99813, ICD-10-D-D7801, ICD-10-D-D7802, ICD-10-D-D7821, ICD-10-D-D7822, ICD-10-D-E3601, ICD-10-D-E3602, ICD-10-D-E89810, ICD-10-D-E89811, ICD-10-D-G9731, ICD-10-D-G9732, ICD-10-D-G9751, ICD-10-D-G9752, ICD-10-D-H59111, ICD-10-D-H59112, ICD-10-D-H59113, ICD-10-D-H59119, ICD-10-D-H59121, ICD-10-D-H59122, ICD-10-D-H59123, ICD-10-D-H59129, ICD-10-D-H59311, ICD-10-D-H59312, ICD-10-D-H59313, ICD-10-D-H59319, ICD-10-D-H59321, ICD-10-D-H59322, ICD-10-D-H59323, ICD-10-D-H59329, ICD-10-D-H9521, ICD-10-D-H9522, ICD-10-D-H9541, ICD-10-D-H9542, ICD-10-D-I97410, ICD-10-D-I97411, ICD-10-D-I97418, ICD-10-D-I9742, ICD-10-D-I97610, ICD-10-D-I97611, ICD-10-D-I97618, ICD-10-D-I97620, ICD-10-D-J9561, ICD-10-D-J9562, ICD-10-D-J95830, ICD-10-D-J95831, ICD-10-D-K9161, ICD-10-D-K9162, ICD-10-D-K91840, ICD-10-D-K91841, ICD-10-D-L7601, ICD-10-D-L7602, ICD-10-D-L7621, ICD-10-D-L7622, ICD-10-D-M96810, ICD-10-D-M96811, ICD-10-D-M96830, ICD-10-D-M96831, ICD-10-D-N9961, ICD-10-D-N9962, ICD-10-D-N99820, ICD-10-D-N99821, ICD-10-D-T888XXA
Nerve injury	ICD-9-D-9550, ICD-9-D-9551, ICD-9-D-9552, ICD-9-D-9553, ICD-9-D-9554, ICD-9-D-9555, ICD-9-D-9556, ICD-9-D-9557, ICD-9-D-9558, ICD-9-D-9559, ICD-9-D-9074, ICD-10-D-S440, ICD-10-D-S4400, ICD-10-D-S4400XA, ICD-10-D-S4400XD, ICD-10-D-S4400XS, ICD-10-D-S4401, ICD-10-D-S4401XA, ICD-10-D-S4401XD, ICD-10-D-S4401XS, ICD-10-D-S4402, ICD-10-D-S4402XA, ICD-10-D-S4402XD, ICD-10-D-S4402XS, ICD-10-D-S441, ICD-10-D-S4410, ICD-10-D-S4410XA, ICD-10-D-S4410XD, ICD-10-D-S4410XS, ICD-10-D-S4411, ICD-10-D-S4411XA, ICD-10-D-S4411XD, ICD-10-D-S4411XS, ICD-10-D-S4412, ICD-10-D-S4412XA, ICD-10-D-S4412XD, ICD-10-D-S4412XS, ICD-10-D-S442, ICD-10-D-S4420, ICD-10-D-S4420XA, ICD-10-D-S4420XD, ICD-10-D-S4420XS, ICD-10-D-S4421, ICD-10-D-S4421XA, ICD-10-D-S4421XD, ICD-10-D-S4421XS, ICD-10-D-S4422, ICD-10-D-S4422XA, ICD-10-D-S4422XD, ICD-10-D-S4422XS, ICD-10-D-S443, ICD-10-D-S4430, ICD-10-D-S4430XA, ICD-10-D-S4430XD, ICD-10-D-S4430XS, ICD-10-D-S4431, ICD-10-D-S4431XA, ICD-10-D-S4431XD, ICD-10-D-S4431XS, ICD-10-D-S4432, ICD-10-D-S4432XA, ICD-10-D-S4432XD, ICD-10-D-S4432XS, ICD-10-D-S444, ICD-10-D-S4440, ICD-10-D-S4440XA, ICD-10-D-S4440XD, ICD-10-D-S4440XS, ICD-10-D-S4441, ICD-10-D-S4441XA, ICD-10-D-S4441XD, ICD-10-D-S4441XS, ICD-10-D-S4442, ICD-10-D-S4442XA, ICD-10-D-S4442XD, ICD-10-D-S4442XS, ICD-10-D-S445, ICD-10-D-S4450, ICD-10-D-S4450XA, ICD-10-D-S4450XD, ICD-10-D-S4450XS, ICD-10-D-S4451, ICD-10-D-S4451XA, ICD-10-D-S4451XD, ICD-10-D-S4451XS, ICD-10-D-S4452, ICD-10-D-S4452XA, ICD-10-D-S4452XD, ICD-10-D-S4452XS, ICD-10-D-S448, ICD-10-D-S448X, ICD-10-D-S448X1, ICD-10-D-S448X1A, ICD-10-D-S448X1D, ICD-10-D-S448X1S, ICD-10-D-S448X2, ICD-10-D-S448X2A, ICD-10-D-S448X2D, ICD-10-D-S448X2S, ICD-10-D-S448X9, ICD-10-D-S448X9A, ICD-10-D-S448X9D, ICD-10-D-S448X9S, ICD-10-D-S449, ICD-10-D-S4490, ICD-10-D-S4490XA, ICD-10-D-S4490XD, ICD-10-D-S4490XS, ICD-10-D-S4491, ICD-10-D-S4491XA, ICD-10-D-S4491XD, ICD-10-D-S4491XS, ICD-10-D-S4492, ICD-10-D-S4492XA, ICD-10-D-S4492XD, ICD-10-D-S4492XS
Pneumonia	ICD-9-D-4800:ICD-9-D-4809, ICD-9-D-481, ICD-9-D-4820, ICD-9-D-4821, ICD-9-D-48230, ICD-9-D-48231, ICD-9-D-48232, ICD-9-D-48239, ICD-9-D-48240, ICD-9-D-48241, ICD-9-D-48242, ICD-9-D-48249, ICD-9-D-48281, ICD-9-D-48282, ICD-9-D-48283, ICD-9-D-48284, ICD-9-D-48289, ICD-9-D-4829, ICD-9-D-4830, ICD-9-D-4831, ICD-9-D-4838, ICD-9-D-4841, ICD-9-D-4843, ICD-9-D-4845, ICD-9-D-4846, ICD-9-D-4847, ICD-9-D-4848, ICD-9-D-485, ICD-9-D-486, ICD-10-D-J12:ICD-10-D-J189
Pulmonary embolism	ICD-9-D-4151: ICD-9-D-4159, ICD-10-D-I26: ICD-10-D-I269

(continued)

Appendix Table 1. Continued

Variable	Code
Transfusion requirement	ICD-9-P-9904, ICD-10-P-3023, ICD-10-P-30230AZ, ICD-10-P-30230G0, ICD-10-P-30230G2, ICD-10-P-30230G3, ICD-10-P-30230G4, ICD-10-P-30230H0, ICD-10-P-30230H1, ICD-10-P-30230J0, ICD-10-P-30230J1, ICD-10-P-30230K0, ICD-10-P-30230K1, ICD-10-P-30230L0, ICD-10-P-30230L1, ICD-10-P-30230M0, ICD-10-P-30230M1, ICD-10-P-30230N0, ICD-10-P-30230N1, ICD-10-P-30230P0, ICD-10-P-30230P1, ICD-10-P-30230Q0, ICD-10-P-30230Q1, ICD-10-P-30230R0, ICD-10-P-30230R1, ICD-10-P-30230S0, ICD-10-P-30230S1, ICD-10-P-30230T0, ICD-10-P-30230T1, ICD-10-P-30230V0, ICD-10-P-30230V1, ICD-10-P-30230W0, ICD-10-P-30230W1, ICD-10-P-30230X0, ICD-10-P-30230X2, ICD-10-P-30230X3, ICD-10-P-30230X4, ICD-10-P-30230Y0, ICD-10-P-30230Y2, ICD-10-P-30230Y3, ICD-10-P-30230Y4, ICD-10-P-30233AZ, ICD-10-P-30233G0, ICD-10-P-30233G2, ICD-10-P-30233G3, ICD-10-P-30233G4, ICD-10-P-30233H0, ICD-10-P-30233H1, ICD-10-P-30233J0, ICD-10-P-30233J1, ICD-10-P-30233K0, ICD-10-P-30233K1, ICD-10-P-30233L0, ICD-10-P-30233L1, ICD-10-P-30233M0, ICD-10-P-30233M1, ICD-10-P-30233N0, ICD-10-P-30233N1, ICD-10-P-30233P0, ICD-10-P-30233P1, ICD-10-P-30233Q0, ICD-10-P-30233Q1, ICD-10-P-30233R0, ICD-10-P-30233R1, ICD-10-P-30233S0, ICD-10-P-30233S1, ICD-10-P-30233T0, ICD-10-P-30233T1, ICD-10-P-30233V0, ICD-10-P-30233V1, ICD-10-P-30233W0, ICD-10-P-30233W1, ICD-10-P-30233X0, ICD-10-P-30233X2, ICD-10-P-30233X3, ICD-10-P-30233X4, ICD-10-P-30233Y0, ICD-10-P-30233Y2, ICD-10-P-30233Y3, ICD-10-P-30233Y4, ICD-10-P-30240AZ, ICD-10-P-30240G0, ICD-10-P-30240G2, ICD-10-P-30240G3, ICD-10-P-30240G4, ICD-10-P-30240H0, ICD-10-P-30240H1, ICD-10-P-30240J0, ICD-10-P-30240J1, ICD-10-P-30240K0, ICD-10-P-30240K1, ICD-10-P-30240L0, ICD-10-P-30240L1, ICD-10-P-30240M0, ICD-10-P-30240M1, ICD-10-P-30240N0, ICD-10-P-30240N1, ICD-10-P-30240P0, ICD-10-P-30240P1, ICD-10-P-30240Q0, ICD-10-P-30240Q1, ICD-10-P-30240R0, ICD-10-P-30240R1, ICD-10-P-30240S0, ICD-10-P-30240S1, ICD-10-P-30240T0, ICD-10-P-30240T1, ICD-10-P-30240V0, ICD-10-P-30240V1, ICD-10-P-30240W0, ICD-10-P-30240W1, ICD-10-P-30240X0, ICD-10-P-30240X2, ICD-10-P-30240X3, ICD-10-P-30240X4, ICD-10-P-30240Y0, ICD-10-P-30240Y2, ICD-10-P-30240Y3, ICD-10-P-30240Y4, ICD-10-P-30243AZ, ICD-10-P-30243G0, ICD-10-P-30243G2, ICD-10-P-30243G3, ICD-10-P-30243G4, ICD-10-P-30243H0, ICD-10-P-30243H1, ICD-10-P-30243J0, ICD-10-P-30243J1, ICD-10-P-30243K0, ICD-10-P-30243K1, ICD-10-P-30243L0, ICD-10-P-30243L1, ICD-10-P-30243M0, ICD-10-P-30243M1, ICD-10-P-30243N0, ICD-10-P-30243N1, ICD-10-P-30243P0, ICD-10-P-30243P1, ICD-10-P-30243Q0, ICD-10-P-30243Q1, ICD-10-P-30243R0, ICD-10-P-30243R1, ICD-10-P-30243S0, ICD-10-P-30243S1, ICD-10-P-30243T0, ICD-10-P-30243T1, ICD-10-P-30243V0, ICD-10-P-30243V1, ICD-10-P-30243W0, ICD-10-P-30243W1, ICD-10-P-30243X0, ICD-10-P-30243X2, ICD-10-P-30243X3, ICD-10-P-30243X4, ICD-10-P-30243Y0, ICD-10-P-30243Y2, ICD-10-P-30243Y3, ICD-10-P-30243Y4, ICD-10-P-30250G0, ICD-10-P-30250G1, ICD-10-P-30250H0, ICD-10-P-30250H1, ICD-10-P-30250J0, ICD-10-P-30250J1, ICD-10-P-30250K0, ICD-10-P-30250K1, ICD-10-P-30250L0, ICD-10-P-30250L1, ICD-10-P-30250M0, ICD-10-P-30250M1, ICD-10-P-30250N0, ICD-10-P-30250N1, ICD-10-P-30250P0, ICD-10-P-30250P1, ICD-10-P-30250Q0, ICD-10-P-30250Q1, ICD-10-P-30250R0, ICD-10-P-30250R1, ICD-10-P-30250S0, ICD-10-P-30250S1, ICD-10-P-30250T0, ICD-10-P-30250T1, ICD-10-P-30250V0, ICD-10-P-30250V1, ICD-10-P-30250W0, ICD-10-P-30250W1, ICD-10-P-30250X0, ICD-10-P-30250X1, ICD-10-P-30250Y0, ICD-10-P-30250Y1, ICD-10-P-30253G0, ICD-10-P-30253G1, ICD-10-P-30253H0, ICD-10-P-30253H1, ICD-10-P-30253J0, ICD-10-P-30253J1, ICD-10-P-30253K0, ICD-10-P-30253K1, ICD-10-P-30253L0, ICD-10-P-30253L1, ICD-10-P-30253M0, ICD-10-P-30253M1, ICD-10-P-30253N0, ICD-10-P-30253N1, ICD-10-P-30253P0, ICD-10-P-30253P1, ICD-10-P-30253Q0, ICD-10-P-30253Q1, ICD-10-P-30253R0, ICD-10-P-30253R1, ICD-10-P-30253S0, ICD-10-P-30253S1, ICD-10-P-30253T0, ICD-10-P-30253T1, ICD-10-P-30253V0, ICD-10-P-30253V1, ICD-10-P-30253W0, ICD-10-P-30253W1, ICD-10-P-30253X0, ICD-10-P-30253X1, ICD-10-P-30253Y0, ICD-10-P-30253Y1, ICD-10-P-30260G0, ICD-10-P-30260G1, ICD-10-P-30260H0, ICD-10-P-30260H1, ICD-10-P-30260J0, ICD-10-P-30260J1, ICD-10-P-30260K0, ICD-10-P-30260K1, ICD-10-P-30260L0, ICD-10-P-30260L1, ICD-10-P-30260M0, ICD-10-P-30260M1, ICD-10-P-30260N0, ICD-10-P-30260N1, ICD-10-P-30260P0, ICD-10-P-30260P1, ICD-10-P-30260Q0, ICD-10-P-30260Q1, ICD-10-P-30260R0, ICD-10-P-30260R1, ICD-10-P-30260S0, ICD-10-P-30260S1, ICD-10-P-30260T0, ICD-10-P-30260T1, ICD-10-P-30260V0, ICD-10-P-30260V1, ICD-10-P-30260W0, ICD-10-P-30260W1, ICD-10-P-30260X0, ICD-10-P-30260X1, ICD-10-P-30260Y0, ICD-10-P-30260Y1, ICD-10-P-30263G0, ICD-10-P-30263G1, ICD-10-P-30263H0, ICD-10-P-30263H1, ICD-10-P-30263J0, ICD-10-P-30263J1, ICD-10-P-30263K0, ICD-10-P-30263K1, ICD-10-P-30263L0, ICD-10-P-30263L1, ICD-10-P-30263M0, ICD-10-P-30263M1, ICD-10-P-30263N0, ICD-10-P-30263N1, ICD-10-P-30263P0, ICD-10-P-30263P1, ICD-10-P-30263Q0, ICD-10-P-30263Q1, ICD-10-P-30263R0, ICD-10-P-30263R1, ICD-10-P-30263S0, ICD-10-P-30263S1, ICD-10-P-30263T0, ICD-10-P-30263T1, ICD-10-P-30263V0, ICD-10-P-30263V1, ICD-10-P-30263W0, ICD-10-P-30263W1, ICD-10-P-30263X0, ICD-10-P-30263X1, ICD-10-P-30263Y0, ICD-10-P-30263Y1, ICD-10-P-30273H1, ICD-10-P-30273J1, ICD-10-P-30273K1, ICD-10-P-30273L1, ICD-10-P-30273M1, ICD-10-P-30273N1, ICD-10-P-30273P1, ICD-10-P-30273Q1, ICD-10-P-30273R1, ICD-10-P-30273S1, ICD-10-P-30273T1, ICD-10-P-30273V1, ICD-10-P-30273W1, ICD-10-P-30277H1, ICD-10-P-30277J1, ICD-10-P-30277K1, ICD-10-P-30277L1, ICD-10-P-30277M1, ICD-10-P-30277N1, ICD-10-P-30277P1, ICD-10-P-30277Q1, ICD-10-P-30277R1, ICD-10-P-30277S1, ICD-10-P-30277T1, ICD-10-P-30277V1, ICD-10-P-30277W1, ICD-10-P-30280B1, ICD-10-P-30283B1
Urinary tract infection	ICD-9-D-5990, ICD-10-D-N390

(continued)

Appendix Table 1. Continued

Variable	Code
Wound disruption	ICD-9-D-99830, ICD-9-D-99831, ICD-9-D-99832, ICD-9-D-99833, ICD-10-D-T8130XA, ICD-10-D-T8130XD, ICD-10-D-T8130XS, ICD-10-D-T8131XA, ICD-10-D-T8131XD, ICD-10-D-T8131XS, ICD-10-D-T8132XA, ICD-10-D-T8132XD, ICD-10-D-T8132XS, ICD-10-D-T8133XA, ICD-10-D-T8133XD, ICD-10-D-T8133XS
Conversion to THA	CPT-81510, CPT-81511, CPT-81512, CPT-81513, CPT-81514, CPT-81515, CPT-81516, CPT-81517, CPT-81519, CPT-81519, CPT-81520, CPT-81521, CPT-81522, CPT-81523, CPT-81524, CPT-81525, CPT-81526, CPT-81527, CPT-81528, CPT-81529
Return to care	
ED visit	CPT-99281, CPT-99282, CPT-99283, CPT-99284, CPT-99285, CPT-G0380, CPT-G0381, CPT-G0382, CPT-G0383, CPT-G0384
Hospital admission	CPT-99221, CPT-99222, CPT-99223, CPT-99231, CPT-99232, CPT-99233
ICU admission	CPT-99291, CPT-99292
Diagnoses associated with readmission	
Congenital deformities of hip	ICD-9-D-7556, ICD-10-D-Q6589
Sprain in hip region	ICD-10-D-S73191A, ICD-9-D-8438, ICD-9-D-7265, ICD-10-D-S73192A
Pain in hip joint	ICD-9-D-71945, ICD-9-D-71945, ICD-10-D-G8918, ICD-10-D-M25552, ICD-9-D-33818

NOTE. Colon means all consecutive ICD or CPT codes between the numeric suffixes are included.

AVN, avascular necrosis; COPD, chronic obstructive pulmonary disease; CPT, Current Procedural Terminology; ED, emergency department; ICD-9, *International Classification of Diseases, Ninth Revision*; ICD-10, *International Classification of Diseases, Tenth Revision*; ICU, intensive care unit; SSI, surgical-site infection; THA, total hip arthroplasty.

Appendix Table 2. Risk of Complications Within 90 Days, Corrected for Baseline Comorbidities and Congenital Hip Abnormalities

Risk Factor	OR	95% CI	*P* Value
Age	0.93	0.85-1.00	.07
CCI	0.54	0.11-1.34	.35
Male sex	0.55	0.06-3.03	.53
Diabetes	3.41	0.39-26.24	.24
Chronic kidney disease	13.02	0.34-357.33	.12
Obesity	5.49	0.86-36.84	.07
Tobacco use	2.83	0.36-20.64	.30
COPD	0.41	0.03-3.03	.43
Coronary artery disease	13.71	1.10-192.84	.04
Inpatient hip arthroscopy	20.51	3.18-429.45	.01
Congenital hip abnormalities	8.38	1.46-61.09	.02

CCI, Charlson Comorbidity Index; CI, confidence interval; COPD, chronic obstructive pulmonary disease; OR, odds ratio.