The Timing of Hip Arthroscopy After Intra-articular Hip Injection Affects Postoperative Infection Risk

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Purpose: To evaluate the association of preoperative intra-articular hip injection with surgical site infection after hip arthroscopy. **Methods:** A large administrative database was used to identify all patients undergoing hip arthroscopy from 2007 to 2015 within a single private insurer and from 2005 to 2012 within Medicare in the United States. Those that received an ipsilateral preoperative intra-articular hip injection were identified. The patients were then divided into the following groups based on the interval between preoperative injection and ipsilateral hip arthroscopy: (1) <3 months, (2) 3 to 6 months, and (3) 6 to 12 months. These groups were compared to a control group composed of patients with no history or a remote history (>12 months) of preoperative hip injection. Patients developing a surgical site infection within 6 months following hip arthroscopy were identified using International Classification of Diseases, Ninth Revision, and Current Procedural Terminology codes associated with infection. Groups were compared using a multivariate logistic regression analysis to control for age, gender, body mass index, smoking status, alcohol usage, and multiple medical comorbidities including diabetes mellitus, hemodialysis use, inflammatory arthritis, and peripheral vascular disease. **Results:** In total, 19% of privately insured and 6% of Medicare patients received a hip injection within 12 months of hip arthroscopy. The overall infection rate in privately insured and Medicare patients was 1.19% and 1.10%, respectively. Preoperative hip injection within 3 months of surgery was associated with a significantly higher risk of postoperative infection versus controls (2.16%, odds ratio [OR] 6.1, $P < .001$, for privately insured group; 2.80%, OR 1.99, $P = .037$, for Medicare group). In contrast, preoperative hip injection given after more than 3 months of surgery was not associated with an increased risk of postoperative infection versus controls. **Conclusions:** Risk of infection after hip arthroscopy increased when preoperative intra-articular hip injections were given within 3 months of surgery. **Level of Evidence:** Level III, retrospective comparative study.

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The differential diagnosis of hip pain is broad and complex, with possibilities that include intra- or extra-articular components of the hip, lumbar spine, or visceral organs. As a result, diagnostic intra-articular hip injections are widely used by orthopaedic surgeons to aid in differentiating between intra- and extra-articular sources of pain. In the appropriate clinical setting, pain relief from an intra-articular anesthetic or corticosteroid injection will lead surgeons to recommend arthroscopic intervention directed at the assumed pain generators in the joint. Conversely, a negative response from an intra-articular injection suggests that surgery will unlikely provide any symptomatic relief. The use of preoperative intra-articular hip injection to guide

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The authors report the following potential conflicts of interest or sources of funding: A.S.R. has board membership in the Eastern Orthopaedic Association; consultancy fees from Arthrex, Stryker, and MAKO; receives payment for lectures including service on speakers bureaus from Arthrex, DePuy, and Mitek; royalties from ConforMIS; owns stock/stock options in ConforMIS; and publishing royalties, financial or material support from Springer and Saunders/Mosby-Elsevier. S.H.C. receives consultancy fees from StrykerPivot Medical; royalties from Blue Belt Technologies; has stock/stock options in Blue Belt Technologies, Cymedical Orthopaedics. B.T.K. receives consultancy fees from Arthrex; has stock/stock options in A-3 Surgical. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

Received December 5, 2016; accepted June 16, 2017.

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0749-8063/161216/$36.00

http://dx.doi.org/10.1016/j.arthro.2017.06.037

clinical decision making has become contemporary practice at many institutions.[1-3] Additionally, preoperative intra-articular hip injections of gadolinium contrast are commonly performed during magnetic resonance arthrography.

However, recent studies have suggested that intra-articular injections given prior to elective surgery may increase the risk of postoperative infection.[4-9] Prior work has revealed a 2.2-fold increase in the incidence of infection after shoulder arthroscopy when a preoperative injection was given within 3 months of surgery.[8] Similarly, several studies have found an increased risk of prosthetic joint infection (PJI) when total hip arthroplasty and total knee arthroplasty were performed within 3 months of intra-articular injection.[4,7,9] Other studies have reported an increased incidence of infection when intraoperative corticosteroid injection is given at the time of arthroscopy, suggesting that corticosteroids dampen the intra-articular immune response, making the joint more susceptible to infection.[10,11]

Given the frequency in which intra-articular hip injection is performed prior to hip arthroscopy, the purpose of this study was to evaluate the association of preoperative intra-articular hip injection with surgical site infection after hip arthroscopy. Our hypothesis was that intra-articular hip injection within 3 months of surgery would be associated with an increased risk of postoperative infection.

Methods

Prior to beginning, this study was deemed exempted from review by the University of Virginia Institutional Review Board. Afterwards, the PearlDiver Patient Records Database (www.pearldiverinc.com, Fort Wayne, IN) was used to identify all patients undergoing hip arthroscopy from (1) a single private insurer (Humana) from 2007 to 2015 and (2) Medicare beneficiaries from 2005 to 2012 from all regions of the United States. Within PearlDiver, the private insurer–based database has approximately 20 million individual patient records from 2007 to 2015, whereas the Medicare-based database has more than 100 million individual patient records from 2005 to 2012. Although both the Humana and Medicare databases were queried, they remain separate within the PearlDiver database and, as such, separate analyses were performed for each set of patients. Both databases include anonymous and deidentified information on standard patient demographics; medical comorbidities; procedural volumes; geographic parameters; International Classification of Diseases, Ninth Revision (ICD-9) diagnosis codes; and Current Procedural Terminology (CPT) codes.

Hip Arthroscopy Patients

The lone inclusion criterion was patients treated with arthroscopic procedures of the hip under the following CPT codes: 29860, 28961, 29862, 29863, 29914, 29915, and 29916. In addition to the surgical procedure and laterality, additional patient information analyzed included age, gender, obesity based on body mass index, smoking status, Charlson Comorbidity Index (CCI) and medical comorbidities. The CCI is a validated measure of 1-year mortality risk given a range of comorbidities.[12] Each comorbidity category has a weighted score (from 1 to 6) based on the adjusted risk of mortality, and the sum of all the weights results in a single comorbidity score. Specifically, medical diagnoses identified and included in the analysis were diabetes mellitus, hypertension, depression, hyperlipidemia, chronic anemia, hemodialysis use, inflammatory arthritis, chronic lung disease, hypercoagulability, chronic kidney disease, peripheral vascular disease, hypothyroidism, chronic liver disease, congestive heart failure, and coronary artery disease.

For all patients undergoing hip arthroscopy, the occurrence of a preoperative intra-articular hip injection was identified using CPT code 20610 for large joint injection. Because this code does not specify which large joint was injected, only injections that were performed for hip-related pathology (based on ICD-9 code) were included. ICD-9 codes used to identify hip-related diagnoses linked to the injection included: 719.45, 719.65, 719.85, 719.95, 715.15, 715.25, 715.35, 715.95, 716.65, 716.85, 716.95, 718.05, 718.15, 718.85, and 718.95. Patients were then divided into the following study groups based on the interval of time from preoperative injection to ipsilateral hip arthroscopy: (1) less than 3 months, (2) 3 to 6 months, and (3) 6 to 12 months. The control group was composed of patients with no history or remote history (>12 months) of preoperative hip injection.

Exclusion criteria included patients who underwent hip arthroscopy procedures or hip injections coded without a CPT modifier for laterality since the injection could not be matched to the same side as the surgery. Additionally, CPT code 29999 (unlisted arthroscopy) was excluded as a hip arthroscopy procedure since it is typically used to code for many extra-articular hip procedures (e.g., iliopsoas tendon release, gluteus repair, trochanteric bursectomy).

Postoperative Infections

Patients developing an ipsilateral surgical site infection within 6 months of hip arthroscopy were identified using ICD-9 codes for infection (998.51, 998.59, 711.05, 711.45, 711.85, and 711.95) or CPT codes (10180, 20005, 27030, 26990, 26991, 26992) for procedures used to treat the infection (Appendix Table 1, available at www.arthroscopyjournal.org).

Data and Statistical Analysis

All comparisons were performed and are reported separately for each of the 2 study groups (private payer and Medicare). Differences in key patient demographics and characteristics were analyzed across the study

groups using chi-squared tests to compare frequencies (gender, age, obesity rates, percent smokers, and percentage with diabetes) and analysis of variance to compare means of normally distributed variables across 3 or more groups (mean Charlson Comorbidity Index). The risk of postoperative infection was compared between each of the study groups and the control group using binomial multivariate logistic regression analysis to control for a multitude of variables including age, gender, body mass index, smoking status, alcohol usage, and the 16 medical comorbidities aforementioned. Infection risks are reported as odds ratios (ORs) with their corresponding 95% confidence intervals (CIs) and *P* values. Only *P* values $< .05$ were considered to represent statistical significance.

Results

A total of 8,291 hip arthroscopy procedures met all inclusion criteria. Of these, 169 (7%) and 502 (9%) procedures from the private insurer and Medicare databases, respectively, were excluded because of unknown laterality of the hip injection or arthroscopy. As such, 7,620 patients (2,351 [31%] privately insured and 5,269 [68%] Medicare beneficiaries) were included in the analysis. The key demographics of the study groups are listed in Table 1. Among Medicare beneficiaries, there were no significant differences in any of these demographics across the study groups ($P > .090$ for all variables). Within the privately insured group, there was no difference in gender ($P = .213$), obesity rate ($P = .734$), smoking rate ($P = .170$), diabetes rate ($P = .170$), or the CCI ($P = .427$) across the groups; however, there was a difference in age distribution ($P = .002$). Accordingly, multivariate regression analysis was used to control for this (and all other variables) in the comparison of infection rates. Overall, 19% of private insured patients and 6% of Medicare beneficiaries received a hip injection within 12 months prior to hip arthroscopy.

Among privately insured patients, 1,906 (81%) had no history or a remote history of intra-articular hip injection, and these patients served as the control group. The remaining patients received an injection <3 months (n = 232, 10%), 3 to 6 months (n = 124, 5%), or 6 to 12 months (n = 89, 4%) prior to surgery (Table 2). The infection rates for these 3 study groups were 2.16%, 0.81%, and 1.12%, respectively; the rate of infection for the control group was 1.10%. Infections were observed with CPT codes 29861 (1.4%), 29862 (1.1%), 29863 (1.3%), 29914 (0.4%), 29915 (0.5%), and 29916 (0.5%) (Table 3). In the multivariate analysis, there was an increased risk of infection for the <3-month group (OR 6.1, 95% CI 3.8-10.0, $P < .001$) compared to the control group, but not for the other 2 study groups (3-6 months and 6-12 months) (Table 4). Additionally, tobacco use (OR 2.1, 95% CI 1.2-3.6, $P = .006$), depression (OR 4.0, 95% CI 2.4-6.6, $P < .001$), hyperlipidemia (OR 1.9, 95% CI 1.0-3.5,

Table 1. Demographics of Patients Undergoing Hip Arthroscopy Based on Preoperative Injection Status

	Time Interval Between Injection and Surgery (months)				
	0-3	3-6	6-12	Control	*P* Value
Privately insured patients					
Total no.	232	124	89	1,906	
Female, n (%)	154 (66)	88 (71)	64 (72)	1,188 (62)	.054
Male, n (%)	78 (34)	36 (29)	25 (28)	718 (38)	
Age groups, years, n (%)					
<30	39 (17)	22 (18)	16 (18)	443 (23)	.002
30-49	101 (44)	56 (45)	38 (43)	713 (37)	
50-70	83 (36)	39 (31)	21 (24)	614 (32)	
70+	9 (4)	7 (6)	14 (16)	136 (7)	
Patients with obesity (BMI >30), n (%)	48 (21)	21 (17)	19 (21)	331 (17)	.495
Smokers, n (%)	46 (20)	20 (16)	15 (17)	289 (15)	.321
Patients with diabetes mellitus, n (%)	43 (19)	21 (17)	16 (18)	259 (14)	.122
CCI, mean ± SD	1.1 ± 2.3	1.0 ± 1.4	1.2 ± 2.1	1.0 ± 1.9	.708
Medicare beneficiaries					
Total no.	107	125	97	4,940	
Female, n (%)	76 (71)	80 (64)	67 (69)	3,107 (63)	.213
Male, n (%)	31 (29)	45 (36)	30 (31)	1,833 (37)	
Mean age, years, n (%)					
<65	67 (63)	58 (46)	51 (53)	2,222 (45)	.092
65-79	47 (44)	63 (50)	45 (46)	2,519 (51)	
≥80	3 (3)	4 (3)	1 (1)	199 (4)	
Patients with obesity (BMI >30), n (%)	26 (24)	30 (24)	25 (26)	1,091 (22)	.734
Smokers, n (%)	40 (37)	33 (26)	27 (28)	1,368 (28)	.170
Patients with diabetes mellitus, n (%)	37 (35)	43 (34)	25 (28)	1,378 (28)	.170
CCI, mean ± SD	4.6 ± 2.8	4.2 ± 2.1	4.1 ± 2.1	4.3 ± 2.3	.427

BMI, body mass index; CCI, Charlson Comorbidity Index; SD, standard deviation.

Table 2. Infection Rates Based on Timing of Injection

Timing of Injection Before Surgery	No. of Cases	No. of Infections	Infection Rate, %
Privately insured patients			
<3 months	232	5	2.16
3-6 months	124	1	0.81
6-12 months	89	1	1.12
Control	1,906	21	1.10
Totals	2,351	28	1.19
Medicare beneficiaries			
<3 months	107	3	2.80
3-6 months	125	2	1.60
6-12 months	97	1	1.03
Control	4,940	52	1.05
Totals	5,269	58	1.10

$P = .042$), hypertension (OR 2.0, 95% CI 1.1-3.8, $P = .035$), chronic kidney disease (OR 3.6, 95% CI 1.6-8.4, $P = .005$), hemodialysis use (OR 11.5, 95% CI 1.6-83.0, $P = .016$), and overall CCI (OR 1.2, 95% CI 1.0-1.3, $P = .024$) were all independently associated with increased infections risk.

Similar results were noted for Medicare patients undergoing hip arthroscopy. Among these patients, 107 (2%) patients received an injection <3 months prior to surgery; 125 (2%) underwent injection 3 to 6 months preoperatively; 97 (2%) were injected 6 to 12 months; and 4,940 (94%) had no history or a remote history of injection and served as controls (Table 2). The infection rates for these groups were 2.80%, 1.60%, 1.03%, and 1.05%, respectively. Infections were observed with CPT codes 29860 (1.2%), 29861 (1.6%), 29862 (0.9%), 29863 (1.3%), 29914 (1.0%), 29915 (0.9%), and 29916 (1.1%) (Table 3). The only study group to find an increased risk for postoperative infection in the multivariate analysis was the <3-month group with an OR of 2.0 (95% CI 1.2-3.2; $P = .037$) (Table 4). Additionally, obesity (OR 1.7, 95% CI 1.0-2.7, $P = .036$), tobacco use (OR 1.7, 95% CI 1.0-2.8, $P = .033$), inflammatory arthritis (OR 2.9, 95% CI 1.2-7.0, $P = .018$), coronary artery disease (OR 1.9, 95% CI 1.1-3.1, $P = .014$), hemodialysis use (OR 3.5, 95% CI 1.4-8.6, $P = .007$), hypothyroidism (OR 1.7, 95% CI 1.1-2.7, $P = .014$), and overall CCI (OR 1.2, 95% CI 1.1-1.3, $P < .001$) were all independently associated with increased infections risk.

Discussion

In our multivariate analysis, we found a 2- to 6-fold increase in the incidence of infection after hip arthroscopy when a preoperative intra-articular hip injection was given within 3 months of surgery, confirming our hypothesis.

A septic joint is a rare but devastating complication after hip arthroscopy that can lead to substantial morbidity. Like other arthroscopic procedures, hip arthroscopy has been associated with low infection rates, with previous studies reporting rates ranging from 0% to <1%.[13-17] Because of the rarity of this complication, studies investigating the risk factors for postoperative infection must analyze a large number of patients that oftentimes can only be afforded by using a large database. Although previous underpowered studies have reported no significant association between preoperative injection and postoperative infection,[18-20] larger studies have since refuted those results.[6,7,9] The risk of postoperative infection from a preoperative intra-articular injection is still widely debated, with one hypothesized etiology being the direct inoculation of bacteria into the joint from the skin or ultrasound gel, which is of questionable asepticity. Moreover, the delivery of corticosteroid, which interrupts the inflammatory and immune response, can make the joint more susceptible for infection. However, despite the relatively low rate of postoperative infection, particularly after arthroscopy, the latest results from several high-powered studies, along with the potentially harmful consequences of a septic joint, caution should be exercised in the use of hip injections prior to elective hip surgery.

The association between intra-articular injection and postarthroscopy infection has been reported in the shoulder, knee, and ankle.[8,10,11] In a series of Medicare patients, Werner et al.[8] reported that patients who received an injection within 3 months of shoulder arthroscopy were 2.2- and 1.6-fold more likely to develop a postoperative infection at 3 and 6 months, respectively. The authors reported a 1.1% postoperative

Table 3. Infections Based on CPT Code*

CPT Code	No. of Cases	No. of Infections	Infection Rate, %
Privately insured patients			
29860	62	0	0.00
29861	213	3	1.41
29862	1,133	12	1.06
29863	524	7	1.34
29914	998	4	0.40
29915	588	3	0.51
29916	849	4	0.47
Totals	2,351	28	1.19
Medicare beneficiaries			
29860	167	2	1.20
29861	431	7	1.62
29862	4,050	35	0.86
29863	1,350	17	1.26
29914	510	5	0.98
29915	445	4	0.90
29916	444	5	1.13
Totals	5,269	58	1.10

CPT, Current Procedural Terminology.

*Discrepancies between total value and summation of values for each code are attributed to patients having multiple CPT codes for a single operation.

Table 4. Comparison of Infection Rates Across Groups

Comparison	Odds Ratio	95% CI	*P* Value
Privately insured patients			
<3 months vs control	6.1	3.8-10.0	<.001
3-6 months vs control	2.4	0.6-9.3	.285
6-12 months vs control	1.8	0.6-5.2	.396
Medicare beneficiaries			
<3 months vs control	1.99	1.2-3.2	.037
3-6 months vs control	1.58	0.8-3.0	.172
6-12 months vs control	0.82	0.3-2.7	.195

CI, confidence interval.

infection rate at 6 months for these at-risk patients, which is similar to that found in the current study. However, they were able to gather 3,625 at-risk patients, compared to the 232 and 107 at-risk patients we were able to collect from the private insurance and Medicare databases, respectively, for this study. The reasons for our lower numbers include the much more frequent practice of intra-articular shoulder injections, which can be performed in the office, as opposed to intra-articular hip injections, which is typically referred to a trained ultrasonographer or radiologist to be completed under ultrasound or fluoroscopic guidance. Additionally, hip arthroscopy is much less frequently performed than that in the shoulder, particularly in the older Medicare population that is more likely to have cartilage wear in the hip.[21] As the understanding of hip pathology and the use of hip arthroscopy grows, higher-powered studies may be conducted to confirm the findings of our study.

The increased risk of postoperative infection seems to lie with the timing between injection and surgery, with multiple studies finding the cutoff to be 3 months. This 3-month cutoff may be related to the biologic half-life of the injected corticosteroids within large joints[22]; however, this information is not well described, and corticosteroids with ester preparations would be expected to have a longer half-life since they rely on the patient's own esterases to release the active moiety.[23] Although the interval between injection and hip arthroscopy may vary widely depending on the institutional workflow and scheduling, 2 studies from different institutions reported their mean intervals to be 2.5 and 3.4 months in their series of patients.[1,24] Therefore, we hypothesize that a significant number of patients are undergoing hip arthroscopy within 3 months of an intra-articular injection. As with our study, Werner et al.[8] did not find any increased risk of postoperative infection in the shoulder when arthroscopy was delayed more than 3 months after injection. In the arthroplasty literature, Schairer et al.,[9] Werner et al.,[7] and Cancienne et al.[4] all found an increased risk of PJI when arthroplasty was performed within 3 months of intra-articular injection but no difference in infection rates if the interval was more than 3 months. Ravi et al.[6] examined 2,468 patients who received preoperative injection within 5 years of total hip arthroplasty and found that only those who received an injection within 1 year before surgery were at increased risk of PJI and revision total hip arthroplasty. However, the authors did not further stratify those patients who received an injection within 1 year before surgery into smaller intervals Similarly, Papavasiliou et al.[5] reviewed 144 patients who underwent total knee arthroplasty and found a significant association with preoperative intra-articular steroid injection within 11 months of total knee arthroplasty and PJI. They did not find any relationship between the timing of injections and risk of PJI, which may be attributed to the study being underpowered.

Diagnostic intra-articular hip injections are widely used by orthopaedic surgeons to guide their decision-making process on whether or not to recommend arthroscopic intervention. However, the utility of an intra-articular diagnostic injection to predict outcome after hip arthroscopy has been called into question recently. A recent systematic review concluded that although hip injections provide substantial pain relief for a variety of pathologies, pain relief after injection is a poor predictor of operative success after hip arthroscopy.[25] Other studies have made the same conclusion.[1,24,26] Krych et al.[1] examined 96 patients who received a preoperative intra-articular injection and reported that the amount of pain relief poorly predicted outcomes after hip arthroscopy, even when adjusting for chondral degeneration. Ladd et al.[24] reported similar results in their examination of 93 patients who underwent preoperative intra-articular injection and subsequent hip arthroscopy. It is important to note that patients receiving hip injections for diagnostic purposes may represent a different entity than those receiving injections for therapeutic purposes. Injections for therapeutic purposes can be effective for many patients, thereby avoiding the need for surgery altogether. Some insurances require failure of a preoperative injection as a requisite for approval of surgery. However, in good surgical candidates likely to benefit hip arthroscopy, this prerequisite can potentially lead to a delay in treatment and an increased risk of postoperative infection. Therefore, practitioners should maintain appropriate discretion when ordering intra-articular injections in their presurgical evaluation of patients, if possible, and be mindful of the potential risks if surgery is performed within 3 months of an injection.

Limitations

The limitations of our study are consistent with other studies that use large, administrative databases. The capacity in which we can answer our research question is based on the quality of the data and accuracy of the

procedural coding. For instance, the exclusion of CPT code 29999 (unlisted arthroscopy) in our study likely excluded patients who underwent hip arthroscopy. Miscoding and noncoding by physicians are potential sources of error and underreporting. For instance, patients who received a peritrochanteric rather than an intra-articular injection but were given an intra-articular hip-related ICD-9 code would have been included in our study. Additionally, information on type of injection (e.g., anesthetic, corticosteroid, gadolinium) and surgical indication for hip arthroscopy through ICD-9 codes are not reliably coded in the database. Information on use of ultrasound, fluoroscopy, or any other means of guidance during injection did not become available through specific CPT codes until 2015, which was outside the time periods examined in this study. We cannot assure that the database represents a true cross section of the United States, as only data from a single private insurance (Humana) and Medicare were included in the analysis. Medicare beneficiaries, of which 55% were older than 65 years in this study, generally are not representative of the typical hip arthroscopy population because of their higher likelihood of having hip arthritis. Patients who switched out of insurance after either injection or surgery would be lost to follow-up and thus not identified by our search. Similarly, patients who switched into either of the examined insurances after getting an injection and subsequently underwent surgery would be mistakenly included in the control group. Although we created a matched group for comparison purposes in an attempt to eliminate any confounding impact these comorbidities may have on increased infection risk, the matching algorithm is limited by age in the Medicare database. Finally, the number of recorded infections was low. Because the 2 databases remain separate within the PearlDiver, a combined or comparative analysis could not be performed. However, the principal advantage of using large national databases is the ability to analyze a rare complication in a large number of patients, which affords a population size and level of statistical power that is not easily achieved through standard review of patient records.

Conclusions

Risk of infection after hip arthroscopy increased when preoperative intra-articular hip injections were given within 3 months of surgery. The association between the timing of injection and surgery and elevated infection risk is consistent with that found for other elective arthroscopy and arthroplasty procedures.

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Appendix Table 1. ICD-9 and CPT Codes Used

ICD-9/CPT Code	Diagnosis/Procedure
Hip Arthroscopic Procedures	
29860	Arthroscopy, hip, diagnostic with or without synovial biopsy (separate procedure)
28961	Arthroscopy, hip, surgical; with removal of loose body or foreign body
29862	Arthroscopy, hip, surgical; with debridement/shaving of articular cartilage (chondroplasty), abrasion arthroplasty, and/or resection of labrum
29863	Arthroscopy, hip, surgical; with synovectomy
29914	Arthroscopy, hip, surgical; with femoroplasty (ie, treatment of cam lesion)
29915	Arthroscopy, hip, surgical; with acetabuloplasty (ie, treatment of pincer lesion)
29916	Arthroscopy, hip, surgical; with labral repair
Hip Injection	
20610	Arthrocentesis, aspiration and/or injection, major joint or bursa (eg, shoulder, hip, knee, subacromial bursa); without ultrasound guidance
Hip-related Diagnoses	
719.45	Pain in joint, pelvic region, and thigh
719.65	Other symptoms referable to joint, pelvic region, and thigh
719.85	Other specified disorders of joint, pelvic region, and thigh
719.95	Unspecified disorder of joint, pelvic region, and thigh
715.15	Osteoarthrosis, localized, primary, pelvic region and thigh
715.25	Osteoarthrosis, localized, secondary, pelvic region and thigh
715.35	Osteoarthrosis, localized, not specified whether primary or secondary, pelvic region and thigh
715.95	Osteoarthrosis, unspecified whether generalized or localized, pelvic region and thigh
716.85	Other specified arthropathy, pelvic region and thigh
716.95	Arthropathy, unspecified, pelvic region and thigh
718.05	Articular cartilage disorder, pelvic region and thigh
718.15	Loose body in joint, pelvic region and thigh
718.85	Other joint derangement, not elsewhere classified, pelvic region and thigh
718.95	Unspecified derangement of joint, pelvic region and thigh
Postoperative Infections	
998.51	Infected postoperative seroma
998.59	Other postoperative infection
711.05	Pyogenic arthritis, pelvic region and thigh
711.45	Arthropathy associated with other bacterial diseases, pelvic region and thigh
711.85	Arthropathy associated with other infectious and parasitic diseases, pelvic region and thigh
711.95	Unspecified infective arthritis, pelvic region and thigh
10180	Incision and drainage, complex, postoperative wound infection
20005	Incision and drainage of soft tissue abscess, subfascial (ie, involves the soft tissue below the deep fascia)
27030	Arthrotomy, hip, with drainage (eg, infection)
26990	Incision and drainage, pelvis or hip joint area; deep abscess or hematoma
26991	Incision and drainage, pelvis or hip joint area; infected bursa
26992	Incision, bone cortex, pelvis and/or hip joint (eg, osteomyelitis or bone abscess)

CPT, Current Procedural Terminology; ICD-9, International Classification of Disease, Ninth Revision.