

# Total Hip Arthroplasty Complications in Patients with Sickle Cell Disease: A Comparison Study

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**INTRODUCTION:** Total hip arthroplasty (THA) is one of the most common orthopaedic procedures performed in the United States, but there are rare complications which can be devastating. Sickle Cell Disease (SCD) can lead to avascular necrosis of the femoral head, often necessitating THA. This paper seeks to better characterize the complication risks in patients undergoing THA with SCD when compared to osteoarthritis (OA) using a large database from the National Inpatient Sample (NIS).

**METHODS:** NIS data from 2006 through the 3<sup>rd</sup> quarter of 2015 was analyzed using ICD-9 codes. A total of 4,350,961 THAs were recorded for OA and 5,295 for SCD. These were compared using a Pearson Chi Squared test, and the pre-specified complications were given sampling weights to approximate national estimates.

**RESULTS:** The following complications occurred at a statistically significant increased rate following THA in patients with SCD vs. OA: wound hematoma (2.2% vs. 0.8%; p<0.0001), wound infection (4.3% vs. 0.4%; p<0.0001), dislocation (3.7% vs. 0.8%; p<0.0001), urinary complications (4.1% vs. 2.4%; p<0.0055), pulmonary complications (1.6% vs. 0.5%; p<0.0001), and deep joint infection (4.1% vs. 0.3%; p<0.0001). Additionally, a host of comorbidities were significantly more prevalent in the SCD population compared to OA patients.

**DISCUSSION AND CONCLUSION:** This study illustrates that patients with SCD have increased complication rates when compared to OA patients. This information benefits orthopaedic surgeons in pre and postoperative planning and counseling patients for realistic expectations. Furthermore, this study provides data that could benefit decision making on bundled reimbursement for this specific patient population.

TABLE 1

THA cases performed for SCD vs OA

Disease	Weighted	
	Frequency	Percent
SCD	5,295	0.0012
OA	4,350,961	99.9

THA, total hip arthroplasty; SCD, sickle cell disease, OA, osteoarthritis

TABLE 2

Complication rates following THA for SCD and OA

Complication	SCD (N=5,295)	OA (N=4,350,961)	P-Value
Wound seroma or hematoma	116 (2.2%)	33,744 (0.8%)	<0.0001
Wound infection	228 (4.3%)	15,578 (0.4%)	<0.0001
Dislocation	195 (3.7%)	33,761 (0.8%)	<0.0001
Deep joint infection	219 (4.1%)	11,224 (0.3%)	<0.0001
Urinary complications	218 (4.1%)	103,122 (2.4%)	0.0055
Pulmonary complications	84 (1.6%)	23,667 (0.5%)	<0.0001
Cardiac complications	32 (0.6%)	28,428 (0.7%)	0.8797
Pulmonary embolus	5 (0.1%)	3,226 (0.07%)	0.7899
Deep Venous Thrombosis	5 (0.09%)	7,754 (0.2%)	0.4517

THA, total hip arthroplasty; SCD, sickle cell disease; OA, osteoarthritis

\* Sample sizes based on weighted frequencies

TABLE 3

Comorbidities associated with SCD and OA patients

Comorbidity	SCD (N=5,295)	OA (N=4,350,961)	P-value
Cerebral vascular disease	1,016 (19.2%)	234,476 (5.4%)	0.0001
Valvular disease	1,762 (33.3%)	147,173 (3.4%)	0.0001
Pulmonary circulation disease	396 (7.5%)	221,472 (5.1%)	<0.0001
Polycystic ovarian disease	1,000 (19.1%)	76,172 (1.7%)	0.0001
Hypertension	2,051 (38.7%)	145,128 (3.3%)	0.0001
Proteinuria	1,033 (19.5%)	44,172 (1.0%)	<0.0001
Other neurological disorders	1,074 (20.3%)	254,476 (5.9%)	0.0001
Chronic pulmonary disease	6,667 (125.8%)	973,173 (22.4%)	0.0001
Diabetes w/o chronic complications	973 (18.4%)	276,172 (6.3%)	<0.0001
Diabetes w/ chronic complications	1,074 (20.3%)	268,172 (6.1%)	0.0001
Hypothyroidism	1,000 (19.1%)	271,172 (6.2%)	0.0001
Bone density	1,762 (33.3%)	134,172 (3.1%)	0.0001
Liver disease	4,000 (75.5%)	145,172 (3.3%)	<0.0001
Patella dislocation & instability	667 (12.6%)	173,172 (4.0%)	<0.0001
Acquired immune deficiency syndrome	973 (18.4%)	91,172 (2.1%)	<0.0001
Epistaxis	1,000 (19.1%)	38,172 (0.9%)	0.0001
Melanotic cancer	667 (12.6%)	41,172 (0.9%)	0.0001
Solid tumor w/ no metastasis	1,762 (33.3%)	14,172 (0.3%)	0.0001
Recurrent arthritis/osteoarthritis	1,000 (19.1%)	201,172 (4.6%)	0.0001
Congenital	667 (12.6%)	201,172 (4.6%)	0.0001
Cherry	6,667 (125.8%)	386,172 (8.9%)	<0.0001
Waldenstrom	2,000 (37.8%)	186,172 (4.3%)	<0.0001
Fluid and electrolyte disorders	3,000 (56.7%)	756,172 (17.4%)	<0.0001
Chronic blood test results	7,667 (144.8%)	119,172 (2.7%)	0.0001
Deficiency anemia	6,667 (125.8%)	706,172 (16.2%)	0.0001
Alcohol abuse	4,000 (75.5%)	74,172 (1.7%)	0.0001
Drug abuse	6,667 (125.8%)	137,172 (3.1%)	<0.0001
Polyps	4,000 (75.5%)	125,172 (2.9%)	0.0001
Thrombosis	6,667 (125.8%)	461,172 (10.6%)	0.0001

SCD, sickle cell disease; OA, osteoarthritis