High Rate of Post Operative Complications in Patients with Simultaneous Bilateral Total Hip Arthroplasty: a NIS Study

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INTRODUCTION: Published comparisons between bilateral and unilateral total hip arthroplasties (THAs) remain biased and not widely generalizable as many of the studies have been limited to one database and include a relatively small sample size. The purpose of this study is to compare postoperative complications and resource utilization in patients having simultaneous THAs compared with a cohort of patients having unilateral procedures. We hypothesize that patients undergoing simultaneous bilateral THAs will incur less overall hospital costs but be subject to greater surgical complications.

METHODS: A retrospective cohort study was performed using the Nationwide Inpatient Sample (NIS) database to identify patients undergoing primary elective THA from 2016 to 2019 in the United States of America (USA). A total of 740,585 patients were identified. Of these, 9,955 (1.3%) were same-day bilateral procedures. Patients with staged bilateral THA during the same hospitalization were excluded. Demographics, complications, and costs were compared between the two cohorts (unilateral versus bilateral) of patients undergoing primary elective THA procedures (Tables 1-3). A binary logistic regression analysis controlling by age, gender, race, ethnicity, comorbidities, and the primary diagnosis was performed.

RESULTS: Patients with bilateral procedures were at a statistically increased risk for many in-hospital medical complications including respiratory (OR: 1.8; 95% CI: 1.5-2.2, P<0.01), gastrointestinal (OR: 4.1; 95% CI: 2.4-6.9, P<0.01), renal (OR: 1.3; 95% CI: 1.1-1.6, P<0.01), urinary tract infection (OR: 1.2; 95% CI: 1.0-1.5, P<0.04), urinary retention (OR: 1.2; 95% CI: 1.1-1.4, P<0.01), postoperative anemia (OR: 1.5; 95% CI: 1.4-1.6, P<0.01), postoperative blood transfusion (OR: 3.6; 95% CI: 3.3-3.9, P<0.01) and pulmonary embolism (OR: 3.2; 95% CI: 2.0-5.1, P<0.01). Patients with bilateral procedures were also at a statistically increased risk for many orthopedic specific complications including intraoperative fractures (OR: 2.1; 95% CI: 1.6-2.6, P<0.01), periprosthetic fractures (OR: 7.4; 95% CI: 5.2-10.5, P<0.01) and other mechanical complications (OR: 71; 95% CI: 23-30, p<0.01) (Table 2). Patients undergoing bilateral procedures accumulated greater hospital costs (USD 25,347 vs. USD 16,757, P<0.001) with an absolute difference of USD 8,590. In the bilateral group, the length of stay (LOS) was higher on average (2.28 days vs. 1.84 days, P<0.001) along with a discharge rate to a rehabilitation facility (17.8% or 1,775 individuals vs 13.4% or 105, 560 individuals, P<0.001) (Table 3).

DISCUSSION AND CONCLUSION:

Patients undergoing simultaneous bilateral THAs are at increased risk of developing important postoperative complications despite being younger and having fewer comorbidities on average when compared with patients undergoing unilateral THA. Although patients who undergo a simultaneous bilateral THA have higher hospitalization costs, the amount is less than two separate hospitalizations considering that many unilateral procedures require the contralateral side. This data highlights the importance of patient selection and optimization for bilateral THA and the potential risks and benefits of the procedure.

Table 1. Patient demographics among unilateral and bilateral total hip arthroplasty in the National Inpatient Sample (NIS 2016-2019)

Characteristic	Unilateral patients n=730,630 %(n)	Bilateral patients n=9, 955 %(n)	p-value
Age (years ± SD)	66 ± 10	61 ± 11	<0.01
Gender			<0.01
Male	44.9 (353,080)	52.6 (5,235)	
Female	55.1 (432,495)	47.4 (4,720)	
Race			<0.01
White	83.5 (655,715)	81.8 (8,140)	
African American	6.7 (52,490)	7.4 (740)	
Ethnicity			<0.01
Hispanic	3.1 (24,580)	3.9 (390)	
Comorbidities			<0.01
No comorbidities	67.0 (526,170)	74.0 (7,365)	
1 or more	33.0 (259,520)	26.0 (2,590)	
Primary Diagnosis			
Primary OA	91.9 (722,045)	86.2 (8,585)	<0.01
DDH	0.7 (5,715)	2.0 (200)	<0.01
Secondary OA	2.0 (15,690)	3.4 (340)	<0.01
AVN	4.9 (38,590)	7.2 (720)	<0.01
Inflammatory	0.5 (3,650)	1.1 (110)	<0.01

OA: Osteoarthritis
AVN: Avascular necrosis

Table 2. Risk of postoperative complications for bilateral patients compared to unilateral patients after THA.

Complication	Unilateral patients %(n)	Bilateral patients %(n)	OR (95% CI)	p-value
Myocardial Infarction	0.1 (645)	0.1 (10)	1.6 (0.8-3.1)	0.10
Respiratory Complications	0.8 (5,990)	1.3 (125)	1.8 (1.5-2.2)	<0.01
Gastrointestinal Complications	<0.1 (330)	0.2 (15)	4.1 (2.4-6.9)	<0.01
Renal Failure	1.5 (11,415)	1.6 (160)	1.3 (1.1-1.6)	<0.01
Postop UTI	0.7 (5,845)	0.8 (75)	1.2 (1.0-1.5)	0.04
Postop Urinary Retention	1.9 (14,770)	2.2 (220)*	1.2 (1.1-1.4)	<0.01
Postop Anemia	16.8 (131,780)	22.3 (2,220)*	1.5 (1.4-1.6)	<0.01
Postoperative Blood Tx	1.9 (14,795)	5.8 (575)*	3.6 (3.3–3.9)	<0.01
Pulmonary Embolism	0.1 (510)	20 (0.2)*	3.2 (2.0-5.1)	<0.01
DVT	0.1 (580)	0	N/A	N/A
Postoperative Infection	<0.1 (80)	0	N/A	N/A
Hip Dislocations	None	None	N/A	N/A
Intraoperative Fractures	0.4 (3,335)	0.9 (85)*	2.1 (1.6-2.6)	<0.01
Periprosthetic Fractures	<0.1 (390)	35 (0.4)*	7.4 (5.2-10.5)	<0.01
Other Mechanical Complications	0.1 (940)	3.2 (320)*	27 (23-30)	<0.01
Mortality	0.03 (210)	0	N/A	N/A

Binary logistic regression analysis controlling by age, gender, race, ethnicity, comorbidities, and primary diagnosis.
OR: Odds Ratio
CI: Confidence Interval

Table 3. Mean and relative cost associated with bilateral compared to unilateral patients undergoing THA.

Resource	Unilateral patients n=730, 630 Mean/Median (Range)	Bilateral patients n=9,955 Mean/Median (Range)	p-value
Total Cost (USD$)	16,757 ± 9,579	25,347 ± 20,451	<0.001
Length of Stay (days)	1.84 ± 1.26	2.28 ± 1.42	<0.001
Disposition	n (%)	n (%)	
Home	86.5 (679,435)	82.2 (8,180)	<0.001
Rehabilitation Facility	13.4 (105,560)	17.8 (1,775)	<0.001

Median was used for total costs.
Total costs were adjusted for inflation to 2019 US dollars.