

Antidiabetic Medications & Effect on Outcomes and Glycemic Markers Following Total Hip Arthroplasty

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INTRODUCTION:

While diabetes is a known risk factor for surgical-site infections (SSI) after total hip arthroplasty (THA), the influence of antidiabetic treatment regimens has not been established. This study aimed to assess the impact of different antidiabetic medication regimens on clinical outcomes and perioperative glycemic control in THA patients with Type 2 Diabetes.

METHODS:

We retrospectively reviewed patients with Type 2 Diabetes who underwent primary, elective THA from 2011-2022. Patients were stratified into three cohorts based on antidiabetic medications taken for at least one month in the year before THA: 1) one medication, 2) two or more medications, and 3) insulin-containing regimens. Cohorts were matched by preoperative hemoglobin A1c (HbA1c), age, body-mass index (BMI), sex, and American Society of Anesthesiologists classification status. Patient demographics, clinical outcomes, and Patient-Reported Outcomes Measurement Information System (PROMIS) pain intensity and interference scores were also compared.

RESULTS:

Of the 973 included THAs, 55.6%, 31.4%, and 12.9% fell into Cohorts 1, 2, and 3, respectively. After matching, each cohort included 88 procedures. Patients in Cohort 3 had greater blood glucose variability during their hospitalization (161.8 vs. 120.9 [1] & 112.3 [2]; $P < 0.001$) and greater SSI incidence (17.0% vs. 1.1% [1] & 9.1% [2]; $P < 0.001$), although they exhibited better PROMIS pain-interference scores one year postoperatively (61.7 vs. 55.1 [1] & 50.3 [2]; $P = 0.043$). Multivariable regression analysis identified insulin-containing regimens (OR: 2.8; $P = 0.015$), higher BMI (OR: 1.1; $P = 0.002$), and elevated preoperative HbA1c (OR: 1.3; $P = 0.049$) as predictors of SSI following THA.

DISCUSSION AND CONCLUSION:

Patients with Type 2 Diabetes on insulin-containing regimens exhibited worse perioperative glycemic control and increased SSI incidence after THA, while maintaining favorable improvements in patient-reported outcomes. Our findings suggest insulin use may influence infection risk following THA, emphasizing the importance of perioperative optimization and

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patients.

Table 1: Baseline Characteristics of Patients Stratified by Medication Cohort

Demographic	Cohort 1 (n=88)	Cohort 2 (n=88)	Cohort 3 (n=88)	P-Value
Age (years)	64.2 ± 9.6	65.1 ± 9.0	65.0 ± 10.9	0.806
BMI (kg/m ²)	27.7 ± 6.3	28.0 ± 5.9	27.5 ± 6.8	0.892
Pre-Op HbA1c (%)	7.3 ± 1.1	7.3 ± 1.2	7.4 ± 1.2	0.828
Sex				0.654
Women	46 (52.3)	42 (47.7)	40 (45.5)	
Men	42 (47.7)	46 (52.3)	48 (54.5)	
Race				0.122
White	46 (52.3)	57 (64.8)	51 (58.0)	
African American	26 (29.5)	19 (21.6)	32 (36.4)	
Asian	1 (1.1)	4 (4.5)	0 (0.0)	
Other	15 (17.0)	8 (9.1)	15 (17.0)	
Smoking Status				0.776
Never	36 (40.9)	39 (44.3)	32 (36.4)	
Former	42 (47.7)	39 (44.3)	42 (47.7)	
Current	10 (11.4)	10 (11.4)	14 (15.9)	
ASA Score				0.512
I	0 (0.0)	0 (0.0)	0 (0.0)	
II	14 (15.9)	13 (14.8)	12 (13.6)	
III	69 (78.4)	65 (73.6)	67 (76.3)	
IV	5 (5.7)	12 (13.6)	9 (10.2)	

Continuous variables are represented as mean ± standard deviation; categorical variables are represented as count (percent). ASA, American Society of Anesthesiologists; BMI, Body Mass Index; HbA1c, hemoglobin A1c; Kg, kilograms; M, meters; Pre-Op, preoperative.

Table 2: Perioperative and Postoperative Outcomes

Demographic	Cohort 1 (n=88)	Cohort 2 (n=88)	Cohort 3 (n=88)	P-Value
Hospitalization	120.9 ± 74.1	112.2 ± 64.3	101.8 ± 39.7	<0.001
Glycemic Range	103.2 ± 31.4	106.6 ± 30.8	109.9 ± 33.6	0.375
Operative Time (min)	69.0 ± 42.6	65.2 ± 48.8	68.1 ± 42.9	0.879
LOS (hours)				0.775
Discharge Destination				
Home	72 (81.8)	71 (80.7)	67 (76.1)	
SNF	13 (14.8)	15 (17.0)	16 (18.2)	
ADP	3 (3.4)	1 (1.1)	4 (4.5)	
Other	0 (0.0)	1 (1.1)	1 (1.1)	
90-Day Readmission	5 (5.7)	10 (11.4)	8 (9.1)	0.405
Days to Readmission	51.4 ± 31.2	29.7 ± 26.5	46.3 ± 28.3	0.360
Revisits	2 (2.3)	2 (2.3)	3 (3.4)	0.964
Days to Revision	49.0 ± 39.6	30.0 ± 18.4	40.3 ± 50.4	0.393
Infection	1 (1.1)	8 (9.1)	15 (17.0)	0.081

Continuous variables are represented as mean ± standard deviation; categorical variables are represented as count (percent). Infection is defined as a surgical site infection or postoperative joint infection, regardless of reoperation status. ADP, acute rehabilitation facility; HbA1c, hemoglobin A1c; LOS, length of stay; SNF, skilled nursing facility.

Table 3: Patient-Reported Outcome Measures

	Cohort 1 (n=88)	Cohort 2 (n=88)	Cohort 3 (n=88)	P-Value
PROMIS Intensity	Mean ± SD, N	Mean ± SD, N	Mean ± SD, N	
Preoperative	55.6 ± 10.5, 12	56.7 ± 6.9, 15	57.3 ± 8.9, 10	0.893
6 Weeks	45.6 ± 10.0, 10	43.2 ± 7.5, 15	43.3 ± 8.4, 8	0.864
6 Months	42.6 ± 11.0, 8	47.4 ± 5.8, 8	49.6 ± 11.2, 6	0.618
1 Year	47.2 ± 14.2, 8	41.6 ± 9.7, 9	51.7 ± 10.1, 10	0.182
PROMIS Interference	Mean ± SD, N	Mean ± SD, N	Mean ± SD, N	
Preoperative	63.7 ± 9.1, 14	68.4 ± 6.2, 16	65.6 ± 7.0, 11	0.242
6 Weeks	58.7 ± 10.8, 10	53.3 ± 9.1, 16	56.3 ± 6.0, 8	0.646
6 Months	45.8 ± 6.2, 9	40.5 ± 11.6, 12	45.6 ± 7.6, 8	0.254
1 Year	55.1 ± 10.3, 8	50.3 ± 10.2, 11	61.7 ± 9.0, 10	0.043
6 Months	45.8 ± 6.2, 9	40.5 ± 11.6, 12	45.6 ± 7.6, 8	0.254
1 Year	55.1 ± 10.3, 8	50.3 ± 10.2, 11	61.7 ± 9.0, 10	0.043
6 Months	45.8 ± 6.2, 9	40.5 ± 11.6, 12	45.6 ± 7.6, 8	0.254
1 Year	55.1 ± 10.3, 8	50.3 ± 10.2, 11	61.7 ± 9.0, 10	0.043

PROMIS, Patient-Reported Outcomes Measurement Information System; A, change.

Table 4: Multivariable Logistic Regression Results for Characteristics Predictive of Infection and Need for Revision (n=973)

Variable	Infection		Revision	
	Odds Ratio [95% CI]	P-Value	Odds Ratio [95% CI]	P-Value
Medication Cohort				
One	1.0	-	1.0	-
Two	1.3 [0.6 - 2.7]	0.488	1.1 [0.3 - 3.4]	0.917
Three	2.8 [1.2 - 6.4]	0.018	1.3 [0.3 - 6.2]	0.627
ASA at Surgery	1.0 [1.0 - 1.1]	0.425	1.0 [1.0 - 1.1]	0.244
BMI	1.1 [1.0 - 1.2]	0.002	1.1 [1.0 - 1.3]	0.005
Male Sex	1.5 [0.8 - 2.9]	0.242	2.3 [0.8 - 7.7]	0.143
Pre-Op HbA1c	1.3 [1.0 - 1.7]	0.049	1.1 [0.6 - 1.7]	0.772
ASA				
I	-	-	-	-
II	1.0	-	1.0	-
III	0.9 [0.4 - 2.0]	0.83	0.9 [0.3 - 3.3]	0.803
IV	0.7 [0.1 - 2.8]	0.67	NA	-
Smoking Status				
Never	1.0	-	1.0	-
Former	1.0 [0.5 - 1.9]	0.9	1.7 [0.6 - 5.8]	0.337
Current	1.7 [0.6 - 4.4]	0.317	1.0 [0.0 - 7.3]	0.988

Odds ratio for ASA status I is not calculated, as only two patients in the cohort are in this classification, and ASA status II is used as the reference category. The odds ratio for revision in ASA status IV cannot be calculated, as of the 49 patients in this classification, none underwent revision. ASA, American Society of Anesthesiologists; BMI, body mass index; CI, confidence interval; HbA1c, hemoglobin A1c.