Original Article

Obesity and its effect on outcomes in same-day bilateral total knee arthroplasty

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Background: The niche surgery of same-day bilateral total knee arthroplasty (sd-BTKA) continues to create debate amongst specialists in arthroplasty. To date, there is a significant lack of literature on obese patients undergoing sd-BTKA, and no study has evaluated outcomes of this procedure when compared to non-obese patients. Therefore, this study will perform a retrospective analysis to compare (I) incidence, (II) demographics, and (III) complications of sd-BTKA in non-obese, obese, and morbidly obese patients in the United States from 2009 to 2016.

Methods: The National Inpatient Sample (NIS) database was queried for all individuals that underwent sd-BTKA from 2009 to 2016. This returned 184,844 non-obese patients, 39,901 obese patients, and 20,394 morbidly obese patients. Analyzed variables included mean age, mean length of stay (LOS), race, payer, age-adjusted Charlson Comorbidity Index score, discharge disposition, hospital charges, hospital costs, and complications. Chi-square analyses and analyses of variance were utilized to assess categorical and continuous variables, respectively.

Results: Non-obese patients most commonly underwent sd-BTKA over the course of the study. As weight status increased, mean age decreased and the proportion of females, LOS, hospital charges and costs, and proportion of discharges to skilled nursing facilities increased. Regression analysis demonstrated obese and morbidly obese cohorts were at an overall increased odds for experiencing complications. Specifically, obese patients were at increased risk for pulmonary emboli, periprosthetic joint infections, and respiratory failures, while morbidly obese patients are at increased risk for pulmonary emboli, respiratory failures, and urinary tract infections.

Conclusions: Surgeons should thoroughly evaluate the risks and benefits of performing sd-BTKA on obese and morbidly obese patients, as both confer higher overall complication rates and increased length of stay. More research is necessary to characterize the cost analysis of this procedure, as health care models continue to transition to more cost-effective procedures.

Keywords: Morbid obesity; obesity; same-day bilateral total knee arthroplasty (sd-BTKA); simultaneous

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Introduction

Obesity has a negative impact on the body in a multitude of ways, including a six-fold increase in risk for knee osteoarthritis (1). As such, many patients with increased body mass indices (BMI) will present to providers with bilateral disease, with some necessitating total knee arthroplasties (TKA) (2). To avoid the morbidity of multiple operations, same-day bilateral total knee arthroplasty (sd-BTKA) may be an option for these patients, as some find appeal in a single surgery and hospitalization (3,4). Moreover, physicians may acquiesce to the procedure as investigations report decreased cumulative hospital stays and rehabilitation time (5-10). Despite the purported benefits of this procedure, studies have revealed increased risk for negative outcomes with the bilateral operation (9-13). As a consequence of the conflicting body of literature, the utility of sd-BTKA continues to generate debate amongst arthroplasty surgeons (14-16).

Over time, the debate regarding sd-BTKA intensified to a level that warranted consensus recommendations in 2013 (4). Among several proposals, the presence of certain comorbidities, such as morbid obesity, were felt to warrant exclusion of individuals from consideration for the operation. This notion is predicated off studies identifying higher BMI patients as having an increased risk for complications when undergoing unilateral TKA (17-23), though several studies have demonstrated a lack of association between poor outcomes and high BMI (24-28). Ultimately, whether high BMI patients should be subjected to the cumulative risk of two unilateral TKAs or the single operation of sd-BTKA remains inconclusive, as no studies have investigated the prospect.

To date, there is a shortage of studies that have quantified the role of high BMI in patients undergoing sd-BTKA. Specifically, no study has evaluated the effect elevated BMI has on the outcomes of this procedure when compared to non-obese patients. Therefore, this study will compare (I) incidence, (II) demographics, and (III) outcomes of non-obese, obese, and morbidly obese sd-TKA patients in the United States from 2009 to 2016. We present the following article in accordance with the STROBE reporting checklist (available at http://dx.doi.org/10.21037/atm-20-806).

Methods

Database

The National Inpatient Sample (NIS) database was queried for all individuals who underwent sd-BTKA from 2009 to 2016. The NIS is a large, publicly available database gathered by the Agency for Healthcare Research and Quality (AHRQ) for the Healthcare Cost and Utilization Project (HCUP), which was created with the goal of improving health care delivery. The unweighted NIS database contains seven million hospital stays each year. When weighted, it represents approximately 35 million hospitalizations nationally (29).

Patient selection

Using International Classification of Diseases, Ninth and Tenth Editions (ICD-9 and -10) procedural codes (ICD-9: '81.54'; ICD-10: '0SRC069', '0SRC06A', '0SRC06Z', '0SRC0J9', '0SRC0JA', '0SRC0JZ', '0SRC0KZ', '0SRD069', '0SRD06A', '0SRD06Z', '0SRD0J9', '0SRD0JA', '0SRD0JZ', '0SRD0KZ'), an initial query was made to the NIS for those undergoing sd-BTKA. This was achieved by tallying patients who presented more than one TKA code (n=245,139). We then stratified patients into non-obese, obese (BMI >30 kg/m^2; ICD-9: '278.00', '278.03'; ICD-10: 'E66.09', 'E66.1', 'E66.8', 'E66.9') and morbidly obese (BMI >40 kg/m^2; ICD-9: '278.01'; ICD-10: 'E66.01', 'E66.2') cohorts utilizing their respective diagnosis codes. As this study was retrospective and utilized a deidentified database, it was deemed exempt from Institutional Review Board approval.

Variables

Patient variables included mean age, mean length of stay (LOS), sex, race, primary payer, age-adjusted Charlson Comorbidity Index (ACCI) score, and discharge disposition. Length of stay was defined as the stay from admission until discharge. Race was categorized into Caucasian, African American, Hispanic, Asian, Native American, and other. Primary payer included Medicare, Medicaid, private insurance, self-pay, no charge, and others. The ACCI is a prognostic tool employed to estimate 10-year mortality based on 19 comorbid conditions and is categorized in accordance with the number of present comorbidities, namely 0, 1, 2, or 3+ (30). Discharge disposition was categorized into routine, short-term hospital, skilled nursing facility, home with home health care, against medical advice, and deceased.

The analyzed outcomes included charges, costs, and complications. Charges represented the monetary amount

the hospital billed to the payer, while costs represented the monetary amount the hospital facility incurred for the inpatient stay. The charges associated with hospitals are an element recorded within the NIS database; although costs are not. In order to obtain costs, the yearly "Cost-to-Charge Ratio" supplemental files provided by HCUP were utilized (29). All costs and charges were adjusted using the January 1, 2019 consumer price index. Complications included myocardial infarctions (MI), cardiac arrests, pulmonary emboli (PE), deep vein thromboses (DVT), cerebrovascular complications, sepsis, periprosthetic joint infections (PJI), hematomas/seromas, mechanical complications, respiratory failures, pneumoniae, urinary tract infections (UTI), and blood transfusions. Cerebrovascular complications consisted of thromboses, emboli, or occlusions with or without cerebral infarction and/or hemorrhage. Mechanical complications represented intraoperative or perioperative fractures, mechanical breakdown, loosening, or dislocation of implants.

Statistical analysis

Chi-square analyses were used to analyze race, ACCI, primary payer, median household income, discharge destination, and complications. Student's t-tests were performed to compare age, LOS, costs, and charges. Odds ratios for complications were determined by employing multinomial regression analyses. To reduce the chance of committing type I (alpha) error and more precisely identify statistical significance, post-hoc Bonferroni corrections were utilized. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS®; IBM Corporation; Armonk, New York) version 25. A P value of 0.05 was considered the threshold for significance for all variables.

Results

Incidence

Non-obese patients [n=184,844 (75.4%)] comprised the highest percentage of sd-BTKA procedures over the course of the study, which was followed by obese [n=39,901 (16.3%)] and then morbidly obese [n=20,397 (8.3%)] patients (*Table 1*).

Patient demographics

Age decreased, mean LOS increased, and proportion of females increased as BMI increased (P<0.001 for all). Caucasians were the most common race undergoing sd-BTKA, although the proportion of African Americans increased as BMI increased (P<0.001). The number of individuals with an ACCI of 3+ decreased as obesity status increased, while those with ACCI statuses of 1 and 2 increased as BMI increased (P<0.001). The most common payer was private insurance, which increased in proportion as BMI increased (P<0.001). Median household income quartiles 3 and 4 significantly decreased among morbidly obese individuals (P<0.001). Proportion of discharges to skilled nursing facilities increased as BMI increased (P<0.001).

Outcomes

Hospital costs and charges increased as BMI increased (P<0.001 for both) (*Table 2*). In comparison with the non-obese patients, obese patients demonstrated significantly lower proportions of MIs (P=0.028), pneumoniae (P<0.001), and blood transfusions (P<0.001), while demonstrating significantly higher proportions of PE (P<0.001), respiratory failures (P<0.001), and PJIs (P=0.028) (*Figure 1*). For morbidly obese patients, significantly lower proportions were observed in DVTs (P=0.022), cerebrovascular complications (P=0.002), and blood transfusions (P<0.001), while significantly higher proportions were observed regarding PE (P<0.001), sepsis (P<0.001), respiratory failures (P<0.001), and UTIs (P<0.001). Only morbidly obese patients demonstrated a significantly increased overall complication rate compared to non-obese patients (P<0.001).

Multinomial regression analysis

When compared to non-obese patients, obese patients had a significantly reduced risk for MIs [odds ratio (OR): 0.659], cerebrovascular complications (OR: 0.685), pneumoniae (OR: 0.470), and blood transfusions (OR: 0.873) (P<0.003 for all) (*Figure 2; Table 3*). Conversely, obese patients were at increased risk for PE (OR: 1.892), PJIs (OR: 1.471), and respiratory failures (OR: 1.375) (P<0.011 for all). Obese patients also demonstrated a slight, yet significant, overall increase in complication risk (OR: 1.107) when compared to non-obese patients (P<0.001).

When morbidly obese patients were compared to non-obese patients, they had a significantly reduced risk for cerebrovascular complications (OR: 0.357), pneumoniae (OR: 0.704), and blood transfusions (OR: 0.811) (P<0.006 for all).

Table 1 Comparison of patient demographics between non-obese, obese, and morbidly obese patients that underwent same-day bilateral total knee arthroplasty from 2009 to 2016

Parameter (%)	Non-obese	Obese	Morbidly obese	P value
Incidence	184,844 (75.4)	39,901 (16.3)	20,394 (8.3)	
Mean age (SD)	64.5 (9.3)‡	62.2 (8.3)‡	60.0 (8.1)‡	<0.001
Mean LOS (SD)	3.6 (2.0)‡	3.7 (2.1)‡	4.0 (2.6)‡	<0.001
Sex				0.001
Male	85,002 (46.0)‡	15,667 (39.3)‡	6,337 (31.1)‡	
Female	99,722 (54.0)‡	24,227 (60.7)‡	14,057 (68.7)‡	
Race				<0.001
Caucasian	146,896 (87.4)‡	30,046 (83.8)‡	15,031 (81.4)‡	
African American	9,423 (5.6)‡	3,150 (8.8)‡	2,043 (11.1)‡	
Hispanic	4,710 (2.8)	1,382 (3.9)†	688 (3.7)†	
Asian	2,536 (1.5)‡	285 (0.8)‡	93 (0.5)‡	
Native American	500 (0.3)	144 (0.4)†	80 (0.4)†	
Other	3,983 (2.4)	841 (2.3)	529 (2.9)†	
Age-Adjusted Charlson Comorbidity Index Score				<0.001
0	695 (0.4)	114 (0.3)†	64 (0.3)	
1	7,653 (4.1)‡	2,060 (5.2)‡	1,469 (7.2)‡	
2	39,112 (21.2)	9,500 (23.8)†	5,014 (24.6)†	
3+	137,383 (74.3)‡	28,226 (70.7)‡	13,846 (67.9)‡	
Primary payer				<0.001
Medicare	85,759 (46.6)‡	15,123 (38.0)‡	6,484 (31.9)‡	
Medicaid	4,066 (2.2)‡	1,010 (2.5)‡	797 (3.9)‡	
Private insurance	88,988 (48.3)‡	22,431 (56.4)‡	12,387 (61.0)‡	
Self-pay	956 (0.5)	171 (0.4)	135 (0.7)†	
No charge	99 (0.1)	29 (0.1)	xxx†	
Other	4,358 (2.4)	1,033 (2.6)†	507 (2.5)	
Median household income				<0.001
Quartile 1	37,458 (20.6)	8,100 (20.6)	5,085 (25.3)†	
Quartile 2	47,137 (26.0)	10,305 (26.2)	5,538 (27.5)†	
Quartile 3	48,282 (26.6)	11,181 (28.4)†	5,209 (25.9)	
Quartile 4	48,625 (26.8)‡	9,751 (24.8)‡	4,280 (21.3)‡	
Disposition				<0.001
Routine	31,251 (16.9)‡	6,119 (15.4)‡	2,576 (12.7)‡	
Short-term hospital	3,847 (2.1)	674 (1.7)†	320 (1.6)†	
Skilled nursing facility	109,421 (59.2)‡	24,981 (62.7)‡	14,161 (69.5)‡	

Table 1 (*continued*)

Table 1 (*continued*)

Parameter (%)	Non-obese	Obese	Morbidly obese	P value
Home health care	39,989 (21.6)‡	8,014 (20.1)‡	3,284 (16.1)‡	
Against medical advice	15 (0.0)	xxx	xxx	
Deceased	201 (0.1)	25 (0.1)	20 (0.1)	

xxx, number concealed in accordance with the Healthcare Cost and Utilization Project Data Use Agreement; †, a statistically significant difference compared to only the non-obese cohort; ‡, a statistically significant difference compared to other cohorts. SD, standard deviation; LOS, length of stay.

Table 2 Comparison of outcomes between non-obese, obese, and morbidly obese patients that underwent same-day bilateral total knee arthroplasty from 2009 to 2016

Parameter	Non-obese	Obese	Morbidly obese	P value
Hospital charges (SD)	$86,588.40 ($51,106.39)‡	$88,025.10 ($46,906.11)‡	$89,961.58 ($51,922.47)‡	<0.001
Hospital cost (SD)	$25,757.29 ($11,837.76)	$25,767.99 ($11,080.72)	$26,561.95 ($12,530.51)‡	<0.001
Complications, n (%)				
Myocardial Infarctions	473 (0.3)	73 (0.2)†	49 (0.2)	0.028
Cardiac arrests	142 (0.1)	30 (0.1)	20 (0.1)	0.571
Pulmonary emboli	1,177 (0.6)‡	423 (1.1)‡	167 (0.8)‡	<0.001
Deep vein thromboses	800 (0.4)	152 (0.4)	64 (0.3)†	0.022
Cerebrovascular complications	480 (0.3)	83 (0.2)	29 (0.1)†	0.002
Sepsis	292 (0.2)	79 (0.2)	57 (0.3)†	<0.001
Periprosthetic joint infections	222 (0.1)	69 (0.2)†	25 (0.1)	0.028
Hematomas/seromas	1,154 (0.6)	233 (0.6)	125 (0.6)	0.637
Mechanical complications	178 (0.1)	45 (0.1)	25 (0.1)	0.388
Respiratory failures	913 (0.5)‡	279 (0.7)‡	263 (1.3)‡	<0.001
Pneumoniae	894 (0.5)	114 (0.3)†	89 (0.4)	<0.001
Urinary tract infections	3,184 (1.7)	626 (1.6)	547 (2.7)‡	<0.001
Blood transfusions	48,242 (26.1)‡	9,543 (23.9)‡	4,664 (22.9)‡	<0.001
Overall complication rates[α]	8,398 (4.5)	1,899 (4.8)	1,236 (6.1)‡	<0.001

[α], this variable does not include blood transfusions; †, a statistically significant difference compared to only the non-obese cohort; ‡, a statistically significant difference compared to other cohorts.

However, morbidly obese patients were at increased risk for PE (OR: 1.267), respiratory failures (OR: 2.217), and UTIs (OR: 1.464) (P<0.011 for all). Moreover, morbidly obese patients had a significantly increased overall complication risk (OR: 1.302) when compared to non-obese patients (P<0.001).

Discussion

Morbidity and mortality are the largest concerns surrounding sd-BTKA, and conflicting studies have generated debate regarding the appropriateness of this procedure. The present study utilized the NIS database to examine and identify outcomes of sd-BTKA patients with varying BMI levels, in an effort to characterize the degree of risk higher BMI patients sustain when undergoing this procedure, as no studies have done so previously. Predictably, LOS, hospital costs and charges, and overall inpatient complication rates increased as BMI increased.

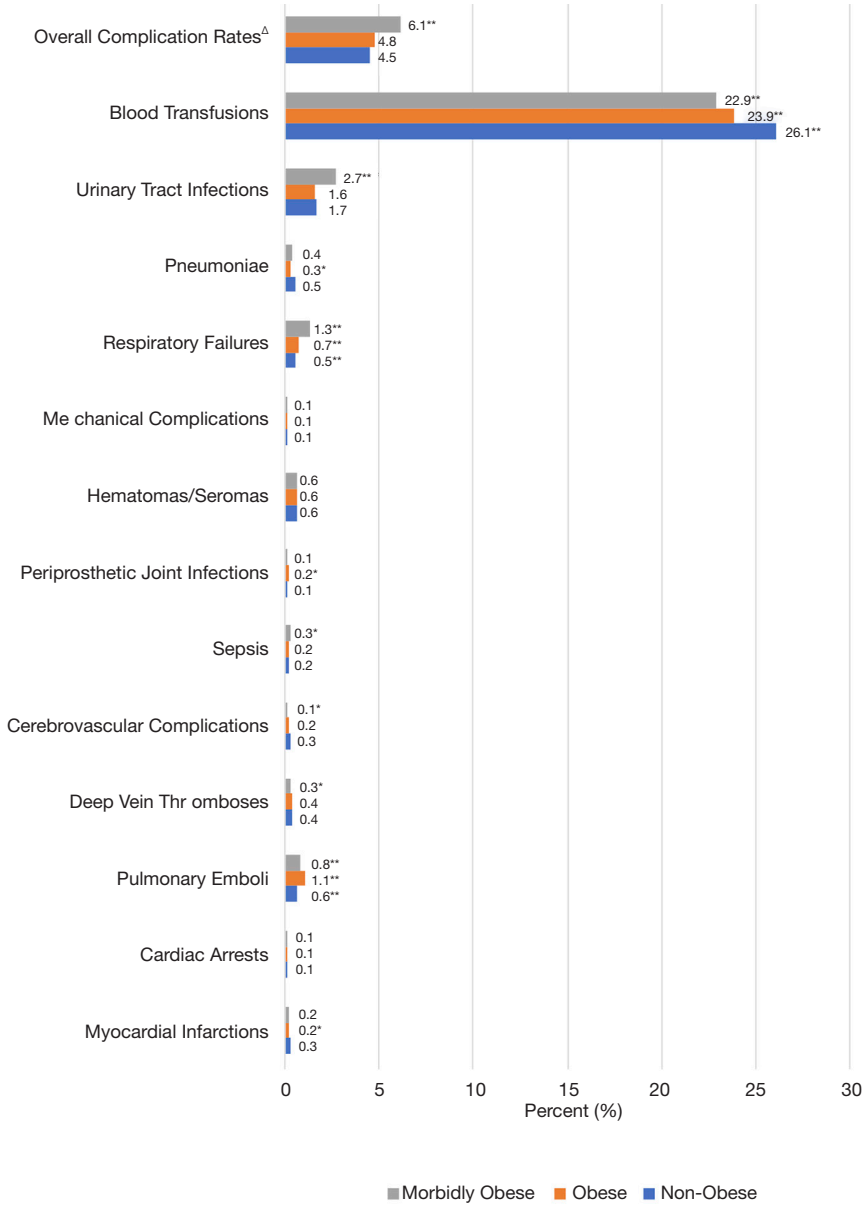

Figure 1 The proportion of complications experienced by non-obese, obese, and morbidly obese individuals undergoing same-day bilateral total knee arthroplasty. △, blood transfusions were not included in the overall complication rate; *, a statistically significant difference compared to only the non-obese cohort; **, a statistically significant difference compared to other cohorts.

Specifically, obese individuals demonstrated increased risk for PE, PJI, and respiratory failures, while morbidly obese individuals demonstrated increased risk for PE, sepsis, respiratory failures, and UTIs. Similar to unilateral TKA, the presence of obesity or morbid obesity appears to confer a higher level of overall risk for complications in patients undergoing sd-BTKA.

This study does possess limitations. As the present study was performed retrospectively, the authors were confined to the data presented within the NIS database. Second, the transition period from ICD-9 to ICD-10 medical coding systems occurred during our study. The new coding system may have caused providers to miscode sd-BTKAs, producing inconsistencies in our obtained incidence numbers. However, any data entry errors that occurred were likely diminished due to the considerable sizes of our analyzed

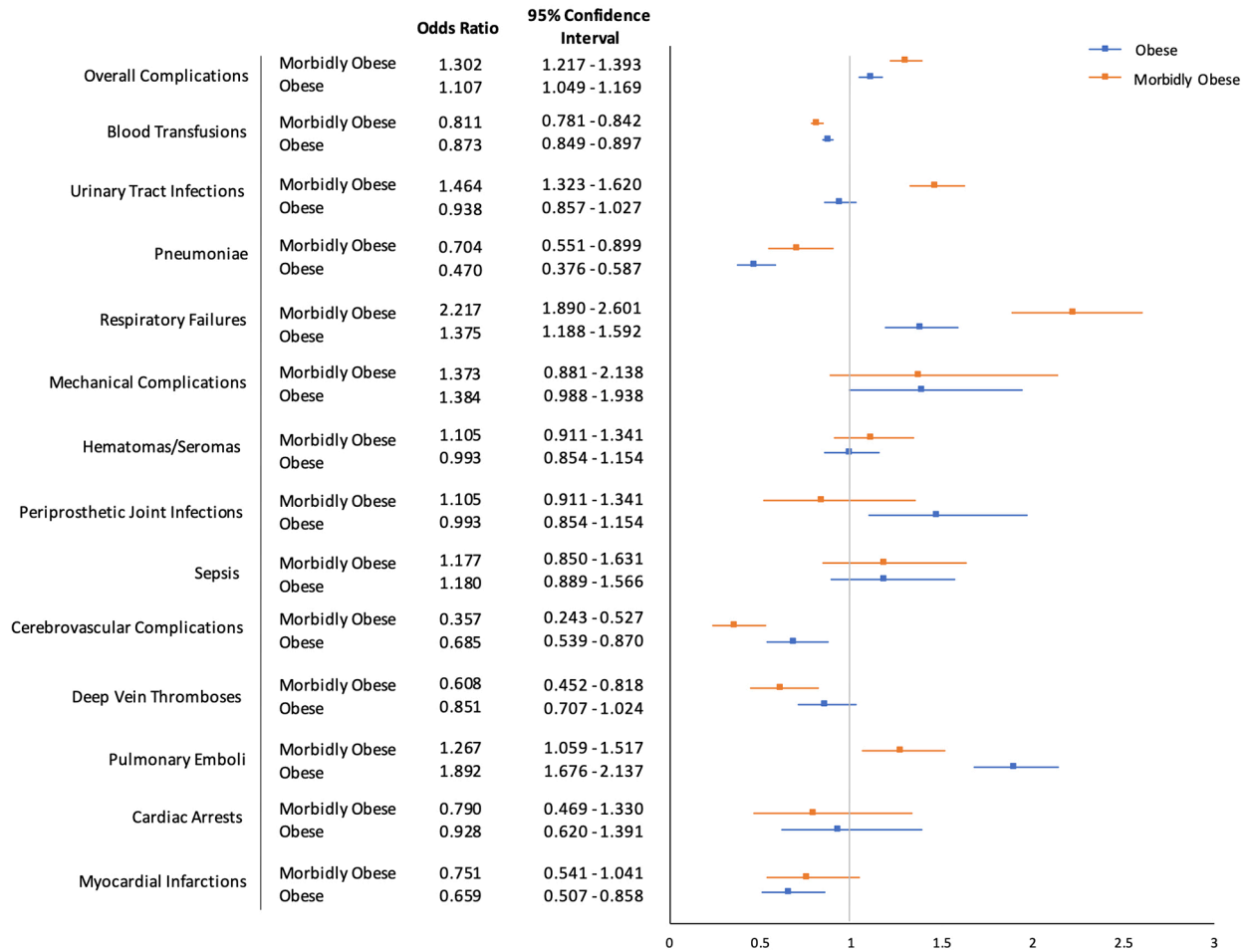

Figure 2 The degree of risk for complications obese and morbidly obese individuals sustain when undergoing same-day bilateral total knee arthroplasty. The non-obese cohort served as the reference when evaluating odds ratios.

cohorts. Moreover, querying the NIS in the method we chose did not delineate between simultaneous or sequential BTKA, which is why we opted for the term 'same-day'. Nonetheless, both procedures are performed under the same anesthetic and may incur similar perioperative risk, as several studies have compared both approaches to staged BTKA or unilateral TKA (31-34). Third, the NIS database only captures the inpatient stay. Therefore, we were unable to measure readmissions and post-discharge complications. Although, this study provides a thorough analysis regarding the morbidity and mortality of patients with varying BMI statuses throughout the inpatient stay, which is arguably when the patient is subjected to the highest amount of risk. Although limitations exist in this study, the breadth of our analysis is comprehensive and provides valuable information pertaining to the role of BMI in the highly debated procedure of sd-BTKA.

In the present study, a significant difference was observed between BMI and hospital LOS. As BMI increased, the LOS also increased, with non-obese individuals staying an average of 3.6 days and morbidly obese individuals staying 4.0 days. An increased LOS can have large implications on the postoperative outcomes TKA patients. Otero *et al.* (35) examined the association between LOS and complications in TKA patients from 2011 to 2013, finding patients staying four or more days experienced complication rates that were three times higher than those staying 3 days (3.41% *vs.* 11.15%). Moreover, the cohort staying 4 days or longer had a higher average American Society of Anesthesiologists (ASA) scores, were older, and more likely to be female. Although LOS in itself was likely not the sole reason patients experienced higher complication rates, it appears to

Table 3 Multiple regression of complication rates between non-obese, obese, and morbidly obese patients that underwent same-day bilateral total knee arthroplasty from 2009 to 2016

Parameter	Adjusted odds ratio	95% confidence interval	P value
Myocardial infarctions			
Non-obese (ref.)			
Obese	0.659	0.507–0.858	0.002
Morbidly obese	0.751	0.541–1.041	0.085
Cardiac arrests			
Non-obese (ref.)			
Obese	0.928	0.620–1.391	0.719
Morbidly obese	0.790	0.469–1.330	0.375
Pulmonary Emboli			
Non-obese (ref.)			
Obese	1.892	1.676–2.137	<0.001
Morbidly obese	1.267	1.059–1.517	0.010
Deep vein thromboses			
Non-obese (ref.)			
Obese	0.851	0.707–1.024	0.087
Morbidly obese	0.608	0.452–0.818	0.001
Cerebrovascular complications			
Non-obese (ref.)			
Obese	0.685	0.539–0.870	0.002
Morbidly obese	0.357	0.243–0.527	<0.001
Sepsis			
Non-obese (ref.)			
Obese	1.180	0.889–1.566	0.251
Morbidly obese	1.177	0.850–1.631	0.327
Periprosthetic joint infections			
Non-obese (ref.)			
Obese	1.471	1.102–1.965	0.009
Morbidly obese	0.837	0.520–1.349	0.466
Hematomas/seromas			
Non-obese (ref.)			
Obese	0.993	0.854–1.154	0.924
Morbidly obese	1.105	0.911–1.341	0.309

Table 3 (*continued*)

Table 3 (*continued*)

Parameter	Adjusted odds ratio	95% confidence interval	P value
Mechanical complications			
Non-obese (ref.)			
Obese	1.384	0.988–1.938	0.059
Morbidly obese	1.373	0.881–2.138	0.161
Respiratory failures			
Non-obese (ref.)			
Obese	1.375	1.188–1.592	<0.001
Morbidly obese	2.217	1.890–2.601	<0.001
Pneumoniae			
Non-obese (ref.)			
Obese	0.470	0.376–0.587	<0.001
Morbidly obese	0.704	0.551–0.899	0.005
Urinary tract infections			
Non-obese (ref.)			
Obese	0.938	0.857–1.027	0.167
Morbidly obese	1.464	1.323–1.620	<0.001
Blood transfusions			
Non-obese (ref.)			
Obese	0.873	0.849–0.897	<0.001
Morbidly obese	0.811	0.781–0.842	<0.001
Overall complications[§]			
Non-obese (ref.)			
Obese	1.107	1.049–1.169	<0.001
Morbidly obese	1.302	1.217–1.393	<0.001

[§], this variable does not include blood transfusions.

be an important factor that should be reduced, though this may not be readily possible when performing sd-BTKA. Thus, selecting patients with favorable characteristics, namely lower ASA or younger age, may be the next best option to optimize postoperative courses. Davidson *et al.* (36) did just that and assessed outcomes in sd-BTKA patients who were selected via their institutionally developed appropriateness of care criteria (AOCC) versus those who were not. Patients were considered 'ideal' candidates by the AOCC if they were younger than 70, did not have cardiac disease, diabetes, or lower extremity deformities, and were non-obese. With the AOCC stratification tool, the ideal cohort was younger (61 *vs.* 65 years), had fewer comorbidities, required a shorter LOS (3.6 *vs.* 3.9 days), and were discharged home more frequently (26% *vs.* 13%). While this study used obesity as an exclusion criterion, providers may observe good outcomes in higher BMI patients if they appropriately satisfy other criteria. Obese and morbidly obese individuals who underwent sd-BTKA in the present study appeared to be 'healthier' despite the presence of obesity, as evidenced by the reduced average ACCI and age. Performing sd-BTKA on high BMI individuals is possible, and risk stratifying patients in a manner similar to the AOCC may increase the likelihood of

achieving favorable outcomes.

Both obese and morbidly obese cohorts demonstrated increased odds for experiencing complications, but morbidly obese patients demonstrated a statistically significant increase in overall complications. Unfortunately, only a select few have examined the role of obesity in sd-BTKA. In a retrospective study performed by Taylor *et al.* (37), the authors compared 1-year morbidity and mortality rates in obese patients undergoing either sd-BTKA (n=151) or unilateral TKA (n=148), concluding both major (MI, PE, cerebrovascular accident, etc.) and minor (UTI, superficial infection, ileus, etc.) complication rates in sd-BTKA to be similar to unilateral TKA. Thus, obese individuals undergoing the procedure of sd-BTKA may not be at increased risk compared to their unilateral TKA counterparts. Madsen *et al.* (3) investigated morbidly obese patients receiving sd-BTKA by performing a ten-year analysis of outcomes in non-obese (n=79) and morbidly obese patients (n=42). The authors found similar complication rates between the two cohorts, with both experiencing four major complication events. The obese cohort experienced one PE, one extensor mechanism disruption, and two DVTs, while the morbidly obese cohort experienced one MI, one extensor mechanism disruption, and two DVTs. Although the authors provided a long-term analysis of sd-BTKA patients, the number of patients examined in each cohort was insufficient to make appropriate conclusions regarding the procedure. Predicated off the limited literature assessing BMI status and sd-BTKA, the benefit of this procedure remains inconclusive, though it may be appropriate for higher BMI individuals with desirable comorbidity profiles. Moreover, opting to perform sd-BTKA may benefit select higher BMI patients considering staged BTKA. In a study performed by Grace *et al.* (38), the authors examined the risk for recurrent complications (MI and other cardiac-related complications, ischemic stroke, respiratory complications, digestive complications, urinary complications, and hematomas) in staged BTKA patients after they experienced a complication following their initial unilateral TKA. The authors noted significantly increased odds ratios (OR) for all analyzed complications, with MIs [OR: 56.63; 95% confidence interval (CI): 18.04–155.44; P<0.001] and stroke (OR: 41.38; 95% CI: 1.98–275.82; P=0.03) presenting the greatest risk. As higher BMI individuals already experience increased probabilities for complications with unilateral TKA compared to non-obese patients, providers may want to consider the prospect of sd-BTKA to mitigate the cumulative risk staged BTKA bestows upon these patients.

Conclusions

The United States continues to experience an increase in obesity, and arthroplasty surgeons will be faced with the decision of operating on these patients. The present study determined that high BMI patients undergo meticulous selection for sd-BTKA, as evidenced by decreasing age and ACCI. However, these patients are still experiencing longer LOS, heightened chances for discharge to nursing facilities, and increased complication rates compared to their non-obese counterparts. Despite these differences, obese and morbidly patients may be optimized to a level where they experience similar risk to those with comparable BMIs undergoing unilateral TKA. More research is necessary to understand the risk patients accrue when undergoing sd-BTKA compared to those undergoing staged BTKA.

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Footnote

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aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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