



N I N J A .

Northern Infection Network Joint Arthroplasty

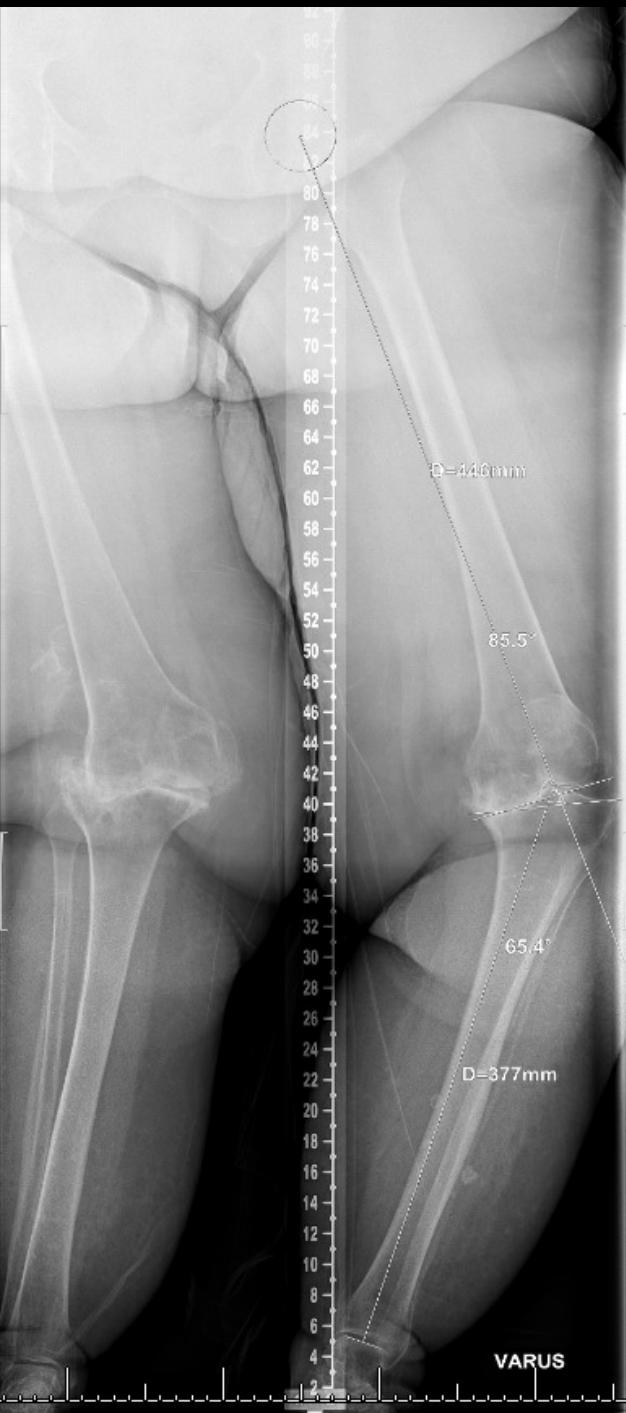
Bariatric surgery before arthroplasty

8 mei 2019

B.J. Robben



Sint Maartenskliniek



NOV Richtlijnen

- Richtlijn totale knieprothese
- Richtlijn totale heupprothese
 - Indicatiestelling:
Bij obesitas dient benoemd te worden
 - Grottere kans op een minder goed resultaat TKP
 - Vergrote kans op peri-prothetische infecties (RR4.4)
 - Vergrote kans op luxaties THP (RR2.4)



NEDERLANDSE
ORTHOPAEDISCHE
VERENIGING | NOV

Richtlijn SMK

- BMI >35,0 kg/m²: bespreek verhoogde complicatiekans ten gevolge van obesitas.
 - Verwijzing naar huisarts
- BMI >40,0 kg/m² is uitstel van operatie te overwegen totdat gewichtsverlies is bereikt. Dit geldt zeker bij bijkomende comorbiditeit.
 - Streef naar 5-10% gewichtsreductie.
- Een goed alternatief is om de obese patiënten (BMI >35) te verwijzen naar een obesitas gespecialiseerde kliniek.
 - 35% blijvend gewichtsverlies

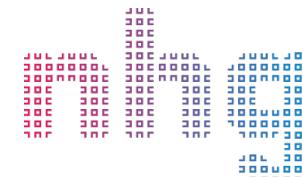


CBO Richtlijn

Bariatrische chirurgie kan worden overwogen bij:

- BMI $\geq 40 \text{ kg/m}^2$ of BMI tussen 35 en 40 kg/m^2 gepaard gaande met comorbiditeit.
- Geen/onvoldoende resultaat bij niet-chirurgische behandelingen.
- Behandeling in een obesitas gespecialiseerde kliniek.
- De persoon is bereid levenslang dagelijks vitaminepreparaten te slikken.

BMI $> 50 \text{ kg/m}^2$ (superobees) bariatrische chirurgie als eerste behandeling worden overwogen



Nederlands
Huisartsen
Genootschap

Niveau 2

Chirurgische behandeling resulteert in significant gewichtsverlies ($> 50\%$ EWL), waarbij de complexere operaties weliswaar resulteren in een groter gewichtsverlies, maar dit ten koste gaat van een groter risico op operatieve en langetermijncomplicaties.

B Colquitt 2005, TEC review 2005, Maggard 2005

Niveau 2

Gewichtsverlies resulteert ook in een significante vermindering van de belangrijkste comorbiditeit van morbide obesitas. De resultaten ten aanzien van een deel van deze problemen, zoals diabetes mellitus en hyperlipidemie, lijken beter te zijn na malabsorptieve operaties dan na restrictieve ingrepen.

B Colquitt 2005, TEC-review 2005, Maggard 2005

Niveau 3

Complicaties van de operatieve ingrepen zijn aanzienlijk. De operatiemortaliteit ($0,1\%$ voor LAGB, $0,5\%$ voor LRYGB en $0,9\%$ voor BPD) lijkt voldoende laag te zijn om chirurgie toe te passen. Dit geldt uiteraard alleen voor patiënten die aan het criterium van morbide obesitas voldoen met een $BMI > 40 \text{ kg/m}^2$ of een $BMI > 35 \text{ kg/m}^2$ met ernstige comorbiditeit.

B Buchwald 2004

Aantal maagverkleiningen neemt explosief toe

⌚ Frederiek Weeda ⌂ 3 juni 2014



Literatuur



■ SPECIALTY UPDATE

Does bariatric surgery prior to total hip or knee arthroplasty reduce post-operative complications and improve clinical outcomes for obese patients?

T. O. Smith,
T. Aboelmagd,
C. B. Hing,
A. MacGregor

SYSTEMATIC REVIEW AND META-ANALYSIS

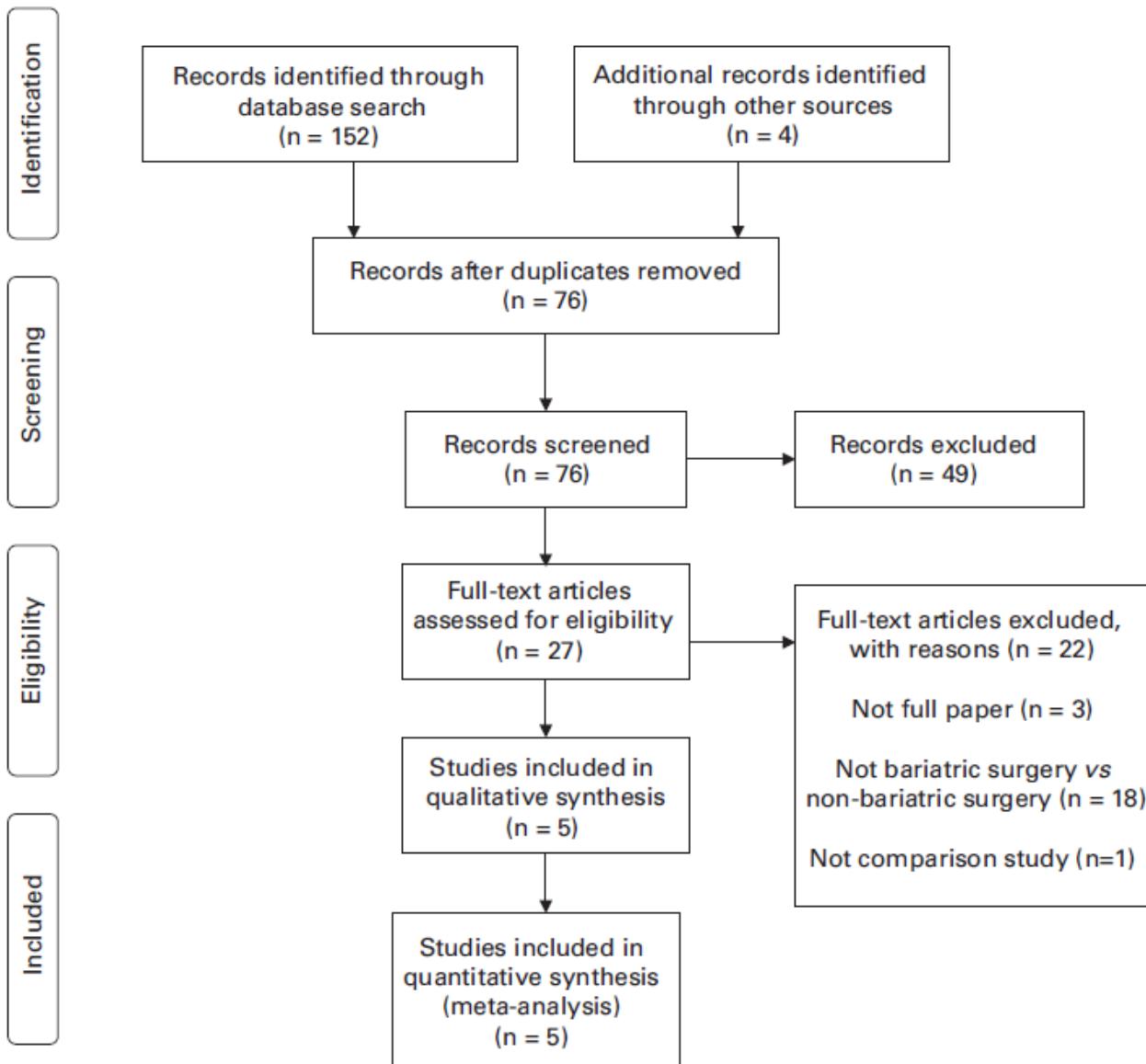


Fig. 1

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses flowchart presenting the search strategy results.

Complications

Table III. Results of the meta-analyses

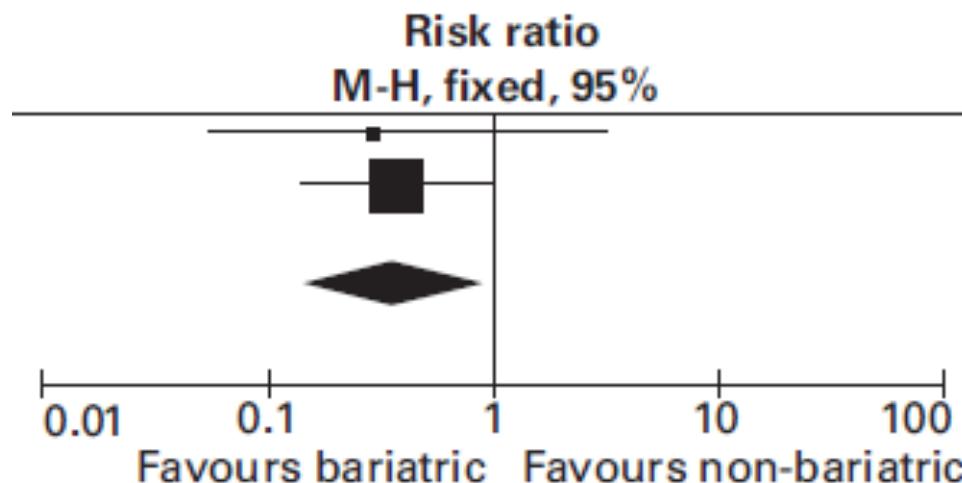
Outcome	Risk ratio (95% CI)	p-value	n	Statistical hetero
Superficial wound infection	1.88 (0.95 to 0.37)	0.07	11 567	0%; 0.46
Deep wound infection	1.04 (0.65 to 1.66)	0.88	22 841	0%; 0.83
Deep vein thrombosis	0.57 (0.13 to 2.44)	0.45	11 710	0%; 1.00
Pulmonary embolism	0.51 (0.03 to 8.26)	0.64	11 346	NE
Joint revision	1.24 (0.75 to 2.05)	0.40	11 835	0%; 0.88
Mortality	1.25 (0.16 to 9.89)	0.84	11 346	0%; 0.76
In-patient re-admission	0.57 (0.06 to 5.09)	0.62	11 346	74%; 0.05*
Medical complication (collective)	0.54 (0.39 to 0.74)	< 0.01	11 781	0%; 0.74
Post-operative infection (with/without I&D)	0.36 (0.15 to 0.90)	0.03	11 656	0%; 0.86
Post-operative blood transfusion	2.30 (0.23 to 23.05)	0.48	11 638	46%; 0.17*
Complications within first 90 post-operative days	0.63 (0.32 to 1.26)	0.19	11 328	0%; 0.96

* denotes that a random-effects analysis model was adopted

CI, confidence intervals; I², inconsistency value; I&D, irrigation and drainage

Wound infection

Study or subgroup	Bariatric surgery		Non-Bariatric surgery		Weight	Risk ratio M-H, fixed, 95 CI
	Events	Total	Events	Total		
Kulkarni 2011 ²²	1	90	2	53	10.6%	0.29 (0.03 to 3.17)
Werner 2015 ²⁶	4	219	560	11294	89.4%	0.37 (0.14 to 0.98)
Total (95% CI)	2%	309	5%	11347	100.0%	0.36 (0.15 to 0.90)
Total events	5		562			
Heterogeneity Chi ² = 0.03, df = 1 (P = 0.86); I ² = 0%						
Test for overall effect: Z = 2.20 (P = 0.03)						



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Bariatric Surgery Prior to Total Knee Arthroplasty is Associated With Fewer Postoperative Complications



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Method

- National database
- Compare 90 day postoperative complication rates after TKA
- 3 groups
 1. non-obese patients ($n = 66,523$),
 2. morbidly obese patients who did not have bariatric surgery ($n=11,294$)
 3. morbidly obese patients who underwent bariatric surgery ($n=219$).

Results

Table 2

Cohort Comparison: Demographics and Comorbidities.

	TKA (Non-Obese)	TKA (Morbidly Obese)	TKA After Bariatric Surgery	P Values		
				Bariatric v Morbidly Obese	Bariatric v Non-Obese	Morbidly Obese v Non-Obese
Total number	66,523	11,294	219			
Demographics						
Female	42,592 (64.0%)	8379 (74.2%)	171 (78.1%)	0.220	<0.0001	<0.0001
Male	23,931 (36.0%)	2915 (25.8%)	48 (21.9%)			
Age						
<65	4586 (6.9%)	2144 (19.0%)	140 (63.9%)	<0.0001	<0.0001	<0.0001
65–69	16,107 (24.2%)	3395 (30.1%)	55 (25.1%)	0.132	0.817	<0.0001
70–74	16,862 (25.3%)	3058 (27.1%)	23 (10.5%)	<0.0001	<0.0001	<0.0001
75–79	15,555 (23.4%)	1799 (15.9%)	1 (0.5%)	<0.0001	<0.0001	<0.0001
80–84	9689 (14.6%)	721 (6.4%)	0 (0.0%)	0.001	<0.0001	<0.0001
>84	3724 (5.6%)	177 (1.6%)	0 (0.0%)	0.297	0.002	<0.0001
Smoker	7269 (10.9%)	1614 (14.3%)	55 (25.1%)	<0.0001	<0.0001	<0.0001
Comorbidities						
DM	29,600 (44.5%)	7808 (69.1%)	174 (79.5%)	0.001	<0.0001	<0.0001
OSA	7550 (11.3%)	4139 (36.6%)	136 (62.1%)	<0.0001	<0.0001	<0.0001
HLD	59,850 (90.0%)	10,510 (93.1%)	208 (95.0%)	0.330	0.019	<0.0001
HTN	62,096 (93.3%)	11,072 (98.0%)	214 (97.7%)	0.929	0.014	<0.0001
PVD	14,689 (22.1%)	3205 (28.4%)	37 (16.9%)	<0.0001	0.077	<0.0001
CHF	17,315 (26.0%)	4782 (42.3%)	71 (32.4%)	0.004	0.038	<0.0001
CAD	31,275 (47.0%)	6187 (54.8%)	111 (50.7%)	0.255	0.308	<0.0001
CKD	12,373 (18.6%)	3161 (28.0%)	36 (16.4%)	<0.0001	0.463	<0.0001
COPD	21,232 (31.9%)	4929 (43.6%)	97 (44.3%)	0.902	<0.0001	<0.0001
CLD	4232 (6.4%)	1401 (12.4%)	63 (28.8%)	<0.0001	<0.0001	<0.0001

DM: diabetes mellitus, OSA: obstructive sleep apnea, HLD: hyperlipidemia, HTN: hypertension, PVD: peripheral vascular disease, CHF: congestive heart failure, CAD: coronary heart disease, CKD: chronic kidney disease, COPD: includes chronic obstructive pulmonary disease and emphysema, CLD: chronic liver disease.

Results

Table 3B
90-Day Complication Rates Statistical Analysis.

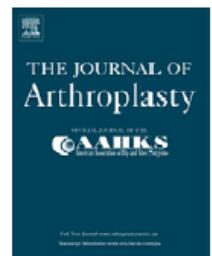
	Bariatric vs Morbidly Obese (No Bariatric)	
	Odds Ratio (95% CI)	P
90-day major complication rate ^a	0.45 (0.29–0.71)	0.001
90-day minor complication rate ^b	0.61 (0.42–0.88)	0.01
VTE (DVT and/or PE)	1.07 (0.62–1.86)	0.91
Infection (Diag. and/or I&D)	0.36 (0.13–0.96)	0.049
Stiffness (Diag. and/or MUA)	1.02 (0.42–2.51)	0.86
Medical ^c	0.46 (0.31–0.67)	<0.0001
Transfusion	0.92 (0.13–6.68)	0.686



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Bariatric Surgery Prior to Total Joint Arthroplasty May Not Provide Dramatic Improvements in Post-Arthroplasty Surgical Outcomes



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Method

- A retrospective cohort study in 36 hospitals USA
- Compared the total joint arthroplasty (TJA) surgical outcomes of patients
- Patients were retrospectively grouped into:
 1. bariatric surgery 2 years prior to TJA (n = 69)
 2. surgery within 2 years of TJA (n = 102)
 3. without bariatric surgery (n = 11,032)

Results

Table 1

Study Sample Characteristics by Bariatric Surgery Status, 2005–2011.

	Group 1: Bariatric Surgery ≥2 years Prior to TJA (N = 69)	Group 2: Bariatric Surgery within 2 years of TJA (N = 102)	Group 3: No Bariatric Surgery (BMI ≥ 40 or BMI ≥ 35 and Osteoarthritis + 1 Co-morbidity) (N = 11032)
	N (%)	N (%)	N (%)
Procedure			
THA	7 (10.1)	30 (29.4)	2616 (23.7)
TKA	62 (89.9)	72 (70.6)	8416 (76.3)
Gender			
Female	52 (75.4)	80 (78.4)	7496 (68.0)
Male	17 (24.6)	22 (21.6)	3536 (32.1)
Age category, years			
<65	49 (71.0)	93 (91.2)	5918 (53.6)
≥65	20 (29.0)	9 (8.8)	5114 (46.4)
Race			
Asian	3 (4.4)	4 (3.9)	238 (2.2)
Black	7 (10.1)	13 (12.8)	1570 (14.2)
Hispanic	14 (20.3)	12 (11.8)	1753 (15.9)
Other/Multi	2 (2.9)	0 (0.0)	170 (1.5)
Unknown	0 (0.0)	0 (0.0)	108 (1.0)
White	43 (62.3)	73 (71.6)	7193 (65.2)
Diabetes (ever)	23 (33.3)	38 (37.3)	5231 (47.4)
ASA category at TJA			
1 and 2	38 (55.1)	70 (68.6)	4315 (39.1)
≥3	31 (44.9)	32 (31.4)	6598 (59.8)
Unknown	0 (0.0)	0 (0.0)	119 (1.1)
Length of stay, days (mean, SD)	2.7 (0.8)	2.9 (0.8)	3.0 (1.4)
Age, years (mean, SD)	59.9 (7.8)	57.0 (6.8)	63.8 (8.7)
BMI, kg/m ² at TJA (mean, SD)	34.6 (6.2)	32.4 (4.7)	40.0 (4.4)
Follow-up after TJA, days (mean, SD)	320 (259)	691 (457)	1076 (717)

BMI = body mass index; TJA = total joint arthroplasty; THA = total hip arthroplasty; TKA = total knee arthroplasty; SD = standard deviation; ASA = american society of anesthesiologists.

Results

Table 3
Cumulative Incidence of Total Joint Arthroplasty Post-operative Outcomes by Bariatric Surgery Status, 2005–2011.

	Group 1: Bariatric Surgery >2 years Prior to TJA (N = 69)	Group 2: Bariatric Surgery within 2 years of TJA (N = 102)	Group 3: No Bariatric Surgery (BMI ≥ 40 or BMI ≥ 35 and Osteoarthritis + 1 Co-morbidity) (N = 11032)
	N [% (95% CI)]	N [% (95% CI)]	N [% (95% CI)]
Surgical outcomes			
Surgical site infection (deep)	1 [1.5 (0.0–4.3)]	1 [1.0 (0.0–2.9)]	127 [1.2 (1.0–1.4)]
Surgical site infection (superficial)	0.0	2 [2.0 (0.0–4.7)]	42 [0.4 (0.3–0.5)]
Death within 30 days	0.0	0.0	19 [0.2 (0.1–0.2)]
Death within 90 days	0.0	0.0	34 [0.3 (0.2–0.4)]
Pulmonary embolism	0.0	0.0	65 [0.6 (0.4–0.7)]
Deep vein thrombosis	0.0	0.0	61 [0.6 (0.4–0.7)]
Revision (all-cause)	2 [2.9 (0.0–6.9)]	5 [4.9 (0.7–9.1)]	313 [2.8 (2.5–3.1)]
Revision (septic)	0.0	1 [1.0 (0–2.9)]	138 [1.3 (1.0–1.5)]
Composite index of surgical outcomes			
Complication ^a (any) within 30 days	1 [1.5 (0.0–4.3)]	2 [2.0 (0.0–4.7)]	219 [2.0 (1.7–2.2)]
Complication ^a (any) within 90 days	1 [1.5 (0.0–4.3)]	2 [2.0 (0.0–4.7)]	300 [2.7 (2.4–3.0)]
Complication ^a (any) within 1 year	2 [2.9 (0.0–6.9)]	6 [5.9 (1.3–10.4)]	457 [4.1 (3.8–4.5)]
Readmissions (sample 2009–2011)			
Total limited, N (%)	69 (100.0)	79 (100.0)	5537 (100.0)
Readmission within 30 days	2 [2.9 (0.0–6.9)]	0.0	208 [3.8 (3.3–4.3)]
Readmission within 90 days	5 [7.2 (1.1–13.4)]	2 [2.5 (0.0–6.0)]	325 [5.9 (5.3–6.5)]

BMI = body mass index; TJA = total joint arthroplasty; CI = confidence interval.

^a Complication = death, surgical site infection (deep or superficial), pulmonary embolism, deep vein thrombosis and/or revision.

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BMI = body mass index; TJA = total joint arthroplasty; CI = confidence interval.

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Complications - Other

Lingering Risk: Bariatric Surgery Before Total Knee Arthroplasty



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^b Duke Department of Biostatistics & Bioinformatics

Method

- Medicare database with International Classification of Diseases
- A total of 39,014 patients were identified
- Identify patients in 3 groups.
 1. bariatric surgery before total knee arthroplasty (n=5914)
 2. BMI >40 , without bariatric surgery (n=6480)
 3. BMI <25 , without bariatric surgery (n= 26,616)
- Preoperative demographics or comorbidities and evaluated short-term medical (30 day) and long-term surgical (90 days and 2 years) complications.

Table 1

Demographics and Comorbidity.

	Group I, BS Before TKA, n = 5918 (%)	Group II, BMI >40, n = 26,616 (%)	Group III, BMI <25, n = 6480 (%)
Female	83.05	76.38	62.75
Less than 65	57.77	27.18	4.78
Congestive heart failure	15.85	13.80	4.80
Valvular disease	12.45	8.23	9.97
Peripheral vascular disease	12.59	9.14	9.09
Hypertension	83.25	74.17	60.32
Other neurological disorders	16.09	7.05	6.10
Chronic pulmonary disease	40.35	28.54	15.68
Diabetes without chronic complications	46.77	42.06	13.94
Diabetes with chronic complications	11.64	10.28	2.36
Hypothyroidism	30.60	21.02	17.50
Renal failure	8.58	8.63	4.58
Liver disease	9.75	3.36	1.50
Chronic peptic ulcer disease	1.35	0.17	0.19
HIV/AIDS	1.54	0.85	1.06
Deficiency anemias	43.68	21.83	22.24
Alcohol abuse	3.90	1.29	1.31
Drug abuse	6.94	1.83	1.03
Psychoses	18.22	6.65	3.01
Depression	44.00	18.16	10.12
Smoking	25.77	14.97	15.48

BS, bariatric surgery; TKA, total knee arthroplasty; BMI, body mass index; HIV, human immunodeficiency virus.

Results

Table 3
Surgical Complication Rates.

Surgical Complication	Group I		Group II		Group III		I:II Odds Ratio	Significance		
	BS Before TKA		BMI >40		BMI <25					
	n = 5918 (%)	n = 26,616 (%)	n = 6480 (%)							
90-d follow-up										
Periprosthetic infection	1.76	1.73	0.57		1.02			P = .893		
Revision	1.03	0.69	0.29		1.50			P = .006		
Manipulation	1.37	0.64	1.00		2.15			P < .001		
Extensor rupture	0.63	0.43	0.31		1.70			P = .01		
Vascular/neuro injury	0.44	0.47	0.25		0.94			P = .785		
Minimum 2-y follow-up										
Periprosthetic infection	5.80	4.83	1.98		1.21			P = .002		
Revision	7.38	4.83	2.52		1.57			P < .001		
Manipulation	3.13	1.61	2.39		1.97			P < .001		
Extensor rupture	2.11	1.42	0.66		1.57			P < .001		
Osteolysis	0.44	0.28	0.39		1.56			P = .049		
Vascular/neuro injury	1.00	0.88	0.74		1.07			P = .64		

BS, bariatric surgery; TKA, total knee arthroplasty; BMI, body mass index.

Bold values indicate P < .05.

The Role of Bariatric Surgery in the Obese Total Joint Arthroplasty Patient

Jessica M. Hooper, MD^a, Ajit J. Deshmukh, MD^b,
Ran Schwarzkopf, MD, MSc^{c,*}

Key points

- Morbid obesity (BMI > 40 kg/m²) greatly increases the risk profile associated with total joint arthroplasty, and bariatric surgery is proven means of weight loss and comorbidity reduction in this high-risk patient population.
- Weight loss after bariatric surgery may reduce pain and disability associated with osteoarthritis, and the radiographic appearance of disease.
- Current data on efficacy of bariatric surgery in reducing risks associated with TJA in the morbidly obese patient population are mixed and are based exclusively on retrospective studies.
- Bariatric surgery may lead to substantial cost savings in the arthroplasty population, both related to health care resource utilization and to reduced incidence of adverse events after TJA.

Conclusie

- Bariatrische chirurgie geeft een aanzienlijke gezondheidswinst
- Bariatrische chirurgie moet in een vroege fase besproken worden en niet bij eindstadium arhrose
- Er is onvoldoende bekend over de risico's voor patiënten na bariatrische chirurgie.
- Probeer prothesiologie uit te stellen tot 2 jaar na bariatrische chirurgie



Bariatric surgery

- Gastric restriction (gastric band)
- Gastric restriction with mild malabsorption (Roux-en-Y gastric bypass)
- Combination of mild gastric restriction and malabsorption (duodenal switch)

Table 3A

90-Day Post Operative Complication Rates.

	TKA (Non-Obese)	TKA (Morbidly Obese)	TKA After Bariatric Surgery
Total number	66,523	11,294	219
90-day major complication rate ^a	4037	2147	21
	6.1%	19.0%	9.6%
90-day minor complication rate ^b	5553	2556	33
	8.3%	22.6%	15.1%
VTE (DVT and/or PE)	1465	675	14
	2.2%	6.0%	6.4%
Infection (Diag. and/or I&D)	781	560	4
	1.2%	5.0%	1.8%
Stiffness (Diag. and/or MUA)	1295	252	5
	1.9%	2.2%	2.3%
Medical ^c	5941	2981	31
	8.9%	26.4%	14.2%
Transfusion	106	56	1
	0.2%	0.5%	0.5%