

TOTAL DİZ PROTEZİ UYGULANAN HASTALARDA OBESİTE VARLIĞININ İNTRAOPERATİF VE ERKEN POSTOPERATİF (HASTANEDE) KOMPLİKASONLAR ÜZERİNE OLAN ETKİSİ

THE EFFECT OF OBESITY ON INTRAOPERATIVE AND EARLY POSTOPERATIVE (IN HOSPITAL) COMPLICATIONS IN PATIENTS UNDERGOING TOTAL PROSTHESIS

Bahattin TUNCALI¹, Hakan BOYA², Şükrü ARAÇ²

¹Başkent Üniversitesi Tıp Fakültesi, Anestezi ve Reanimasyon Ana Bilim Dalı

²Başkent Üniversitesi Tıp Fakültesi, Ortopedi ve Travmatoloji Ana Bilim Dalı

ÖZET

AMAÇ: Hem obezitenin hem de total diz protezi (TDP) uygulamasının artışı ile birlikte, son yıllarda obez hastalarda TDP uygulama sayısı artmıştır. Obezitenin TDP uygulamasında izlenen komplikasyonlar için risk faktörü olup olmadığı tartışmalıdır. Bu çalışmanın amacı TDP uygulaması yapılan hastalarda intraoperatif ve erken postoperatif (hastanede) komplikasyonlar üzerine obezitenin etkisini araştırmaktır.

GEREÇ VE YÖNTEM: Hastalar vücut kitle endeksinde göre 2 gruba ayrıldı; Grup 1: obez (Vücut kitle endeksi: VKE > 30 kg/m²), Grup 2: Obez olmayan (VKE ≤30 kg/m²). Hastaların dosyaları 4 farklı yönden değerlendirildi (Demografik veriler; Preoperatif, İntraoperatif, Postoperatif bulgular). Parametrik verilerin analizinde T-test, non-parametrik verilerin analizinde Ki-kare testi kullanıldı. P<0.05 değeri anlamlı kabul edildi.

BULGULAR: Obez olan ve olmayan hastalar arasında hastanede yatış, operasyon ve turnike süreleri, kan transfüzyonu sayısı, ASA (American Society of Anesthesiologists) puanları, İskemik kalp hastalığı, diyabet varlığı, lokal cilt komplikasyonları ve derin ven trombozu, sepsis, pulmoner emboli, mortalite gibi sistemik komplikasyonlar yönünden fark yoktu. Ancak obez grupta hipertansiyon, hipotiroidizm ve obstrüktif uyku apnesi istatistiksel olarak anlamlı oranda daha sık izlendi.

SONUÇ: Obez olan ve olmayan hastalara uygulanan TDP olguları arasında lokal ve sistemik komplikasyonlar yönünden fark yoktur.

ANAHTAR KELİMELEER: Diz, Artroplasti, Komplikasyon, Obezite, Yatan hasta

ABSTRACT

OBJECTIVE: Due to the increase in both obesity and total knee prosthesis arthroplasty (TKA), the number of TKA applications in obese patients has increased in recent years. However, it is debatable whether obesity is a risk factor for the complications observed in TKA. The aim of this study is to investigate the effect of obesity on intraoperative and early postoperative (in hospital) complications in patients with TKA.

MATERIAL AND METHODS: Patients were divided into 2 groups according to body mass index; Group 1: obese patients (Body mass index: BMI> 30 kg/m²), Group 2: non-obese patients (BMI≤30 kg/m²). Patient files were examined from 4 different perspectives (Demographic data, Preoperative features, Intraoperative features, Postoperative features). T-test was used in the analysis of parametric data, and Chi-square test was used in the analysis of non-parametric data. A value of P<0.05 was considered significant.

RESULTS: There was no statistically significant difference between the obese and non-obese patients in respect of the length of hospital stay, the operation time, the tourniquet time, the number of blood transfusions, presence of ischemic heart disease, diabetes, ASA scores, local skin complications, and systemic complications such as deep vein thrombosis, sepsis, pulmonary embolism and mortality. However, a statistically significant difference was found in presence of hypertension, hypothyroidism, and obstructive sleep apnea in the obese group.

CONCLUSIONS: There is no difference in terms of local and systemic complications in obese and non-obese patients undergoing TKA.

KEYWORDS: Knee, Arthroplasty, Complication, Obesity, Inpatient

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Yazışma Adresi / Correspondence: Prof.Dr.Hakan BOYA

Başkent Üniversitesi Tıp Fakültesi, Ortopedi ve Travmatoloji Ana Bilim Dalı

E-mail: hakanboya@yahoo.com

Orcid No (Sırasıyla): 0000-0002-7898-2943, 0000-0001-6110-4004, 0000-0003-2331-7070

INTRODUCTION

Obesity [body mass index (BMI) > 30 kg / m²] has increased rapidly in recent years and has become an important health problem in the world (1). Due to the increase in both obesity and knee arthroplasty practices, the number of obese patients who have undergone total knee arthroplasty (TKA) has increased in recent years (2, 3).

Previous reports have suggested that obesity may cause intraoperative complications, increased postoperative complication frequency, and unsuccessful clinical outcomes in TKA (4 - 6). Hospital costs and length of hospital stay were investigated as to how they were affected by obesity (7). However, it is debatable whether obesity is a risk factor for the complications observed in TKA. There are controversial reports on whether obesity is a risk factor for these complications in studies; while some studies have reported obesity as a risk factor (8 - 19), others have argued the opposite (20 - 26). It is rare that obesity is an isolated diagnosis, and co-morbid diseases accompanying obesity may lead to complications in TKA cases (27).

The aim of this study is to investigate the effect of obesity on intraoperative and early postoperative (in hospital) complications in patients with TKA.

MATERIAL AND METHODS

Records of patients with TKA performed for primary gonarthrosis between 2013 and 2016 were retrospectively reviewed. Patients were divided into 2 groups according to body mass index; Group 1: obese (Body mass index: BMI> 30 kg/m²), Group 2: non-obese (BMI≤30 kg/m²).

Patient files were examined from 4 different perspectives.

1. Demographic data: Gender, age, body weight, height, BMI
2. Preoperative features: past operations, co-morbidities, used drugs, ASA (American Society of Anesthesiology) risk classification.
3. Intraoperative features: duration of operation, duration of anesthesia, duration of tour-

niquet, the circumference of extremity, need for blood component therapy

4. Postoperative features: medical complications, wound healing problems, postoperative respiratory insufficiency, infection, need for intensive care, the necessity of blood component therapy and mechanical ventilator, need for re-operation, duration of hospital stay, deep vein thrombosis, pulmonary embolism, mortality rates.

Statistical analysis was performed using the 20.0 version of the SPSS (SSPS, Inc. Chicago, Illinois, USA) statistical program. Student's t-test was used for the analysis of parametric data, and non-parametric data were analyzed by chi-square test. Results were expressed as mean ± standard deviation, p <0.05 was considered statistically significant.

Ethical Committee

This study was approved by the decision of the Clinical Research Ethics Committee of Başkent University, KA16/321. There is no institution or person contributing to the research.

RESULT

152 patients with TKA performed for primary gonarthrosis [134 (88.2%) women, 18 (11.8%) men; the average age of 70,8 years (50 to 89 years)] were included in the study. 69 patients had a BMI≤30 kg/m². There were 62 obese, 18 morbidly obese and 3 super-obese patients in the group with > 30 kg / m².

There was no statistically significant difference between obese and non-obese patients with regard to age and sex, however, the mean thigh circumference was statistically significantly lower in non-obese patients than obese patients (t=-9,023, SD=149,8, p=,024) (**Table 1**).

Table 1: Age, sex, thigh circumference

	Normal	Non-obese	P
Age	71,78±7,9	70,05±7,3	0,660
Sex	60/9	74/9	0,802
Thigh circumference	47,58±6,1	57,34±7,1	0,024

There was no statistically significant difference between the obese and non-obese patients in respect of the length of hospital stay ($\chi^2=2,822$, SD=2, p=,244) (**Table 2**), the operati-

on time ($t=-,919$, $SD:150$, $p=,359$), and the tourniquet time ($t=,564$, $SD:150$, $p=,573$) (**Table 3**).

Table 2: Length of hospital stay

	0-5 days	6-7 days	≥ 8 days	p
Non-obese	46	15	8	p:0,244
Obese	65	13	5	

Table 3: Operation and tourniquet time

Operation time				
	Average	Standard Deviation	Standard Error Mean	P
Normal	84,93 min.	14,458	1,753	p:0,359
Non-obese	87,13 min.	16,204	1,779	
Tourniquet time				
Normal	73,91 min.	15,683	1,888	p:0,573
Non-obese	72,12 min.	22,165	22,165	

There was no statistically significant difference in the number of blood transfusions between obese and non-obese patients ($\chi^2=5,665$, $SD=3$, $p=,129$). When the accompanying diseases were evaluated, there was no statistically significant difference in the presence of ischemic heart disease ($\chi^2=,132$, $SD=1$, $p=,716$) and diabetes ($\chi^2=1,141$, $SD:1$, $p=,285$), but a statistically significant difference was found in presence of hypertension ($\chi^2=5,135$, $SD=1$, $p=,023$). Also, both hypothyroidism ($p=,032$) and obstructive sleep apnea ($p=,039$) were more common in the obese patient group, too (**Table 4**). There was no statistically significant difference between groups in ASA scores ($\chi^2=2,822$, $SD=2$, $p=,244$).

Table 4: Accompanying diseases

	Non-obese	Obese	P
Ischemic heart disease	7	7	0,716
Diabetes	17	27	0,285
Hypertension	28	49	0,023
Chronic obstructive pulmonary disease	0	1	0,270
Cirrhosis	1	0	0,208
Gout	1	0	0,208
hypothyroidism	0	6	0,032
Arrhythmia	4	3	0,527
Bronchial Asthma	2	4	0,540
Hydrocephalus	0	1	0,270
Obstructive Sleep Apnea	0	5	0,039

There was no statistically significant difference ($\chi^2=1,495$, $SD=1$, $p=,221$) between obese and non-obese subjects in terms of local skin complications (**Table 5**).

Table 5: Local Complications

LOCAL COMPLICATIONS	Non-obese		Obese (BMI ≥30 kg/m ²)		P
	Normal	Obese	Morbid Obese	Super Obese	
Transient drainage	6	2	-	-	0,221
Fat necrosis	-	1	-	1	
Superficial infection	-	-	-	-	
Deep infection	-	-	1	-	
Skin necrosis	2	-	-	-	
	8		5		

There was no statistically significant difference between the two groups when systemic complications such as deep vein thrombosis, sepsis, pulmonary embolism, and mortality were evaluated (**Table 6**).

Table 6: Systemic Complications

	Non-obese	Obese	P
Cardiovascular	1	2	0,668
Gastrointestinal system	0	1	0,208
Neurological	3	1	0,222
Respiratory distress	0	1	0,270
Genitourinary system	0	0	-
Deep vein thrombosis	0	0	-
Pulmonary embolism	0	0	-
Death at hospital	0	0	-

DISCUSSION

In this retrospective study, we did not find any significant difference when comparing local and systemic complications between obese and non-obese patients who underwent total knee arthroplasty intraoperative and early postoperative (in hospital) period. Examination of a limited number of cases is the most important limitation in the study. On the other hand, the preparation of the patients by the single center and the same surgical-anesthesia team in the preoperative period and postoperative follow-up can be considered to make the results more meaningful. Diabetes, hypertension, coronary artery disease, obstructive sleep

apnea, malignancy, musculoskeletal disorders are among the co-morbid conditions observed in obese patients (1, 2, 28). Diabetes and hypertension are the most common diseases (25). However, only hypertension was more frequently observed in the obese patient group in the study. Therefore, we believe that it is more important whether or not they are under control rather than the presence of comorbid conditions observed in obese patients. The predisposition to complications may increase in the presence of uncontrolled co-morbid diseases.

The most important complication reported in the intraoperative period in obese patients is the avulsion of the MCL and it has been suggested that hyperflexion forcing may cause it (14 - 17, 19, 20). We did not encounter MCL avulsion in obese, morbid obese and super obese patients in the study. It may be effective to remove the medial tibial, femoral osteophytes in the early period of operation (19). Extension of the quadriceps tendon incision proximally, subluxation of the patella without eversion, PCL cutting are intraoperative technical practices used to prevent abnormal tension and facilitate the exposure (2). Although obesity is a complicating factor for surgical exposure, it is not an important determinant for intraoperative complications because excess fat tissue can accumulate in different parts of the body, such as the abdomen (4).

We found that there was no difference between tourniquet time, operation time and hospital stay between obese and non-obese patients. The important point revealed in the assessment of the duration of the tourniquet in obese is where the body fat accumulates. For this reason, the BMI used for obesity identification alone is not determinant for this parameter. To avoid this problem, it is recommended to use a suprapatellar index (extremity length / limb circumference in 4 cm proximal of patella) (4). The length of stay in hospital and operation time is expected to be longer in morbid obese patients (14, 29). However, the results supporting our outcome have been previously reported (6).

The literature also supports the fact that there is no difference in the duration of hospital stay between these two groups, although the difficulty in positioning the patient, surgical

exposure, and implantation have led to a higher incidence of operation time in the obese group, especially in morbid obese patients (21, 25, 26, 30, 31). It has been reported that the risk of deep infection is 3-9 times higher in morbid obese patients with TKA (5, 8, 9, 22, 32). In this study, the only patient who had a deep infection diagnosis postoperatively was in the obese group and was morbidly obese. Wound complications (transient drainage, fat necrosis, superficial infection, skin necrosis) are significantly more common in morbidly obese patients with TKA according to literature (14, 16, 18). Wound problems in obese patients are probably associated with poor oxygenation of adipose tissue, increased wound tension, and underlying endocrine disorders (8, 18, 21). Intraoperatively vigorous traction of soft tissues may be another causative factor. However, wound complications were more frequently observed in the non-obese group in the study. Since this situation is already known from literature sources, extraordinary attention may be paid to both intraoperative manipulations of soft tissues and postop wound care. We believe that obesity is not a risk factor alone in the formation of superficial wound problems but may be active when combined with secondary factors (aggressive physical therapy, wound closure with tight and / or frequent stitches, co-morbid states uncontrolled, etc.). The likelihood of this type of local postoperative complications may be greater in morbid obese (BMI = 40-49 kg / m²) or super obese (BMI > 50 kg / m²) patients than obese (BMI = 30-39 kg / m²) patients due to uncontrolled co-morbid pathologies (33).

Although diabetes, cardiac and pulmonary co-morbidities are common in obese patients, there is no significant difference in infectious, cardiac, renal, respiratory and systemic complications after TKA (34, 35). There is no increase in the 90-day medical complication risk in obese patients who undergo TKA (36). Although previous studies have reported a link between obesity, especially morbid obesity, and thromboembolic disease and cardiovascular complications postoperatively, we did not detect a significant difference compared to the findings of D 'Apuzzo M. et al. (10, 18, 37). Although in-hospital death prevalence was reported as 0.58% and 0.08% after knee arthroplasty in

morbid obese patients in two studies, we didn't encounter in-hospital death postoperatively in the study (20, 37). The prevalence of urinary tract infections in obese patients undergoing knee arthroplasty is another debate. Although studies (37, 38) reveal the coexistence of obesity and urinary tract infection, we cannot show coexistence between the two groups (20).

This study is not the only study to report that there is no difference in terms of local and systemic complications in obese and non-obese patients, but it is one of the few studies with similar results (36, 39, 40).

In conclusion, there is no difference in terms of local and systemic complications in obese and non-obese patients.

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