

Is overweight or obesity a perioperative risk factor in total hip replacement?

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ABSTRACT

Introduction: A large proportion of patients who undergo total hip replacement (THR) are obese. **Aim of the present study is to investigate the influence of Body Mass Index (BMI) on complications following THR in a single surgeon in the short term follow-up. Material and method:** This study was based on the retrospective review of charts and BMIs from 171 patients who had undergone THR between April 2005 and March 2006 at our hospital. All operations were performed by a single surgeon. All patients were followed up 6 weeks after operation. **Results:** 27 / 171 patients (15.8%) were found to have complications. Systemic minor complications included arrhythmia in 1 case, urinary tract infection in two cases, ileus in two cases, renal insufficiency in 3 cases, confusion in 2 cases and anaemia in 14 cases (8.2%) requiring blood transfusion. There was one case of pulmonary embolism as a major systemic complication. Local minor complications included one single dislocation and 1 superficial wound infection. Body mass index ranged from 20.8 to 46.7 with a mean of 28.6. Hospital length of stay ranged from 10 to 42 days with a mean of 13. The length of operation time between obese and non-obese patients varied significantly in our study. There was no increased risk for complications and length of hospital stay. **Discussion:** We can conclude that there are no economic or medical reasons for excluding obese patients from THR as there is no increased risk for complications and length of hospital stay.

Keywords: Total Hip Replacement, Complication, Obesity, BMI, Bleeding

1. INTRODUCTION

A large proportion of patients who undergo total hip re-

placement (THR) are obese [17,18]. There has been much concern that obesity is associated with anaesthetic and operative complications after THR. Obese patients have a higher risk of adverse cardiovascular and respiratory events and obesity is an independent risk factor for the development of type II diabetes mellitus, a condition that carries an increased risk of post-operative morbidity. Other studies have demonstrated an increased risk of venous thromboembolic disease following joint replacement surgery in the obese. There is a strong association between obesity and prolonged wound drainage post-operatively which, in turn, is associated with a higher rate of wound infection and blood loss [1,4,20]. Namba *et al.* [15] concluded that obese patients have a 4.2 times higher risk of post-operative infection following THR. Furthermore, obesity has a bearing on health economics, with obese patients having an increased length of hospital stay compared with the general population [3,12]. Recently a weak correlation BMI and the complication rate in THR has been published by Patel *et al.* [17]. He stated that orthopaedic surgeons should be aware of the slightly higher risk in THR in such patients. On the other hand several authors found no increased post-operative complications rate in obese patients undergoing THR [2,9,11,19]. Aim of this study was to investigate the influence of BMI on complications following THR in a single surgeon.

2. MATERIAL AND METHOD

This study was based on the retrospective review of charts and BMIs from 171 patients who had undergone THR between April 2005 and March 2006 at our hospital. All operations were performed by a single surgeon (WH). Prior to surgery weight and height of the patients were recorded by nursing staff. BMI was calculated as the body weight in kilograms divided by the height in metres squared. Co-morbid conditions were also recorded. Any complications reported by the patient or the medical staff were recorded. Complications were group-

ed into systemic and local, each group being subdivided into minor and major according to Patel [17]. A complication that could be treated with medical and conservative management or that was not a risk to the artificial joint and/or the patient was listed as a minor complication (superficial infection, ooze, pain). Any complication that needed surgical/medical intervention and posed a risk to the joint or the patient was listed as a major complication (dehiscence, deep infection, post-operative stiffness requiring manipulation under anaesthesia, haematoma requiring second operation, cardiac arrest, deep vein thrombosis, cardiovascular accident, congestive cardiac failure, systemic infection, intensive care unit admission, myocardial infarction, pulmonary embolism). There were 75 men and 96 women. Average height was 168 cm (Min: 147, Max: 193). Average weight was 81 Kg (Min: 53, Max: 160). Average age at time of operation was 66 years (Min: 43, Max: 90). We reviewed all BMIs and divided the patients into 4 groups: BMI < 26 (Optimal and under weight), 26 - 30 (Clinically overweight), 31 - 40 (Clinically obese), > 40 (Morbidly obese) [4]. Patient clinical complexity level (PCCL) was assigned. PCCL of women was 0 in 62 cases, 1 in 1 case, 2 in 14 cases, 3 in 12 cases and 4 in 7 cases. PCCL of men was 0 in 55 cases, 2 in 7 cases, 3 in 10 cases and 4 in 3 cases. The indications for THR were dysplastic coxarthrosis (15), primary arthrosis of the hip (124), inflammatory arthritis (2), secondary osteoarthritis (26), rheumatoid arthritis (3), necrosis of the femoral head (1).

On the acetabular side, a standard cementless acetabular cup according to Wagner was used in 148 cases, in 19 cases a cemented full-profile polyethylene cup in 4 cases an acetabular reconstruction ring. On the femoral side, 1 case was treated with the cementless Cone Prosthesis according to Wagner, 154 with a cementless CLS stem and 16 with a cemented Müller Straight Stem. The bearing surfaces were polyethylene/ceramic in all cases. All procedures were performed in an ultra-clean-air theater (with antibiotic prophylaxis). During their stay at the hospital, all patients were treated with low molecular weight Heparin and compression stockings as a prophylaxis against deep vein thrombosis. For the duration of 8 weeks, partial weight bearing of 20 kg with the support of lower arm crutches was required. Average operation time was 65 min (Min: 42, Max: 170).

Data were first fed in electronic format into Excel. Accuracy of the electronic data was confirmed by three independent observers. Data were then analysed for frequencies and Chi-squared test. All patients were followed up by one of us (MA) 6 weeks after operation.

3. RESULTS

Body mass index ranged from 20.8 to 46.7 with a mean

of 28.6. 27 / 171 patients (15.8%) were found to have complications. Systemic minor complications included arrhythmia in 1 case, acute hypertension in one case, urinary tract infection in two cases, ileus in two cases, renal insufficiency in 3 cases, confusion in 2 cases and anaemia in 14 cases (8.2%) requiring blood transfusion. There was one case of pulmonary embolism as a major systemic complication. Local minor complications included one single dislocation and 1 superficial wound infection. Hospital length of stay ranged from 10 to 42 days with a mean of 13. Average loss of haemoglobin in women was -3.5 (Min: -0.8, Max: -9.2) and in men -3.8 (Min: -1, Max: -7.7) (**Table 1**). **Table 2** shows the different complications and related BMI.

For the purpose of analysis patients were split into 4 groups of BMI (**Table 3**) with a complication rate ranging from 6.2 - 41.5% (17/ 41 (41.5%), 4/64 (6.2%), 5/ 62 (8.0%) and 2/6 (33.3%). When patients were put into BMI groups there was no effect on complication rate with increasing BMI.

Table 1. Distribution of demographic data and BMI.

BMI vs Hemoglobin loss		Mean (g/dl)
Women		
< 26		-3,84
26 - 30		-3,88
31 - 40		-3,68
> 40		-3,30
Men		
< 26		-4,77
26 - 30		-3,72
31 - 40		-4,11
> 40		---
BMI vs. Length of hospital stay		Mean (days)
Women		
< 26		13,5
26 - 30		13,14
31 - 40		13,82
> 40		14,66
Men		
< 26		13,5
26 - 30		13,12
31 - 40		15,62
> 40		---
BMI vs. Duration of operation		Mean (hours)
Women		
< 26		1:08
26 - 30		1:04
31 - 40		1:07
> 40		1:27
Men		
< 26		1:02
26 - 30		1:04
31 - 40		1:09
> 40		---

Table 2. Complications and BMI.

Initials	Complication	Sex	Age	BMI
BE1	Acute hypertension	f	56	42,2
GM1	Acute renal failure	f	80	20,8
NR1	Acute renal failure	m	62	32,0
TG1	Acute renal failure	f	73	30,1
KF1	Postoperative Delirium	m	79	23,4
RM1	Postoperative Delirium	f	90	21,2
KF1	Arrhythmia	m	79	23,4
AE1	Haemorrhage	f	81	25,8
AC1	Haemorrhage	f	66	24,7
GH1	Haemorrhage	f	70	22,6
GM1	Haemorrhage	f	80	20,8
KH1	Haemorrhage	f	77	25,2
KM1	Haemorrhage	f	46	23,7
NR1	Haemorrhage	m	62	32,1
PM1	Haemorrhage	f	55	26,4
RA1	Haemorrhage	f	59	23,4
SB1	Haemorrhage	f	81	25,6
SH1	Haemorrhage	m	76	28,7
TG1	Haemorrhage	f	73	30,1
WC1	Haemorrhage	f	90	24,5
WM1	Haemorrhage	f	82	21,3
KP1	Ileus, not particularly specified	m	68	34,3
SA1	Ileus, not particularly specified	m	75	30,3
GM1	Infection, not particularly specified	f	80	20,8
EG1	Dislocation	m	56	35,9
BE1	Pulmonary embolism	f	56	42,2
BR1	Urinary tract infection	f	78	25,0
KF1	Urinary tract infection	m	79	23,4

Table 3. Correlation between complications and BMI divided into four groups.

BMI groups		Complications	
		No	Yes
< 26	Count	24	17
26 - 30	Count	60	4
31 - 40	Count	57	5
> 40	Count	4	2

4. DISCUSSION

The numbers of patients presenting for THR who are obese is increasing and there have been concerns that these patients have an increased risk of complications and a reduced benefit of surgery in terms of function and pain relief [3,9,13,14,16]. A higher risk for obese patients in respect to deep infection dislocations and revision rate for septic loosening has been postulated [7,8,

10,12,21].

Stickles *et al.* [23] reported a higher rate of orthopaedic complications (infection, dislocation, component failure) with increasing BMI in the first year after THR.

Obese patients are often considered poor candidates for total joint arthroplasty. These patients tend to have longer hospital stays and higher total charges compared with nonobese patients [6]. Ibrahim *et al.* [9] could not find any difference in the length of hospital stay between obese and non-obese patients. This compares favourably with our results. Within the current literature, the effect of obesity on THA remains varied. Some reports have found no difference in the rate of perioperative complications between obese and non-obese patients. Anderson *et al.* [2] and Soballe *et al.* [22] found no relationship between obesity and postoperative complications. Lehman *et al.* [11] showed no difference in the prevalence of perioperative complications in obese pa-

tients with similar gains in pain relief and functional abilities as non-obese patients. Chan and Villar [5] showed no difference in the quality of life in the short term following THA between obese and non-obese patients. With our study results we can follow Andrew *et al.* [3] and Ibrahim *et al.* [9] that there is no association between obesity and the risk of revision surgery or other complications. Especially we could not find any increased risk for hematoma, dislocation rate and infection rate and the rate of blood transfusion in the short term follow up.

Certainly a limitation of this study is the short period of follow-up. This limitation is of particular importance to the rate of revision surgery. A major advantage of our study is a consecutive patient series who were operated by the same orthopaedic surgeon. Patel *et al.* [17] came to the same conclusion in a patient cohort who was operated by seven different orthopaedic surgeons. Interestingly Bowditch *et al.* [4] found a higher rate of blood loss in obese patients. A lack of this study is the small number of 80 Patients operated by four surgeons. To be able to compare different studies we suggest a larger series of patients operated by the same orthopaedic surgeon and the use of the same classification system for obesity. We believe that the lack of consensus regarding the impact of obesity on THR may be explained in part by the different definitions of obesity which have been used [3]. The aim of our study was to investigate the influence of BMI on early complications in THR. The length of operation between obese and non-obese patients varied significantly in our study. Nevertheless we can conclude that there are no economic or medical reasons for excluding obese patients from THR, especially as there is no increased risk for complications and length of hospital stay. We fully agree with Andrew *et al.* [3] who postulated that patients should still be encouraged to reduce their weight prior to surgery but it seems unacceptable for patients to be denied treatment in the form of hip replacement solely on the basis of their BMI.

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