

Influence of Overweight in Elderly Patients Undergoing Vaginal Surgery Due to Pelvic Floor Disorders

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Abstract. *Aim: To evaluate the feasibility and safety of vaginal surgery for treatment of genital prolapse in overweight compared to normal weight patients aged 50 years or older. Patients and Methods: We retrospectively reviewed the perioperative data of 93 patients aged between 50 and 87 years undergoing surgery due to pelvic floor disorders. A total of 54 women had a body mass index (BMI) of 25 kg/m² or higher and were defined as the study collective. Thirty-nine patients undergoing similar surgical procedures during the same period of time had a BMI less than 25 kg/m² and served as the control group. Operating time, duration of hospital stay, intra- and postoperative complications were evaluated as comorbidities. χ^2 -test, Fisher's exact test, Student's t-test and non-parametric Mann-Whitney U-test were applied to compare the results of both collectives. Results: There were no significant differences between study and control collectives regarding time of surgery, duration of hospital stay or intra- and postoperative complications, although a significant difference was found with regard to the prevalence of pre-existing diabetes mellitus (17% in the study group, versus 5% in the control group, respectively, Fisher's exact test: $p=0.04$). Conclusion: Overweight in elderly patients undergoing vaginal surgery due to pelvic floor disorders does not affect the perioperative outcome and is not a risk factor for perioperative complications.*

In general, being overweight is a worldwide problem with an increasing incidence (1). It is defined as an increased weight due to an abnormal amount of body fat. The body mass index (BMI) defined as weight (kg)/height squared (m²) is

considered to be the best predictive value for body fat (2). The number of overweight and obese people in Germany has almost doubled during the past 15 years (3). The microcensus survey of the Federal Statistical Office of Germany in 2009 classified 42% of adult females as being overweight and 17% as being obese (4). The main reasons for this development are the consumption of high caloric food in combination with reduced physical activity. Less frequent causes include eating disorders, endocrine diseases, such as hypothyroidism or Cushing syndrome, adverse side-effects of a pharmacotherapy with antidepressants, neuroleptics, antidiabetics, glucocorticoids or β -blockers, as well as immobilisation or pregnancy (5). This development represents a serious health problem since it implies an increased morbidity and mortality from hypertension, stroke, diabetes mellitus type 2, metabolic and malignant maladies (6, 7). Among the medical conditions associated with obesity is pelvic floor dysfunction, including pelvic organ prolapse (8, 9). Pelvic floor disorders comprise a broad spectrum of clinical conditions, which include urinary and fecal incontinence, pelvic organ prolapse, as well as voiding and defecatory dysfunctions. Since impaired pelvic floor support often leads to pelvic organ prolapse with genital ulcerations and urinary incontinence, it adversely affects the quality of life (10). Disorders of the pelvic floor are known to affect between 5 and 45% of the female population depending on age. A female's life-time risk of requiring surgery for correction of pelvic organ prolapse is up to 11% (11). Obesity is associated with a four-fold increased risk of pelvic floor dysfunction (12). Coincidentally with an increasing body weight, average life expectancy is also rising (4). Advanced age is associated with an increased incidence of benign gynaecological diseases such as pelvic organ prolapse, fibroids, and bleeding disorders (13-16). These facts have resulted in an escalating number of older and overweight patients needing pelvic floor repair after failure of conservative therapy approaches. Surgery on overweight or obese patients in general represents a challenge, with increased risk of morbidity and mortality (17-20). Several investigators have focused on the feasibility of surgical

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procedures for benign or malignant gynaecological conditions in obese patients (21-27). Studies dealing with obesity and gynaecological surgery in females suffering from pelvic floor disorders are rare (28-30). To the best of our knowledge, no investigation focusing on the perioperative morbidity in overweight geriatric patients undergoing vaginal surgery due to pelvic floor dysfunction has yet been published. Therefore, we designed a retrospective study in order to evaluate the feasibility and safety of vaginal surgery for treatment of genital prolapse in overweight women compared to non-overweight controls aged 50 years or older.

Patients and Methods

We retrospectively analysed the data of 93 patients aged at least 50 years who underwent vaginal surgery due to pelvic floor disorders between 2005 and 2011 at the Department of Obstetrics and Gynaecology of the University Mannheim. Body weight and height were used for the calculation of BMI. The World Health Organization determines normal weight as a BMI between 18.5 and 24.9 kg/m² and overweight as a BMI ≥ 25.0 kg/m² (14). In our investigation, 54 women had a BMI ≥ 25.0 kg/m² and were defined as the study group. Thirty-nine women had a BMI less than 25.0 kg/m² and served as the control group. Surgical and clinical information were recorded by reviewing the patient's chart. Pre-operative diagnoses of study and control participants are given in Table I. The different types of surgery performed are shown in Table II. All surgical procedures were performed under general anaesthesia and prophylactic antibiotics (2 g Cefazolin *i.v.*) were applied routinely. Pre-, intra- and postoperative characteristics of both groups were analysed, including pre-operative need for thoracic x-ray, additional laboratory parameters apart from the routine blood test (blood count, global clotting parameters and electrolytes) and the need for medical care by consultants of other specialities. The intraoperative use of catecholamines, duration of surgery in minutes, and the number of required revision surgeries were analysed. Additionally, the following parameters were specified as postoperative complications: fever, need for antibiotic treatment, need for blood transfusion, requirement for postoperative opiate medication and postoperative surveillance in an intensive or intermediate care unit. Body temperature was measured every day after surgery with a tympanic thermometer. Fever was defined as elevated body temperature $>38.3^{\circ}\text{C}$ (15).

Statistics. Arithmetic means and standard deviations were calculated for normally-distributed metric variables. Metric non-normally distributed variables were expressed as the mean \pm range. Non-parametric Mann-Whitney U-test and Student's *t*-test were applied where appropriate. χ^2 -test and Fisher's exact test were used to compare descriptive variables. Data were recorded and assessed using the SPSS statistics software (SPSS® version 17.0; SPSS Inc. Chicago, USA). A *p*-value of <0.05 was regarded as statistically significant.

Results

The mean \pm standard deviation of the BMI was 22.1 ± 1.2 kg/m² (range=19.0-24.1 kg/m²) in the non-overweight control collective and 29.2 ± 3.3 kg/m² (range=25.5-40.0 kg/m²) in the overweight study collective (Mann-Whitney U-test *p*=0.02).

All patients were at least 50 years of age. The patients of the study collective were between 50 and 83 years old (mean \pm standard deviation=68.5 \pm 8.5 years), the age of the controls ranged between 50 and 86 years (mean \pm standard deviation=69.9 \pm 9.3 years, Student's *t*-test: *p*=0.54). The majority of patients in both groups were classified as ASA I or II according to the American Society of Anesthesiologists (study collective 72% *versus* control collective 77%, Fisher's exact test, *p*=0.45); none of them was classified as ASA IV. There was no significant difference between groups in terms of the number of required co-medications. A total of 34/54 (63%) of the overweight and 21/39 (54%) the non-overweight patients were on regular medication (χ^2 -test, *p*=0.43). By comparing both collectives, the median was two drugs in both collectives (study collective: range: 0-13 drugs; control collective: range: 0-9 drugs, Mann-Whitney U-test, *p*=0.84). Medication was generally required to treat pre-existing hypertension, chronic heart failure or hypercholesterolemia. There was a significant difference comparing both groups regarding the incidence of diabetes mellitus [study collective: 9/54 (17%), control collective: 2/39 (5%); Fisher's exact test, *p*=0.04]. There was no significant difference regarding duration of surgery (mean \pm standard deviation: study collective=114 \pm 43 min, range=40-205 min, control collective=108 \pm 32 min, range=60-230 min; Student's *t*-test, *p*=0.27) and the requirement to perform a surgical revision [study collective=1/54 (2%), control collective=1/39 (3%); Fisher's exact test, *p*=0.31]. No significant differences in terms of additional blood examinations [study collective=7/54 (13%); control collective=4/39 (10%); χ^2 -test, *p*=0.41] were detected. Only 55% (22/39) of the controls, and 66% (36/54) of the study collective underwent thoracic x-ray prior to surgery (χ^2 -test: *p*=0.06). There were no significant differences regarding postoperative complications, as demonstrated in Table III. The overall length of the hospital stay did not differ between groups [median and range: study collective= 8 d (5-20 d), control collective= 8 d (5-24 d), Mann-Whitney U-test: *p*=0.80].

There were no significant differences regarding the requirement for a pre-operative work-up in an inpatient setting [study collective=9/54 patients (17%); control collective=5/39 patients (13%); χ^2 -test: *p*=0.48] or the necessity for surveillance in an intermediate care unit [study collective=0/54 (0%); control collective=1/39 (3%); Fisher's exact test, *p*=0.19]. With the exception of a 77-year-old woman who lived in a retirement home, all patients of both collectives lived autonomously before and after hospitalisation. There was no significant increased need for interdisciplinary assistance in the study group (12/54 patients; 21%) compared to the control group (6/39 patients; 15%; χ^2 -test, *p*=0.29).

None of the patients received blood transfusions, nor did anyone suffer from a severe cardiac problem. An 86-year-old woman of the control group required surveillance in the

Table I. Preoperative diagnoses and indications for surgery in the study collective, Body Mass Index (BMI ≥ 25 kg/m²; n=54) and in the control collective (BMI < 25 kg/m²; n=39).

	Study collective BMI ≥ 25 kg/m ² n (%)	Control collective BMI < 25 kg/m ² n (%)
<i>Descensus uteri</i> II-III	54 (100%)	39 (100%)
<i>Descensus vaginae et vesicae</i>	53 (98%)	38 (97%)
Stress incontinence II/III	3 (6%)	2 (5%)

Table II. Surgical procedures in the study collective (BMI ≥ 25 kg/m²; n=54) and control collective (BMI < 25 kg/m²; n=39).

	Study collective BMI ≥ 25 kg/m ² n (%)	Control collective BMI < 25 kg/m ² n (%)
Vaginal hysterectomy	54 (100%)	39 (100%)
Colporrhaphy anterior	53 (98%)	38 (97%)
Colporrhaphy posterior	47 (87%)	32 (82%)
Sacrospinally vaginofixatio	19 (35%)	15 (38%)
Transobturatoric vaginal sling	3 (6%)	2 (5%)
Bilaterally adnexectomy	2 (3%)	1 (3%)

intermediate care unit for 12 h postoperatively due to the worsening of pre-existing chronic heart failure. Table III shows the postoperative complications; one study and one control participant suffered from a minor wound healing disorder caused by a superficial wound infection. One patient of each collective acquired postoperative pneumonia. In one patient of each group, a revision surgery due to haematoma was necessary.

Discussion

During the past decade, only a limited number of studies focused on the influence of being overweight on perioperative problems after hysterectomy due to benign indications (21, 22, 26, 28-30). Due to the fact that hysterectomy can be performed in different ways, such as vaginally, abdominally, laparoscopically or combined, and due to different indications for surgery, a comparison between these investigations seems to be difficult. Most authors who evaluated the association between BMI and peri- or postoperative complications after hysterectomy for non-malignant disorders focused on the route of surgery (21, 26, 28, 30). Nevertheless, the results of these studies are not decisive. In contrast to our results, Rasmussen *et al.* reported a longer operation time for vaginal as well as for abdominal

Table III. Postoperative complications in the study collective (BMI ≥ 25 kg/m²; n=54) and control the collective (BMI < 25 kg/m²; n=39)

	Study collective BMI ≥ 25 kg/m ² n (%)	Control collective BMI < 25 kg/m ² n (%)
Antibiotic treatment	13 (24%)	10 (26%) +
Fever	6 (11%)	3 (8%) *
Analgesia with opiates	5 (9%)	2 (5%) *
Total	24 (44%)	15 (39%)

*Fisher's exact test $p > 0.05$; + χ^2 -test $p > 0.05$.

hysterectomy and an increased perioperative blood loss for vaginal hysterectomy in overweight women (21). Isik-Akbay *et al.* compared perioperative outcome features of abdominal and vaginal hysterectomies in obese patients and concluded that vaginal hysterectomy is superior to the abdominal technique due to lower incidence of postoperative fever, ileus, urinary tract infections, shorter duration of surgery and hospital stay (28). This study lacked a normal weight control collective, however. In discordance with our findings, Sheth *et al.* demonstrated that the operation time for the vaginal approach was significantly longer in obese patients compared to those with a BMI within the normal range (26). The hospital stay was significantly longer after abdominal hysterectomy in obese individuals. Surgical and anaesthesiological complications did not differ between obese and non-obese patients. In a study including patients undergoing abdominal, laparoscopic or vaginal hysterectomy for benign diseases, Osler *et al.* noted that being overweight was associated with an increased risk of heavy intraoperative bleeding (30). Furthermore, the authors found a significant association between a high-BMI and perioperative infections after abdominal hysterectomy (30). Only two studies have been published so far, focusing on perioperative morbidity in a collective of exclusively vaginally-performed hysterectomies in overweight, compared to normal weight patients suffering from a benign gynaecological disease (22, 29). In 2004, Rafii and co-authors evaluated the effects of being overweight on the perioperative outcome in women who underwent vaginal hysterectomy and found no significant differences concerning intra- and postoperative complications, consumption of analgesic drugs or duration of hospital stay in overweight women (22). Similarly to our study, the authors indicated that an increased BMI does not affect the perioperative outcome and frequency of surgical complications of vaginal hysterectomies. In contrast to our study design, disorders of the pelvic floor were defined as exclusion criteria, and the mean age of study and control patients was less than 50 years. In concordance with our results, Harmali *et al.*, evaluating the perioperative outcome

in women who underwent vaginal hysterectomy for benign gynaecological disorders, showed that there was no significant difference between the overweight study group and the non-overweight control group regarding operation time, length of hospital stay, transfusion rate and perioperative complications (29). Consistent with our findings, the authors found a significantly increased prevalence of pre-existing diabetes mellitus in the overweight patients. It has to be pointed out that in their study, the mean age was 44 years and that only 11% of the patients suffered from pelvic floor disorders. Myomas and non-malignant bleeding disorders were mostly the indication for surgery. Reviewing the above mentioned literature, dealing with overweight women undergoing hysterectomy, conclusions are somewhat contradictory, but nevertheless show in principle that vaginal hysterectomy is a feasible and safe surgical procedure in obese and overweight women. In all these published studies, the mean age of patients was 50 years or less, and none of them focused on elderly overweight women undergoing vaginal pelvic floor surgery (21, 22, 26, 28-30). In addition, it should be mentioned that advanced age and reduced nutritional condition are known risk factors for surgical intervention, as postoperative complications increase, particularly in poorly-nourished patients (31). Therefore, we conclude that being slightly overweight prior to surgery for pelvic floor disorders might be better for the clinical outcome than being underweight. Some earlier studies showed a correlation between postoperative morbidity, duration of hospital stay and the ASA classification, whereas other investigations refuted this association (32-34). Our results did not demonstrate a significant difference between the collectives concerning ASA classification, duration of hospital stay or postoperative complications. From an economic point of view, it should be mentioned that overweight women did not need laboratory parameters in addition to routine blood tests more often than did normal weight woman. Although additional medical care by consultants of other specialities was not significantly required in overweight women, our results reveal a trend for a more intensive interdisciplinary care in women with a higher BMI. We are aware of the limitations of the retrospective design of this study. Nevertheless, we tried to minimize selecting and reporting bias. We consecutively included each woman aged 50 years or more undergoing gynaecological surgery due to pelvic floor disorders. Therefore, the strength of our study lays in the homogeneity of the investigated collectives. The preoperative diagnosis of the study and control patients was exclusively a pelvic floor disorder, and complete information of a number of important covariables was obtained and analysed. To validate our retrospective data, it is inevitable to initiate prospective investigations with a larger sample size. However, our findings show that being overweight does not adversely

influence the perioperative outcome in elderly women undergoing vaginal pelvic floor repair. The interdisciplinary management of surgical procedures in elderly overweight patients will become increasingly important and might be part of the day-to-day routine in gynaecology practice of the future.

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