



Survey Article

Awareness of the association between obesity and peri-operative risk among newly diagnosed patients with complex atypical hyperplasia and endometrial cancer



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ARTICLE INFO

Article history:

Received 8 January 2015

Accepted 22 February 2015

Available online 28 February 2015

Keyword:

Knowledge of obesity-related surgical risks

ABSTRACT

Objectives: The aim of this study is to evaluate knowledge of obesity-related peri-operative risks in women newly diagnosed with complex atypical hyperplasia and endometrial cancer.

Methods: We conducted a cross sectional study of patients newly diagnosed with complex atypical hyperplasia or endometrial cancer who underwent preoperative counseling between 2011 and 2014, using a 17-item questionnaire. Obesity was defined as body mass index (BMI) of 30 kg/m² or greater. Bivariate analysis was conducted using Pearson's Chi-Square or Fisher's Exact tests where appropriate and Mann–Whitney *U* for continuous variables.

Results: Of 98 patients recruited, mean age was 58 years, 87% were obese, 83% white, and 51% had grade 1 endometrioid adenocarcinomas. Sixty-four percent of obese women reported that their physicians had discussed surgical risks related to obesity. However, 17% of obese and 42% of non-obese patients responded that they were unsure of the peri-operative risks associated with obesity. There was a substantial lack of understanding among obese patients regarding their increased risks of respiratory problems (29%), thromboembolism (29%), heart attack (35%), or longer operating time (35%) and hospital stay (47%). However, obese patients were more aware of wound infection risks associated with obesity compared to their non-obese counterparts (72% vs. 31%, $p = 0.004$).

Conclusions: Pre-operative counseling for obese women with newly diagnosed endometrial cancer should incorporate more focused education about obesity-related risks. They report being knowledgeable about the risks associated with their surgery; however, more than a quarter are unaware of the impact obesity has on respiratory problems, thromboembolism, wound infection, heart attack or longer operating time and hospital stay.

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Background

Obesity is a growing problem in the United States over the past 20 years with the prevalence remaining high despite new regulations and interventions implemented by the U.S. Department of Health and Human Services, the Centers for Disease Control and Prevention (CDC), the Institute of Medicine, and the U.S. Surgeon General (Calle

et al., 2003). Results from the 2011–2012 National Health and Nutrition Examination Survey (NHANES) estimated that 34% of U.S. adults are overweight, 35% are obese, and 6% are extremely obese (Fryar and Ogden, 2014).

Obese women are a vulnerable population who face not only economic hardships and social isolation, but medical comorbidities as well. They are at increased risk of heart disease, diabetes, hypertension, stroke, hyperlipidemia, osteoarthritis, sleep apnea, and certain cancers such as endometrial, breast, and colon cancer. Among these, endometrial cancer has the highest association with obesity with up to a 9-fold increased risk of mortality in women with body mass index (BMI) > 40 compared to women of normal weight (RR 6.25, $p < 0.001$, 95%CI 3.75–10.42) (Calle et al., 2003; Chia et al., 2007).

Unfortunately, obesity predisposes women not only to pre-invasive and invasive uterine cancer, but it also places them at higher risk for

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complications related to surgical treatment options. The integration of minimally invasive surgical techniques in gynecologic oncology has improved peri-operative morbidity and length of hospital stay (Walker et al., 2009; Seamon et al., 2009). However, there remain specific risks related to obesity that warrant pre-operative discussion such as longer operative time, diminished tissue oxygenation and immune function, and increased risks for deep venous thrombosis, pulmonary embolism, respiratory failure and need for mechanical ventilation, cardiac complications, nerve injury, infection and bleeding (Bamgbade et al., 2007; Choban et al., 1995; Dossett et al., 2008).

Despite a growing medical interest establishing the link between obesity it is unclear how much information is effectively communicated to patients to heighten their understanding. Given that obesity is a modifiable risk factor with widespread implications in cancer prognosis and treatment options, it is imperative to first ascertain where gaps in knowledge exist in order to design effective interventions to guide patient education. There is limited but growing evidence that women are unaware that obesity increases the risk for complex atypical hyperplasia (CAH) and endometrial cancer (Ligibel et al., 2014; Ackermann et al., 2005). However, to our knowledge, there are no studies to date that focus on their understanding of the impact obesity has on surgical management options and potential complications. Therefore, we aimed to evaluate knowledge of obesity-related peri-operative risks in women with newly-diagnosed CAH or endometrial cancer and to identify areas for improvement in peri-operative counseling.

Materials and methods

We performed a single institution survey study of 98 women newly-diagnosed with CAH or endometrial cancer between January 2011 and July 2014. Prior to the initiation of the study, all procedures were reviewed and approved by Washington University's Human Research Protection Office (HRPO#201101905). All participants were at least 18 years of age, able to read and write in English and provide signed informed consent. We included patients with CAH given that this disease is part of a continuum of uterine pathology with shared risk factors for endometrial cancer and evidence to suggest that up to 43% of women with CAH have occult grade 1 endometrial cancer (Trimble et al., 2006). Diagnoses were established by pre-operative endometrial tissue sampling and all specimens underwent central review by the Department of Pathology at Barnes Jewish Hospital. Furthermore, both obese and non-obese patients were included to assess for differences in knowledge of surgical risks related to obesity based on body mass index (BMI). Obesity was defined as BMI of 30 kg/m² or greater.

We excluded patients with recurrent disease and confirmed all diagnoses by documented histology on pathology reports. All patients invited to participate were under the care of gynecologic oncologists at Washington University School of Medicine and Siteman Cancer Center, a National Cancer Institute-designated comprehensive cancer center. No patients were eligible or approached after surgery.

During their preoperative-planning, outpatient appointment, patients were approached if eligible and were assured of anonymity and confidentiality. They were allowed to complete the questionnaire at the time of their appointment in a private room, or later at home returning forms in a self-addressed envelope provided. Those who did not return the survey after 2 weeks were followed up with a telephone call as a courtesy reminder.

A 17-item questionnaire was administered. We did not identify a validated questionnaire of this type. However each question in the survey was supported by prior studies citing specific surgical complications related to obesity and was validated by review by a panel of gynecologic oncologists. The questionnaire also obtained sociodemographic information including age, race, history of smoking, alcohol and illicit drug use, and highest level of education. We reviewed electronic medical records to confirm each patient's past medical and surgical

history, as well as obtain their American Society of Anesthesiologists (ASA) score.

Demographic information was summarized with descriptive statistics. Bivariate analysis was conducted using Pearson's Chi-Square or Fisher's Exact tests where appropriate for categorical variables. The Anderson–Darling test along with visual assessment of histograms were used to determine whether the distribution of continuous variables was Gaussian. The variable, “age” was found to be normally distributed and bivariate analysis was conducted with the Student's *t*-test. All other non-parametric, continuous variables were analyzed using the Mann–Whitney *U* test. Analysis was performed using Stata 10 (College Station, Texas) and an association was considered statistically significant if $p < 0.05$.

Results

Between 2011 and 2014, 107 women met eligibility criteria and consented for study enrollment, of whom 98 women (92%) completed the self-administered questionnaire. Eight-five had a BMI > 30 kg/m² and of these women, 79 (93%) acknowledged their obesity while 6 (7%) were unsure if they met criteria for obesity. Overall, the mean age was 58 years, 83% were white, 54% had achieved a college education or higher, and half had grade 1 endometrioid adenocarcinoma (51%) on preoperative endometrial biopsy. Compared to patients with BMI < 30 kg/m², obese patients had more comorbidities such as hypertension ($p = 0.009$), diabetes ($p = 0.004$), and hyperlipidemia ($p = 0.04$). There were no significant differences between obese and non-obese women with regards to ASA score or number of prior surgeries (Table 1).

While the overwhelming majority of women correctly recognized obesity as a risk factor for high blood pressure, diabetes, and heart attacks, they had more limited appreciation of the association between obesity and cancer. Nearly half of obese patients and 31% of non-obese patients answered that endometrial cancer is more common in overweight or obese people.

Next we explored patients' understanding of their surgical risks. Among obese patients, 92% reported that their physician had discussed specific risks associated with the indicated procedure versus only 64% recalled obtaining information about obesity-related surgical risks. Among all patients, 75% understood that the risks of surgery are increased in obese patients compared to patients of normal weight. However, 16% of obese and 38% of non-obese women responded that they were unsure of the specific peri-operative risks associated with obesity. There was a substantial gap in understanding among obese patients regarding their increased risks of respiratory problems (29%), thromboembolism (29%), heart attack (35%), or longer operating time (35%) and hospital stay (47%) (Table 2). However, although a significant minority of obese women were unaware of the link, obese patients were more aware of wound infection risks associated with obesity than their non-obese counterparts (72% vs. 31%, $p = 0.004$).

Conclusion

Patients with CAH and endometrial cancer appear to be well-informed that obesity is a risk factor for medical comorbidities such as hypertension, diabetes, and heart disease, but their scope of knowledge beyond this is limited. Only half of obese patients recognized that their weight places them at increased risk for endometrial cancer and 36% were not aware of obesity-related surgical risks. Furthermore, they report being knowledgeable about the risks associated with their planned operative procedure; however, more than a quarter are unaware of the impact obesity has on respiratory problems, thromboembolism, wound infection, heart attack or longer operating time and hospital stay.

Our findings provide new insight into patients' limited awareness of the peri-operative risks related to obesity and reinforce the need for

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