ELSEVIER

JMIG The Journal of Minimally Invasive Gynecology

Original Article

Robotic Hysterectomy in Severely Obese Patients With Endometrial Cancer: A Multicenter Study

Giacomo Corrado, MD, PhD*, Vito Chiantera, MD, Francesco Fanfani, MD, Giuseppe Cutillo, MD, Alessandro Lucidi, MD, Emanuela Mancini, MD, Luigi Pedone Anchora, MD, Giovanni Scambia, MD, and Enrico Vizza, MD

From the Department of Oncological Surgery (Drs. Corrado, Cutillo, Mancini, and Vizza), Gynecologic Oncologic Unit, "Regina Elena" National Cancer Institute, Rome, Italy, Gynecologic Oncology Unit (Drs. Chiantera and Lucidi), Catholic University of the Sacred Heart, Campobasso, Italy, and Department of Obstetrics and Gynecology (Drs. Fanfani, Anchora, and Scambia), Catholic University of the Sacred Heart, Rome, Italy.

ABSTRACT **Study Objective:** The aim of this study was to evaluate the surgical and oncologic outcomes of robotic hysterectomy with or without or less pelvic and aortic lymphadenectomy in severely obese patients (body mass index [BMI] $\geq$ 40 kg/m^2) with endometrial cancer.

Material and Methods: Between August 2010 and November 2014, patients with histologically confirmed endometrial cancer and BMI $\geq$40 kg/m^2 were deemed eligible for the study and underwent RH with or without pelvic and aortic lymphadenectomy.

Results: Seventy patients were divided into 3 groups according to their BMI: group A, BMI between 40 and 45 kg/m^2 (50 patients); group B, BMI between 45 and 50 kg/m^2 (10 patients); and group C, BMI above 50 kg/m^2 (10 patients). No significant statistical differences were found between the 3 groups in terms of operation time, blood loss, hospital stay, and oncologic results. Pelvic lymphadenectomy was performed in 42%, 30%, and 20% of patients in groups A, B, and C, respectively. An intraoperative complication occurred in 1 patient in group A, early postoperative complications in 4 patients in group A and in 1 patient in group C, and a late postoperative complication occurred in 1 patient in group A. No conversions to laparotomy were necessary; however, 3 patients underwent conversions to laparoscopy in group A and 1 patient in both groups B and C.

Conclusion: Our study showed that robotic surgery in severely obese patients with endometrial cancer is safe and feasible. Moreover, it seems that an increase in BMI does not change the surgical and oncologic outcomes. However, randomized controlled trials are needed to confirm these results. Journal of Minimally Invasive Gynecology (2016) 23, 94–100

Keywords: Endometrial cancer; Morbidity obese; Robotic hysterectomy

DISCUSS You can discuss this article with its authors and with other AAGL members at **http://www.AAGL.org/jmig-22-6-JMIG-D-15-00450**.

Use your Smartphone to scan this QR code and connect to the discussion forum for this article now*

* Download a free QR Code scanner by searching for "QR scanner" in your smartphone's app store or app marketplace.

Obesity is defined by the World Health Organization as an "abnormal or excessive fat accumulation that may impair health." [1] Obesity causes 280,000 deaths each year in the United States. Although smoking is the most common cause of preventable death, obesity is the second most common cause [2]. In 2012 over half the population of the European Union was estimated to be overweight, and 1 person in 6 was obese. In adults, the proportion of women who are obese is between 8% and 30% [3].

Endometrial cancer is one of the most well-known cancers linked to obesity and the most common cancer of the female genital system. In 2015, 54 870 new cases of endometrial cancer were diagnosed, with an 18.5% death rate in the United States [4]. Risk of developing endometrial

The authors report no conflicts of interest. The authors are responsible for the content and writing of the paper.

Corresponding author: Giacomo Corrado, MD, PhD, Department of Oncological Surgery, Gynecologic Oncology Unit, "Regina Elena" National Cancer Institute-IFO, Via Elio Chianesi 53, 00144, Rome, Italy.
E-mail: giacomo.corrado@alice.it

Submitted July 27, 2015. Accepted for publication August 27, 2015.
Available at www.sciencedirect.com and www.jmig.org

1553-4650/$ - see front matter © 2016 AAGL. All rights reserved.
http://dx.doi.org/10.1016/j.jmig.2015.08.887

cancer increases with increasing body weight gain [5]. In fact, obese women are 2 to 3 times more likely to develop endometrial cancer than women who are 18.5 kg overweight and are 10 times more likely to get endometrial cancer [6]. A body mass index (BMI) $>$ 30 kg/m^2 indicates obesity and is associated with an increased risk of perioperative complications, whereas a BMI $>$40 kg/m^2 is described as morbid or severe obesity and is associated with higher rates of complications. In morbidly obese women, perioperative complications such as obstructive sleep apnea, arrhythmias, acute cardiac events, and venous thrombotic events are more common. Moreover, obesity is associated with numerous disorders, notably diabetes, hypertension, and cardiovascular disease [7].

Laparoscopic hysterectomy and bilateral salpingo-oophorectomy has been demonstrated to be the surgical technique of choice for women with endometrial cancer in 3 large randomized controlled trials [8–10]. Several studies have demonstrated the overall feasibility of robotic-assisted surgical staging for endometrial cancer [11,12]. In addition, some authors have more recently evaluated the feasibility and safety of performing complete robotic surgical staging in obese women and have found it to be safe and efficient [13]. However, few reports have examined the use of robotic surgery for endometrial cancer staging in severely obese patients [14]. The aim of this study was to evaluate the surgical and oncologic outcomes of robotic hysterectomy (RH) with or without pelvic and aortic lymphadenectomy in severely obese patients (BMI $\geq$40 kg/m^2) with endometrial cancer.

Methods

This double-center study involved patients from 2 oncologic institutes: Catholic University of the Sacred Heart of Rome and the "Regina Elena" National Cancer Institute of Rome. All surgical operations in the study were performed by skilled and expert surgeons trained in laparotomic and laparoscopic surgery.

Study Design and Data Collection

Between August 2010 and November 2014 patients with histologically confirmed endometrial cancer and BMIs $\geq$40 kg/m^2 were deemed eligible for the study and underwent RH using the Da Vinci Si Surgical System (Intuitive Surgical Inc., Sunnyvale, CA). Pretreatment evaluation included a medical history, physical examination, vaginal–pelvic examination, chest x-ray, transvaginal ultrasound scan, and pelvic magnetic resonance imaging. Further eligibility criteria included Eastern Cooperative Oncology Group performance status $\leq$2, adequate bone marrow reserve (absolute granulocyte count $\geq$2000/mL, platelet count $\geq$100 000/mL), and adequate renal, hepatic, and cardiac function. Patients not considered candidates for the robotic approach (large uteri requiring morcellation and women which could not sustain a steep Trendelenburg position) underwent abdominal hysterectomy. Previous abdominal surgery was not considered a contraindication for RH.

Approval to conduct the study was obtained independently from an internal review board at each participating center. An informed consent to undergo clinical evaluation and robotic surgery was obtained from all patients in accordance with the local and international legislation (Declaration of Helsinki) [15]. All patients who underwent RH were informed that the procedure could be converted to laparotomy if necessary.

Clinical patient characteristics, including age, BMI, clinical stage according to the International Federation of Gynecology and Obstetrics classification, histopathologic subtype, and tumor grade, were recorded. Intraoperative parameters, including blood loss and complications, were recorded as well, and blood transfusions were performed if hemoglobin values were $\leq$7 g/dL. Postoperative parameters included short-term (within 30 days of the procedure) and long-term complications ($>$30 days after the procedure), length of hospitalization, time to recovery of normal bladder function, median follow-up duration, recurrence, and disease-free interval. Complications were defined according to the Common Terminology Criteria for Adverse Events, version 4.0 [16]. Moreover, status and number of removed pelvic and aortic lymph nodes were evaluated. Pelvic lymphadenectomy was performed based on frozen section analysis of the uterus (i.e., myometrial invasion $>$50% and grade 2 or 3). Robotic aortic lymphadenectomy was reserved for patients with pelvic node disease at intraoperative examination or finding bulky aortic nodes at the time of surgery [17].

Surgical Technique

All patients were given antibiotic prophylaxis (Augmentin 2.2 g intravenously; GlaxoSmithKline, Verona, Italy) and perioperative low-molecular-weight enoxaparin (40 mg/24 h subcutaneously). The vaginal cavity was cleansed with povidone iodine solution, and a Foley catheter was placed in the bladder. Intraoperative lower extremity sequential compression devices for venous thrombosis prophylaxis were used. All procedures were performed under general endotracheal anesthesia, and peritoneal washing was routinely performed.

Patients were placed in the lithotomy position with the arms tucked at each side. After the creation of a pneumoperitoneum to 12 m mHg with a transumbilical Veress needle, a 12-mm trocar was placed at 5 cm cranial to the umbilical level. Three 8-mm trocars, specific for the Da Vinci robotic system, were placed: 1 (arm 1) on the right side of the abdominal wall, medial and cranial to the right anterior upper iliac spine, and 2 on the left side of the abdominal wall; and the first (arm 2) on the left lowest rib and the second (arm 3) medial and cranial to the left anterior upper iliac spine on the same line of the right trocar. These arms were then fastened to the robotic arms. An assistant 10-mm trocar was placed on the right side of the abdominal wall, 7 to 10 cm laterally, from the supraumbilical trocar. After placing