

Laparoscopic and vaginal approaches to hysterectomy in the obese[☆]

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ABSTRACT

Objective: The aim of the study was to compare surgery-related outcomes between laparoscopic (LH) and vaginal (VH) hysterectomy, performed for benign uterine disease (other than pelvic organs prolapse) in obese women.

Study design: Data of consecutive obese (BMI ≥ 30) patients undergoing LH and VH, between 2000 and 2013, were compared using a propensity-matched analysis. One hundred propensity-matched patient pairs (200 patients) undergoing LH ($n = 100$) and VH ($n = 100$) represented the study group.

Results: Baseline demographic characteristics were similar between groups. Patients undergoing LH experienced similar operative time (87.5 (25–360) vs. 85 (25–240) min; $p = 0.28$), slightly lower blood loss (100 (10–3200) vs. 150 (10–800) ml; $p = 0.006$) and shorter length of hospital stay (1 (1–5) vs. 2 (1–5) days; $p < 0.001$) than women undergoing VH. There was no statistically significant difference between LH and VH in complication rate (3% for VH vs. 10% for LH; OR: 3.4; 95%CI: 0.95–13.5; $p = 0.08$). At multivariable analysis complication rates increased as BMI increase (OR: 1.01 (1.00–1.02) for 1-unit increase in BMI; $p = 0.05$). Independently, LH correlated with reduced hospital stay (OR: 0.63 (95%CI: 0.49–0.82); $p = 0.001$) and complication rates (OR: 0.91 (95%CI: 0.85–0.97); $p = 0.01$).

Conclusions: In obese women affected by benign uterine disease LH and VH should not be denied on the basis of the mere BMI, per se. In this setting, LH upholds effectiveness of VH, improving postoperative outcomes. However, complication rate increases as BMI increase, regardless surgical route.

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Introduction

Hysterectomy is the second most common surgical procedure, after cesarean section, performed in the gynecological practice. It is estimated that more than 600,000 hysterectomies are performed annually in the United States, and more than one third are performed thorough abdominal route [1–3]. The American College of Obstetricians and Gynecologists (ACOG) and the American Association of Gynecologic Laparoscopists (AAGL) support the embrace of vaginal and minimally invasive techniques to perform hysterectomy, thus reducing surgery-related morbidity of open

abdominal hysterectomy (AH) [4,5]. Similarly, a Cochrane systematic review suggested that vaginal hysterectomy (VH) should be preferred over AH; while, where VH is not feasible, laparoscopic hysterectomy (LH) can avoid the need to perform open surgery [6]. However, LH is related to increased operative time in comparison to VH [6].

Although accumulating evidence supports the safety, feasibility and effectiveness of LH, there are several unresolved concerns related to the minimally invasive treatment of obese patients [7–11]. In fact, obesity has long to be considered as a relative contraindication to perform laparoscopic surgery [10,11]. Still now, there is a paucity of data about the safety of LH in the obese population. Albeit several study suggested that LH overcomes AH in obese patients, no data comparing LH and VH exists. This information is highly relevant, especially on the light of the increasing of obesity in the Western countries [12]. Hence, we designed the present study aimed to compare surgery-related outcomes of LH and VH in obese women affected by benign uterine

[☆] The study was conducted in Varese, Italy.

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disease. As a secondary endpoint we sought to analyze how increasing in body mass index (BMI) impacts on postoperative complication rate of patients undergoing LH and VH.

Materials and methods

We retrospectively searched data of consecutive women undergoing hysterectomy for benign condition (other than pelvic floor dysfunction) at the Gynecologic Unit of University of Insubria (Varese, Italy), from 01/01/2000 to 7/31/2013. Data were prospectively collected into a dedicated database. In our institution, research activities involving the study of existing data are exempt from the requirement for institutional review board (IRB) approval. Patients who did not consent to use clinical information and patients diagnosed with gynecological malignancies were excluded from the present analysis. The computerized surgical database, containing data on every surgical procedure performed at our hospital, is of research quality and is updated by trained nurses or residents (not involved in surgical procedures) on a regular basis, following the American College of Surgeons' National Quality Improvement Program platform [13]. Inclusion criteria were: (1) BMI ≥ 30 kg/m²; (2) the execution of hysterectomy via vaginal or laparoscopic route; (3) execution of general anesthesia (4) age ≥ 18 years old; (5) clinical follow-up ≥ 30 days (6) non-prolapsed uteri (Baden-Walker ≤ 1); (7) benign uterine disease.

In 2000, we started a policy of systematic implementation of LH in order to reduce the rate of AH. Although constant attempts were done to decrease the rate of AH, no specific guidelines drove the choice to perform LH and VH. Over the study period, there were no significant differences in the facilities available for patient care and in the referral patterns of our service. Other aspects of patients' management remained consistent over time. The same team of expert surgeons performed all surgical procedures. Detailed surgical technique of LH and VH was previously reported [14,15]. Briefly, LH was performed according type IV-E (according to AAGL classification) [3]; an intrauterine manipulator (RUMI System; CooperSurgical, Trumbull, CT) in conjunction with a Koh cup (Koh Colpotomizer System; CooperSurgical) was inserted. After pneumoperitoneum was created, a 0° 5-mm laparoscope was introduced at the umbilical site. Under direct visualization, three 3- or 5-mm ancillary trocars were inserted, 1 suprapubically and 2 laterally to the epigastric arteries, in the left and right lower abdominal quadrants, respectively. Hysterectomy was started with coagulation and section of the round ligaments and the infundibulopelvic ligaments. The broad ligament was opened up to the uterovesical fold that was then incised with caudal reflection of the bladder. Afterwards the uterine vessels, the cardinal ligaments, and the uterosacral ligaments were coagulated and transected. Hysterectomy was completed performing a circular colpotomy. The uterus was then extracted from the vagina with the intrauterine manipulator still in place. If the uterine size was too big the surgical specimen was morcellated through the vagina. Vaginal cuff closure was performed vaginally using a single layer medium-term reabsorbable suture. Re-introduction of laparoscopy was carried out to ensure hemostasis [16]. All port sites were approximated with absorbable suture or surgical strips. Laparoscopic devices (including trocars, laparoscopic instruments and uterine manipulator (RUMI-Koh)) were for mostly reusable. Disposable vessels sealing devices were not used. Vaginal hysterectomy was made according to a standardized protocol. A circular colpotomy was performed around the anterior portion of the cervix below the line of the bladder. The pouch of Douglas was opened posteriorly and a retractor was positioned. The bladder was then dissected from the vagina anteriorly. The sacrouterine ligaments were clamped transected and sutured using Vicryl No. 0 sutures. These ligatures were kept to suspend the vaginal vault at

the end of the procedure. Then, broad ligament, uterine vessels followed by round and ovarian ligament were clamped, transected and sutured using Vicryl No. 0 sutures. The uterus was then extracted from the vagina and hemostasis was ensured. The peritoneum and the vault was closed using Vicryl No. 1 sutures.

In post-menopausal women surgical plan included the execution of hysterectomy and bilateral salpingo-oophorectomy. Notwithstanding, if the location of (apparently normal) adnexal structures was not favorable and they could not be removed safely, our protocol allowed omitting salpingo-oophorectomy. Operations were performed under general endotracheal anesthesia. Women received a single dose of prophylactic antibiotic 1 h before the surgery; women wore compression stockings and they received antithrombotic prophylaxis with low molecular-weight heparin for 7 days. Operative times were recorded from the first skin incision to the last suture (skin to skin). Blood loss was calculated as the sum of the volume collected by a suction device during the procedure plus the estimated volume of the total number of gauzes used during the procedure. Hospital stay was counted from the 1st postoperative day. Foley catheter was removed in operative room in all patients. No between approach differences in postoperative existed. Bedside physicians, not directly involved in surgery, managed patients' postoperative courses. Incidental damages of the surrounding organs were considered as intra-operative complications. Data on conversions (from LH to AH and from VH to LH or AH) were recorded. Patients were considered by intention to treat principle. Hence, for the statistical analysis, vaginal operations converted to LH were included in the VH group. Postoperative complications included any event requiring drugs administration, blood transfusion and/or secondary procedures. Postoperative complications were graded per the Accordion classification [17]. For the purpose of this investigation only grade ≥ 2 complications were reported. In-hospital complications were abstracted from clinical records, while complications after the discharge were recorded at the time of the 30-day follow-up visits. Fever < 38.5 °C were not considered a postoperative complication. For the study purpose, complications occurred after 30-day were not included in the present analysis. Martin criteria were applied to improve quality of complications reporting [18]. According to the World Health Organization (WHO), definition of BMI was used to categorize patients in: obese class I (30–35 kg/m²), obese class II (35–40 kg/m²) and obese class III (≥ 40 kg/m²) [19].

Statistical analysis

Owing to the non-randomized nature of the study design and the possible allocation biases arising from the retrospective comparison between groups, we performed a propensity-matched analysis. Propensity-matched comparison attempts to estimate the effect of a treatment by accounting for possible factors (e.g., constitutional variables) that predicts receiving the treatment. Propensity-matched comparison aims to reduce biases rising from different covariates. Propensity score was developed through multivariable logistic regression model. Age, BMI, American Society of Anesthesiologists (ASA) score, parity, previous abdominal surgery, prior cesarean section, uterine weight (grams) and comorbidity levels (assessed by Charlson comorbidity index [20]) were included in the model. Patients undergoing LH were matched 1:1 to patients selected to a cohort of women undergoing VH, using a caliper width ≤ 0.2 standard deviations (SDs) of the logit odds of the estimated propensity score. Detailed description of propensity matching is described elsewhere [14,16,21].

After the selection of 100 patients pair, we conducted two separate analyses. Firstly, we compared outcomes of 100 patients undergoing LH with 100 patients undergoing VH. Incidence of events among the groups was analyzed using the Fisher exact test.

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