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Feasibility and safety of same-day discharge after laparoscopic radical hysterectomy for cervix cancer

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HIGHLIGHTS

- Same day discharge after laparoscopic radical hysterectomy is safe and feasible.
- Low rates of post-operative morbidity were seen in the same-day discharge cohort.
- Low rates of readmission/reoperation were seen in the same-day discharge cohort.
- Admission is not associated with a decreased risk of post-operative complications.

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ABSTRACT

Objective. To evaluate the safety and feasibility of same day-discharge (SDD) after laparoscopic radical hysterectomy for cervix cancer by determining complication rates and factors associated with post-operative admission.

Methods. In this retrospective cohort study, patients undergoing laparoscopic radical hysterectomy for cervix cancer at a single institution from January 2006 to November 2015 were identified. Admitted patients were compared to same-day discharge patients. Rates of post-operative complications and readmission were analyzed and regression analysis used to determine factors associated with admission.

Results. 119 patients were identified. 75 (63%) were SDD patients (mean stay 156.7 ± 50.2 min) and 44 (37%) were admitted patients (mean stay 1.2 ± 0.6 days). Ten (13%) SDD patients sought medical attention within 30 days post-operatively vs. nine (20%) admitted patients ($p = 0.17$). Reasons SDD patients sought attention included pain ($n = 1$), wound concerns ($n = 2$), vaginal bleeding ($n = 2$), DVT/VTE ($n = 1$), fever ($n = 2$) and fistula ($n = 2$). All patients developed symptoms and presented between 5 and 13 days post-operatively thus no complications could have been detected or prevented through initial admission. Four SDD patients were readmitted within 30 days of surgery ($p = 0.25$), two required re-operation ($p = 0.16$). Admitted patients were older ($p = 0.049$), had longer operations ($p = 0.02$), increased blood loss ($p = 0.0004$), increased intra-operative complications ($p = 0.001$), surgery later in the day ($p = 0.004$) and before April 2010 ($p = 0.001$). On multivariate analysis, older age (OR1.05, $p = 0.03$), surgery later in the day (OR 7.22, $p = 0.002$) and presence of an intra-operative complication (OR 10.25, $p = 0.02$) were significantly associated with admission.

Conclusion. Same-day discharge after laparoscopic radical hysterectomy for cervix cancer is safe, with a low risk of post-operative morbidity and hospital readmission.

1. Introduction

Cervical cancer is the fourth most common cancer in women worldwide [1] with an estimated 530,000 women being diagnosed in 2012 [2]. Treatment for cervical cancer is dependent on the clinical stage at presentation and includes surgical therapy - radical hysterectomy with nodal staging - for early stage disease. Traditionally, this is done through an abdominal approach however, with the increasing popularity of minimally invasive surgery, laparoscopic or robotic radical hysterectomies are offered to patients [3,4]. While same day discharge after minimally invasive surgery has been an established practice in other surgical specialties including general surgery [5,6], only recently has this practice become more common after laparoscopic simple hysterectomy. Despite a growing body of literature regarding the safety of same-day discharge

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after minimally invasive gynecologic surgery for benign indications [7,8], less has been published regarding the safety and feasibility of same day discharge after oncologic surgery. Furthermore, although there is growing acceptance of same-day discharge after a laparoscopic simple hysterectomy, there are fewer gynecologic oncologists who have adopted the same practice for laparoscopic radical hysterectomies, likely since these are more technically complex procedures associated with increased complication rates.

The purpose of this study is to determine the safety and feasibility of same day discharge after laparoscopic radical hysterectomy for early stage cervical cancer and to determine peri-operative factors associated with admission in these patients.

2. Methods

Approval from the institutional research ethics board was obtained prior to commencing the study. In this retrospective cohort study, all patients undergoing radical hysterectomy for early stage cervical cancer by four gynecologic oncologists at a single institution between January 1, 2006 and November 1, 2015 were identified using a combination of diagnosis and procedure codes. All charts were obtained and only patients undergoing laparoscopic radical hysterectomy ± lymph node assessment were included in the chart review. All records were individually reviewed and study data was obtained from pre-operative consultation notes, operative notes, anesthetic records, nursing notes, pathology reports, post-operative in-hospital progress notes, clinic notes and any other relevant records including emergency room documentation. Information obtained from the chart review included age, body mass index (BMI) (kg/m^2), American Society of Anesthesiologists (ASA) class, pathologic diagnosis and clinical stage. Surgical data obtained included date and type of procedure (laparoscopic radical hysterectomy ± pelvic sentinel nodes ± pelvic and/or para-aortic lymphadenectomy) surgical start time and end time, length of operative procedure (min), estimated blood loss (ml), presence and type of intra-operative complications or transfusions, conversion to laparotomy and reasons for conversion if present. Post-operative data included length of hospital stay and time to discharge. Patients discharged home before midnight on the day of their operation were classified as same day discharge patients and all other patients were classified as admitted patients. Progress notes and nursing notes were reviewed to determine reasons for admission if possible and the presence of any post-operative complications during hospitalization. Follow up data included presence or absence of medical visit to the gynecologic oncology clinic, emergency department or family doctor's office prior to the planned 30 day (3–4 week) post-operative follow up visit with the gynecologic oncologist. Reasons for seeking medical attention were recorded as well as any readmissions, and re-operations and reasons for each within the first 30 days.

Four gynecologic oncologists performed all operations reviewed. All surgeons proceeded in a similar manner with a total laparoscopic approach. A 10 mm port was placed in the umbilicus after insufflating the abdomen with CO_2 gas through a veress needle. Two 5 mm lateral ports and one 10 mm suprapubic port were also placed under direct vision. The Ligasure™ vessel sealing device (Covidien, Boulder, Colorado USA) was used to perform the hysterectomy as well as all nodal dissections. All patients had a type 3 radical hysterectomy with division and dissection of the uterine vessels at their origin at the internal iliac vessels. The vaginal cuff was closed with either the Endo-stitch™ device (Covidien, Boulder, Colorado USA) or by suturing with a 2-0 V-lock suture™ (Covidien, Boulder, Colorado USA). Sentinel lymph node mapping and dissection was performed by the four surgeon (s) using either the PINPOINT endoscopic indocyanine green fluorescence imaging system (2015–onwards) (Novadaq, Mississauga, ON, Canada) or by pre-operative injection of radio-labelled Technetium-99 ± isosulfan blue dye if unable to detect sentinel nodes using the radioisotope. Post-operatively patients were managed with a multimodal pain regime including acetaminophen, non-steroidal anti-inflammatories (NSAIDS) and oral narcotics. Patients were managed post-operatively in the post-anesthetic care unit until they were deemed stable and then they were transferred to either the same-day surgical unit if they were to be discharged home or to the ward for admission. Patients were discharged home if they met standard discharge criteria such as normal vital signs including oxygen saturation, adequately controlled pain on oral medication, and ability to ambulate and tolerate oral intake. Patients were discharged home with a foley catheter in-situ. Home-care nursing was arranged to perform a trial of void after foley removal 10 days post-operatively. Instructions were given to the homecare nurse as to when to re-insert the Foley catheter if the post-void residual volume was high. Patients were counselled regarding same-day discharge at their pre-operative appointment.

Statistics were performed using SAS version 9.4. Descriptive statistics were used for baseline patient characteristics. Continuous variables were analyzed using the student-*t*-test or Wilcoxon rank-sum test and categorical variables were analyzed using the chi-square test or Fisher exact test as appropriate. Two tailed tests were performed and a p-value < 0.05 was considered statistically significant. Histograms were used to determine cutoff points for continuous variables (i.e. time to close, surgical cohorts) in order to form categorical variables which were then used for analysis. Univariate and multivariate logistic regression analyses were used to determine factors associated with admission. Factors included in the multivariate model were determined a priori and were considered clinically relevant factors that could affect the need for admission. These factors were age, BMI (kg/m^2), ASA ($1 + 2$ vs. $3 + 4$), length of operative time (minutes), time from completion of surgery until closure of the same day surgical unit (≤3 h vs. >3 h) and presence of any intra-operative complications.

3. Results

240 patients were identified from the health records coding audit of which 124 were included in the study. Patients with a diagnosis other than cervical cancer or a procedure other than a laparoscopic radical hysterectomy ± sentinel lymph node biopsy ± pelvic and/or para-aortic lymphadenectomy were excluded. Three additional patients were excluded due to missing charts. Two patients (1.65%) underwent a conversion to laparotomy during their planned laparoscopic operation due to large specimen ($n = 1$) and intra-operative genitourinary injury requiring repair ($n = 1$) and were excluded from our analysis as they became laparotomy patients with subsequent postoperative admission. Therefore 119 patients with a radical hysterectomy completed laparoscopically were included in our data analysis.

Baseline characteristics of the cohort are described as follows. Mean age was 45.5 years ± SD 10.6 (range 26–74). Mean BMI (kg/m^2) was 25.8 ± SD 5.8 (range 18–60). 27% of patients had an ASA class of 1 or 2 and 73% had an ASA class of 3 or 4. Fifty-four patients (45%) had a histologic diagnosis of invasive squamous cell carcinoma and 65 patients (55%) had a diagnosis of invasive adenocarcinoma. Ninety-six patients (81%) had International Federation of Gynecology and Obstetrics (FIGO) Stage 1B1 disease, 16% had either stage 1A1 with positive lymphovascular space invasion (LVSI) or 1A2 and the remaining 3% had more advanced disease (>1B2). Procedures included laparoscopic radical hysterectomy with sentinel lymph node biopsy alone (54%), with pelvic lymphadenectomy ± sentinel lymph node biopsy (38%) or with para-aortic lymphadenectomy ± pelvic lymphadenectomy ± sentinel lymph node biopsy (7%). Sixty patients (50.4%) were in the first half of our surgical cohort, before Apr 1, 2010, and 49.6% in the second half after Apr 1, 2010. Nineteen patients (15.9%) had surgeries that finished ≤3 h to the time of the day surgery unit closure with the remainder having surgeries that finished with >3 h to the time of day surgery unit closure.

Of the 119 patients undergoing laparoscopic procedures, 44 patients (37%) were admitted and 75 patients (63%) were discharged home on the same day. When comparing patients who were admitted with

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