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Predictors for Discharge After Robotic Hysterectomy – A Retrospective Analysis

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Introduction

Hysterectomy is one of the most common surgeries performed in the United States with more than 600,000 procedures annually . It has been estimated that in 2011, there were more than 64,000 surgeries performed in an outpatient setting. The highest rate of 0.46% (464/100,000 adult women) has been reported in Maine. The average length of stay was 0.65 days for laparoscopic and 0.79 days for vaginal hysterectomies [1].

Traditionally, hysterectomies have been performed as an inpatient procedure to manage postoperative pain and monitor complications such as bleeding, anemia and return of bowel function. Development of minimally invasive surgery techniques with minimal blood loss, decreased postoperative pain and recovery time, and faster return of bowel function have, however, significantly shortened hospital stays [2]. The robotic surgical platform for minimally invasive surgery was approved by the American College of Obstetrics and Gynecology in 2005, and since then the number of these procedures has continually increased [3].

Today, the feasibility and safety of same-day discharges have been well established for patients undergoing minimally invasive hysterectomy after laparoscopic and robotic surgeries [4]. However, despite the reported positive findings, the percentage of patients who are discharged on the same-day vary from 16% to 90%. Reasons for post-operative hospital admission include nausea and vomiting, inadequate pain control, postoperative urinary retention, inadequate home support, and patient preference [2]. The purpose of this retrospective study was to identify and describe predictors for same-day and non-same-day discharge after robotic hysterectomy in a 637 licensed-bed Magnet® designated tertiary care teaching hospital.

Background

Robotic hysterectomy procedures have been conducted in our organization since 2008 with the assistance of the da Vinci® Surgical System. Annually, over 500 procedures are performed. The perioperative care for these patients has varied among providers, producing a need to gather information with regard to patient outcomes. Patients receive their pre-operative instructions from their provider's office, are NPO after midnight the day of surgery and may or may not complete a bowel prep the day prior to surgery.

Over the last few years, ASU (Ambulatory Surgery Unit) nurses noted increasing difficulty with discharging patients undergoing robotic hysterectomy the same day as surgery due to both post-operative nausea and the inability to void post-operatively. The nurses also discerned a variation in fluid therapy both prior to and following surgery. These observations were a starting point for a literature search and a clinical question: how does the amount of fluids given post-operatively predict robotic hysterectomy patients' length of stay?

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Overview of the Literature

The robotic-assisted techniques are minimally invasive and have become increasingly common today in gynecological surgery. According to the literature, there are several advantages of robotic-assisted surgery, such as low/reduced intraoperative blood loss, decreased postoperative pain and recovery time, decreased postoperative complications, and better cosmetic result. Robotic techniques have a positive financial impact on reduction of operative costs and of hospital length of stay [5].

The literature search revealed articles including , for example, a meta-analysis with regards to liberal (*intra op*: from 2750 to 5388 ml; *post op*: from 1500 to 2900 ml) vs. restrictive perioperative (*intra op*: from 998 to 2740ml; *post op:* from 500 and 2170 ml) fluid therapy [6], a discussion paper regarding the need for an enhanced recovery program (ERP) for patients with endometrial cancer having robotic surgery [7], and a review which investigated the outcomes of various fluid administration regimens in elective surgical procedures [8]. The articles found were not specific to the elective robotic hysterectomy population and varied in their recommendations with regards to the amount of IV fluid that should be administered. A few authors also recommended the need for procedure specific studies to define optimal perioperative fluid management [4,6,7] .

Methods

Study Design and Population

Data were retrieved from the electronic health records (EHRs) including all patients age ≥18 and who have had a robotic hysterectomy between dates 1/1/17 and 12/31/17. The sample (IRB #1166256-1) was comprised of patients with procedure codes: 1070002913, 1070002914, 1070002918, 1070002919 and 435. The demographic characteristics of the sample (N=519) are described below (Table 1.)

Demographic Characteristics	Mean	SD
Age (years)	57.53 years	12.70
BMI kg/m2	32.81	9.24
Weight (kg)	87.1 kg	25.19
Length of stay (LOS)	Min. 0.03 days	Max. 4.2 days

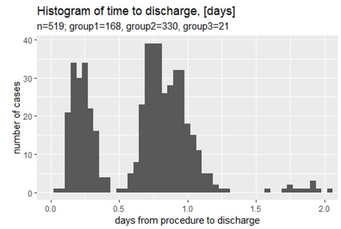
The retrieved variables included also: total volume of intravenous fluid (mL), intra-operative time (i.e. time in OR to time out of OR), urine output (OR), post – void residual (bladder scan), nausea, vomiting, anti-nausea medications and dose(s), pain medications (dose and frequency), and estimated blood loss (in mL).

Statistical Analysis

Statistical differences between categories were estimated by Kruskal-Wallace Rank Sum Test, Pairwise Wilcoxon Rank Sum Test, and Fisher's Exact Test. Confidence Intervals (95% CI) were also calculated. Tests of between-patient effects (same-day vs. non-same-day groups) were conducted with the general linear model repeated-measures procedure. Differences were considered significant if p was ≤ .05. Data were analyzed using R version 3.4.2 (The R Foundation for Statistical Computing, Vienna, Austria.)

Results

The analysis uncovered three groups: 'early discharge' (ED ≤0.49 days), 'mid-discharge' (0.5 days >MD ≤1.49 days) and 'late discharge' (LD ≥1.5 days). ED included 32.5%, MD 63.5%, and LD 4.0% of patients. (Figure 1.)



Significant differences were found between the groups as shown in Table 2. below.

Variables	Early Discharge	Mid-Discharge	Late Discharge	P
Duration of surgery (Mdn)	179.5 min	207.5 min	226 min	p<.000
Post anesthesia care unit stay	.094 days	.115 days	.166 days	p<.000
Time from the end of procedure to voiding	3.72 hrs	5.83 hrs	16.9 hrs	p<.000
Total amount of IV fluids	1450 ml	1907 ml	3958 ml	p<.000
Net fluid volume	1396 ml	1500 ml	2987 ml	p<.000

Nausea was infrequently acknowledged; emesis was more often documented in the MD group (6.28%, n=300, p<.000) than in the ED (1.26%, n=6) and LD groups (1.05%, n=5).

Predictors of LOS were 'duration of surgery in minutes' (Coefficient: -0.01, OR 0.99, p<.000), 'time from end of procedure to patient voiding' (Coefficient: -8.58, OR .000, p<.000) and 'total amount of IV fluids' (Coefficient: -.0002, OR 0.999, p=.0276).

Conclusions and Next Steps

A patient's LOS can be impacted for various reasons. The literature supports the results from our study that IV fluid therapy and length of surgery are predictors for LOS. This study also found a third predictor, 'time from end of procedure to patient voiding'.

The more recent studies have focused on the factors influencing a patient's readiness for discharge. The literature has also recommended the 'Enhanced Recovery After Surgery (ERAS) Pathway for robotic hysterectomy patients which can significantly increase the same day discharge rate. [2.] The findings from this study are informing the next steps, a quality improvement initiative with the gynecology/oncology providers.

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