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Case series

Adverse post-operative outcomes in Jehovah's witnesses with gynecologic cancer within 30 days of surgery: A single institution review of 36 cases☆

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ABSTRACT

Rates of blood transfusion are reported as high as 32% in women undergoing major gynecologic cancer surgery. Therefore, care of the gynecologic oncology patient who refuses blood products, such as Jehovah's witnesses, can pose a unique challenge. The objective of this study was to determine rate of adverse post-operative outcomes within 30 days of surgery in Jehovah's witnesses with gynecologic cancer. This was a retrospective cohort study of Jehovah's witnesses undergoing laparotomy or minimally invasive surgery (MIS) for gynecologic cancer at a single institution. Data for post-adverse complications within 30 days of surgery were recorded. In total, 36 patients were included with a median age of 58.5 years (32–85 years). The majority had endometrial adenocarcinoma (n = 23; 63.9%) or epithelial ovarian, fallopian tube or peritoneal cancer (EOC) (n = 8; 22.2%). 61.1% (n = 22) of patients underwent laparotomy and 38.9% (n = 14) had MIS procedures. 31.8% of laparotomies (n = 7) were terminated prematurely due to surgeon concern for ongoing blood loss. In patients with advanced stage EOC, the rate of suboptimal cytoreduction (> 1 cm) was 50%. In the laparotomy cohort, there were four (18.2%) ICU admissions and two (9.1%) mortalities. The time to adjuvant chemotherapy or radiation was 45.5 days (31–64) for laparotomy compared to 35.0 days (12–64) for MIS. While the majority of patients (97.2%) were unwilling to accept packed red blood cells, over one third (38.9%) were agreeable to autologous blood transfusion. Additionally, five (13.9%) patients were accepting of fresh frozen plasma, six (16.7%) patients were agreeable to cryoprecipitate and seven (19.4%) patients were willing to accept platelet transfusions. There is a high rate of postoperative adverse outcomes among Jehovah's witnesses undergoing laparotomy for gynecologic malignancy compared. Acceptance of blood products is low among Jehovah's witnesses, even in the setting of major oncologic surgery.

1. Introduction

Over 80,000 women are diagnosed with gynecologic cancer annually in the United States (U.S. Cancer Statistics Working Group, 2015). For most gynecologic malignancies, the initial treatment consists of surgery and may be followed by adjuvant chemotherapy, radiation therapy or a combination of both. Primary cytoreductive surgeries for gynecologic malignancies can be associated with significant post-operative morbidity (Chen and Bochner, 1985) Severe anemia has been identified as a predictor of adverse outcome in the peri-operative period, with mortality exceeding 30% in patients with hemoglobin of < 5 g/dL (Carson et al., 2002). Transfusion of blood products is often a necessary intervention with a rate of transfusion reported as high as 32% during the post-operative period among women undergoing major gynecologic cancer surgery (Doo et al., 2016). There are a number of situations in which a patient may refuse blood transfusions, with the most well known involving Christians known as Jehovah's witnesses with over 8 million members world-wide. While devout Jehovah's Witnesses will not accept transfusions of any component of whole blood, others will consider acceptance of blood sub-fractions including albumin and clotting factors as well as autologous donation. Care of the surgical patient who refuses blood products can pose a unique challenge.

While there have been several case reports of patients with gynecologic cancer or complex gynecologic issues undergoing successful bloodless surgery and several reviews focusing on bloodless surgery in these women, there is little data for rates of adverse short-term perioperative outcomes, ability to obtain complete cytoreduction and time to

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initiation of adjuvant chemotherapy in a cohort of Jehovah's witnesses undergoing surgery for gynecologic cancer (Nagarsheth and Sasan, 2009; Nagarsheth et al., 2007). Determining the rates of adverse post-operative outcomes in this population of patients will be helpful for pre-operative surgical planning and patient counseling.

The objective of this study was to identify the incidence of adverse post-operative outcomes including ICU stay, readmission and mortality within 30 days of surgery for Jehovah's witnesses undergoing major laparotomy and minimally invasive surgery for gynecologic cancer.

2. Materials and methods

A retrospective cohort study was performed at a single tertiary care academic health care institution after Institutional Review Board approval for the study was obtained. Patients with a diagnosis of any gynecologic malignancy (cancer of the cervix, uterus, vagina, vulva, ovary, fallopian tube or peritoneum) (ICD-9, 158, 179, 180, 182, 183, 184) who reported their religion as a Jehovah's Witness (V62.6) were identified from the electronic medical record using ICD-9 codes from 2004 to 2015. Patients were included if they underwent surgery for treatment of their cancer, which included both laparotomy and minimally invasive surgery (MIS, including both laparoscopy and robotic assisted procedures). No vulvar or vaginal surgeries were performed in this patient sample. Patients who did not undergo surgery were excluded.

Data was extracted from the electronic medical record for demographic, oncologic and surgical characteristics of patients. Data collection for patient demographics included age at the time of surgery, ASA (American Society of Anesthesiologists) classification and Charlston co-morbidity index. Data was collected for oncologic variables including site of cancer, histology, stage of disease and whether neoadjuvant or adjuvant chemotherapy was received. Operative variables that were collected included pre-operative and post-operative hematologic parameters, operative time, surgical procedures performed, estimated blood loss (milliliters) and extent of cytoreduction (complete, optimal < 1 cm, suboptimal). Operative time was defined as time from skin incision to closure. Intra-operative complications were defined as injury to bowel, bladder, ureters or major vascular structures. Each operative report was reviewed for notation that the surgery was terminated due to concern for ongoing or potential blood loss given patient's refusal of blood loss. Data was collected for adverse postoperative outcomes including readmission, ICU stay, mortality and surgical site infection within 30 days of surgery.

At our institution, all patients who refuse blood products complete a document attesting their refusal to some or all blood components including packed red blood cells, cryoprecipitate, albumin, whole blood, which is scanned into the electronic medical record. This form was reviewed for all patients to verify their refusal or acceptance of blood products, as well as their refusal or acceptance to use autologous blood transfer methods. Descriptive statistics were performed. Statistical analysis was performed using JMP software 12.2.0.

3. Results

In total, 36 women were identified as Jehovah's witnesses who underwent surgery for gynecologic malignancy. Table 1 includes the baseline demographic data for women included in the study. Median age at the time of surgery was 58.5 years old. Pre-operative median ASA score was 3.0 and median Charleston Comorbidity Index was 6.0. Median pre-operative hemoglobin and hematocrit were 12.8 (5.4–15.5) mg/dL and 38.6 (19.6–45.6) mg/dL, respectively. No patient's received hematopoietic growth factors pre- or post-operatively.

Of the 23 patients (63.6%) with endometrial adenocarcinoma, nine (39.1%) were Stage IA, eight were Stage IB (34.7%), one was Stage IIIA (4.8%), one was stage IIIB (4.8%), two were stage IIIC1 (9.5%) and two were Stage IVA (9.5%). Six patients (16.7%) had ovarian adenocarcinoma with one had Stage IIC disease (16.7%), two had IIIC disease (33.3%), one had IIIB disease (16.7%) and one (16.7%) with stage IVB disease. Futhermore, two patients (5.6%) had adenocarcinoma of the cervix (Stage 1A2, 1B1), one (2.8%) had adenocarcinoma of the fallopian tube (Stage IA), one (2.8%) had uterine carcinosarcoma (Stage IV), one (2.8%) had uterine leiomyosarcoma (Stage IV), one (2.8%) had uterine papillary serous carcinoma (Stage IIIC) and one (2.8%) had primary peritoneal adenocarcinoma (Stage IIIC). Two patients (5.6%) with advanced ovarian carcinoma received neoadjuvant chemotherapy.

Table 1
Demographic, clinical and treatment characteristics of Jehovah's witnesses undergoing surgery for gynecologic malignancy.

Factor		Total ($N = 36$)
Age, y		58.5 (32–85)
ASA score		3.0 (2.0–4.0)
Charlston comorbidity index		6.0 (2.0–9.0)
Pre-operative hemoglobin (mg/dL)		12.8 (5.4–15.5)
Pre-operative hematocrit (mg/dL)		38.6 (19.6–45.6)
Neoadjuvant chemotherapy		2 (5.5)
Histology and site		
Cervix	Adenocarcinoma	2 (5.5)
Ovarian, Fallopian Tube, Peritoneal	Adenocarcinoma	8 (22.2)
Uterus	Adenocarcinoma	23 (63.9)
	Leiomyosarcoma	1 (2.8)
	Carcinosarcoma	1 (2.8)
	High grade serous	1 (2.8)
Extent of Surgery		
Laparotomy		22 (61.1)
Minimally Invasive Surgery		14 (38.9)
Procedures		
Hysterectomy +/− BSO		34 (94.4)
Small bowel resection		4 (11.1)
Large bowel resection		4 (11.1)
Ileostomy/colostomy		2 (5.5)
Pelvic lymphadenectomy		11 (30.6)
Para-aortic lymphadenectomy		7 (19.4)

Statistics presented as Median (range) or N (column %).
ASA, American Society of Anesthesiologists; BSO, bilateral salpingo-oophorectomy.

22 patients (61.1%) underwent laparotomy and 14 (38.9%) had minimally invasive surgery (MIS). Postoperative outcomes of Jehovah's witnesses who underwent surgery for gynecologic cancer are described in Table 2. For those undergoing MIS procedures, the median pre-operative hemoglobin and hematocrit were 13.3 (11.5–15.5) mg/dL and 40.2 (34.8–45.6) mg/dL, respectively and median post-operative hemoglobin and hematocrit were 11.7 (9.5–13.6) mg/dL and 34.2 (30.6–41.1) mg/dL, respectively. For those undergoing who underwent laparotomy, the median pre-operative hemoglobin and hematocrit were 12.4 (5.4–14.6) mg/dL and 37.9 (19.6–44.5) mg/dL, respectively and median post-operative hemoglobin and hematocrit were 8.9 (3.4–13.3) mg/dL and 27.9 (11.0–42.2) mg/dL, respectively.

In the patients who underwent laparotomy, in 31.8% ($n = 7$) of the cases there was notation in the operative report by the surgeon that the procedure was stopped prematurely due to current bleeding or high risk of hemorrhage if surgery was continued. Among all patients included with advanced stage EOC, the rate of suboptimal cytoreduction (> 1 cm residual disease) was 50.0%. Median length of stay was 7 days in those undergoing laparotomy vs. 1 day for MIS. Median EBL was 250.0cm^3 (25–4300) for laparotomy vs. 75.0cm^3 (10 − 200) for MIS. Among those who underwent laparotomy, there were four (18.2%) ICU admissions and two (9.1%) deaths occurred within 30 days. No hemodilution techniques were utilized in any patient undergoing surgery.

Table 3 displays additional peri-operative details of the patients with ICU admissions and mortalities. Of the four patients who were admitted to the ICU post-operatively, two of them were noted to be anemic at the time of surgery with one of these surgeries performed in an emergent fashion due to a complication of their malignancy. Among