GENERAL GYNECOLOGY

Utility of cell salvage in women undergoing abdominal myomectomy

Moeun Son, MD; John C. Evanko, MD; Linda B. Mongero, CCP; Sharyn N. Lewin, MD; Yu-Shiang Lu, MS; Thomas J. Herzog, MD; Jin Hee Kim, MD; Jason D. Wright, MD

OBJECTIVE: We examined the use and cost of autologous blood cell salvage in women who undergo abdominal myomectomy.

STUDY DESIGN: Patients who underwent abdominal myomectomy from 2007-2011 were identified. Use of the cell salvage system and reinfusion of autologous blood in women who had the system set-up were analyzed. Cost was examined by directly reported data.

RESULTS: We identified 607 patients who underwent abdominal myomectomy. Four hundred twenty-five women (70%) had the set-up of the cell salvage system. Cell-salvaged blood was processed and reinfused into 85 of these subjects (20%). In a multivariable model, performance of myomectomy by a gynecologic-specific surgeon (odds ratio [OR], 2.14; 95% confidence interval [CI], 1.28—3.59), >5 myomas (OR, 2.49; 95% CI, 1.27—4.89), and larger uterine size statistically were associated significantly with cell-salvage device set-up. Conversely, having a reproductive-endocrinology-infertility specialist as the surgeon was associated with a significant reduction in cell-salvage system set-up (OR, 0.37; 95% CI, 0.21—0.66). For the women who had cell-salvage system set-up, uterine size of >15-19 weeks of gestation (OR, 3.22; 95% CI, 1.56—8.95) or ≥20 weeks of gestation (OR, 4.62; 95% CI, 1.45—14.73), operating time of >120 minutes (OR, 3.98; 95% CI, 1.70—9.29), and intraoperative blood loss of >1000 mL (OR, 26.31; 95% CI, 10.49—65.99) were associated significantly with a higher incidence of reinfusion of cell-salvaged blood.

CONCLUSION: The routine use of cell salvage in women who undergo abdominal myomectomy does not appear to be warranted. Cell-salvage set-up appears to be cost-effective only when reinfused, but clinical characteristics cannot predict accurately which women will require reinfusion of cell-salvaged blood.

Key words: blood, cell saver, transfusion

Cite this article as: Son M, Evanko JC, Mongero LB, et al. Utility of cell salvage in women undergoing abdominal myomectomy. Am J Obstet Gynecol 2014;210:●●●●.

Abdominal myomectomy is performed commonly for the excision of symptomatic uterine fibroid tumors in women who desire fertility preservation. Although an effective treatment, the procedure can be associated with substantial blood loss.[1,2] A number of adjuvant measures are available to reduce the risk of bleeding that include preoperative administration of gonadotropin-releasing hormone agonists, placement of a pericervical tourniquet, injection of intramyometrial vasopressin, and use of uterotonics.[3-7] Despite these measures, allogeneic transfusion is often required, with reported rates between 18% and 24% in some studies.[8-10]

Although allogeneic red blood cell transfusion is effective in the treatment of anemia because of acute blood loss, transfusion is associated with a number of risks that include infectious complications, transfusion reactions, and a substantial cost. To limit allogeneic transfusion, cell salvage and autologous blood recovery have been developed for procedures in which substantial blood loss is anticipated. Cell salvage has been studied for orthopedic and cardiovascular procedures, and the technology has been associated with decreased need for allogeneic blood transfusion and fewer bleeding complications.[11-16]

Despite the bleeding potential of myomectomy, there have been few data to describe the role of cell salvage for the procedure. Small observational studies have suggested that cell salvage may increase the postoperative hematocrit level and reduce the need for allogeneic transfusion.[17-19] However, the sample size in these studies was small, and the cell-salvage system often was evaluated within a subgroup analysis and not the main focus of the studies. Furthermore, little is known about the cost-effectiveness of cell salvage for myomectomy.

The primary objective of our study was to examine the usefulness of cell salvage in women who undergo abdominal myomectomy. We also investigated factors that were associated with rates of cell-salvage set-up and reinfusion and

From the Department of Obstetrics and Gynecology (Drs Son, Evanko, Lewin, Herzog, Kim, and Wright and Ms Lu) and Herbert Irving Comprehensive Cancer Center (Drs Lewin, Herzog, and Wright), College of Physicians and Surgeons, and Department of Clinical Perfusion, New York Presbyterian Hospital, Columbia University Medical Center (Ms Mongero), Columbia University, New York, NY.

Received Nov. 25, 2013; revised Jan. 30, 2014; accepted Feb. 15, 2014.

The authors report no conflict of interest.

Reprints: Jason D. Wright, MD, Department of Obstetrics and Gynecology, Columbia University College of Physicians and Surgeons, 161 Fort Washington Ave., 8th Floor, New York, NY 10032. jw2459@columbia.edu.

0002-9378/$36.00 • © 2014 Mosby, Inc. All rights reserved. • http://dx.doi.org/10.1016/j.ajog.2014.02.020

used these data to help estimate costs of this technology.

Materials and Methods

Data for women who underwent abdominal myomectomy between January 2007 and December 2011 were analyzed. A consecutive list of patients who underwent myomectomy was identified with the use of institutional databases. Patients who underwent minimally invasive, hysteroscopic, or vaginal myomectomy were excluded from the analysis, given the relatively low number of cases during the study time period. Study approval was obtained from the Columbia University Institutional Review Board.

Medical records were reviewed, and relevant data were extracted. Data that were obtained included patient demographic information (age at time of surgery, race, parity), specialty of the attending surgeon, indication for surgery, preoperative imaging and laboratory data, uterine size on physical examination, total operating time, and estimated blood loss. The indication for surgery was classified based on the patient's chief complaint. *Preoperative anemia* was defined as a hematocrit level of <35%. Uterine size was based on "weeks of gestation" because it is measured routinely on physical examination.

Each patient was classified as to whether the cell-salvage system was set-up in the operating room before the initiation of the myomectomy. All patients who had cell-salvage use had the BRAT 2 device (COBE, Arvada, CO). This device suctions blood from the operative field, mixes it with heparinized saline solution, and stores the blood in a canister. When enough blood has been accumulated, the blood is processed by centrifugation and filtration, mixed with saline solution, and reinfused into the patient.

The primary outcome for this study was the set-up of the cell-salvage device during abdominal myomectomy. The secondary outcome was incidence of reinfusion of cell-salvaged blood. We analyzed factors that potentially could be associated with cell-salvage set-up and reinfusion. We also estimated the cost of cell-salvage set-up and reinfusion in comparison to allogeneic blood transfusion.

The estimated cost of allogeneic blood transfusion was determined by the presence of a the current procedural terminology code that corresponded with each step of the blood transfusion process, including ABO (86900), Rh (86901), antibody screen (86850), immediate spin cross-match (86920), incubation technique (86921), and blood administration (36430).[20] These current procedural terminology codes were then cross-referenced to Medicare reimbursement payments with the use of the website www.cms.gov. The estimated cost of the cell-salvage system was determined by the New York Presbyterian Hospital Division of Clinical Perfusion by estimation of the cost of the CellSaver (Haemonetrics, Braintree, MA) machine and supplies in addition to cost of a perfusionist's time (both set-up/pack-up time and operating time) per hour. These estimates were used to calculate the total costs of the blood products that were used in the abdominal myomectomies that we analyzed. We performed several sensitivity analyses and estimated the total costs under a variety of clinical scenarios. Clinical scenarios included whether all of the patients who underwent abdominal myomectomy in our study had had cell-salvage device set-up, whether none of the patients had cell-salvage set-up, whether set-up was done only for those we knew were going to require reinfusion of salvaged blood, and whether only the patients we had identified as "high risk" based on our predictive indicators had cell-salvage set-up.

Frequency distributions based on set-up of the cell-salvage device and reinfusion of cell-salvaged blood were analyzed with χ^2 tests. For the analysis of reinfusion of cell-salvaged blood, we included only patients who had the cell-salvage device set-up. Multivariable logistic regression models were constructed to examine predictors of cell-salvage set-up and reinfusion of cell-salvaged blood, and adjustments were made for other demographic and clinical variables. A second predictive model for reinfusion of cell-salvaged blood that included only variables that were available before surgery is also reported. Results are reported as odds ratios (ORs) with 95% confidence intervals (CIs). All statistical tests were 2-sided; a probability value of $< .05$ was considered statistically significant. SAS software (version 9.3; SAS Institute Inc, Cary, NC) was used for all statistical analyses.

Results

A total of 607 patients who underwent abdominal myomectomy were identified. In this sample, 425 patients (70.0%) had the cell salvage machine set-up for collection; 182 women (30.0%) did not. The rates of cell-salvage set-up between 2007 and 2011, per quarter, are presented in Figure 1. The procedures were performed by 46 surgeons, with a median operative volume of 6 cases (range, 1–94). The rate of cell-salvage set-up by quarter ranged from 46.4–87.8%.

The clinical characteristics of the cohort are displayed in Table 1. No difference was observed between the patients who had cell-salvage system set-up and those who did not have the set-up with regard to age, race, year of surgery, or performance of previous myomectomy ($P > .05$ for all). Bleeding as an indication for surgery ($P = .01$), lower preoperative hematocrit level ($P = .01$), performance of myomectomy by a gynecologic-specific surgeon ($P < .0001$), uterine size >15 weeks of gestation on physical examination ($P < .0001$), and >5 fibroid tumors visualized on preoperative imaging ($P < .0001$) were associated significantly with higher incidence of cell-salvage set-up. In the adjusted model, performance of myomectomy by a gynecologic-specific surgeon (OR, 2.14; 95% CI, 1.28–3.59), >5 myomas (OR, 2.49; 95% CI, 1.27–4.89), and larger uterine size statistically were associated significantly with cell-salvage set-up (Table 1). Conversely, having a reproductive-endocrinology-infertility specialist as the surgeon was associated with a significant reduction in cell-salvage device set-up (OR, 0.37; 95% CI, 0.21–0.66).

A total of 144 units of salvaged blood were processed and reinfused into 85 patients (20.0%). There were no intra-or postoperative complications that were

Download English Version:

https://daneshyari.com/en/article/6144901

Download Persian Version:

https://daneshyari.com/article/6144901

Daneshyari.com