ONCOLOGY

Opportunistic salpingectomy: uptake, risks, and complications of a regional initiative for ovarian cancer prevention

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OBJECTIVE: The purpose of this study was to assess the uptake and perioperative safety of bilateral salpingectomy (BS) as an ovarian cancer risk-reduction strategy in low-risk women after a regional initiative that was aimed at general gynecologists in the province of British Columbia, Canada.

STUDY DESIGN: This population-based retrospective cohort study evaluated 43,931 women in British Columbia from 2008-2011 who underwent hysterectomy that was performed with and without BS or bilateral salpingo-oophorectomy or who underwent surgical sterilization by means of BS or tubal ligation. Parameters that were examined include patient age, operating time, surgical approach, indication, length of hospital stay, and perioperative complications.

RESULTS: There was an increase in the uptake of hysterectomy with BS (5-35%; $P < .001$) and BS for sterilization (0.5-33%; $P < .001$) over the study period, particularly in women <50 years old. Minimal additional surgical time is required for hysterectomy with BS (16 minutes; $P < .001$) and BS for sterilization (10 minutes; $P < .001$) compared with hysterectomy alone or tubal ligation, respectively. No significant differences were observed in the risks of hospital readmission or blood transfusions in women who underwent hysterectomy with BS (adjusted odds ratio [aOR], 0.91; 95% confidence interval [CI], 0.75—1.10; and aOR, 0.86; 95% CI, 0.67—1.10, respectively) or BS for sterilization (aOR, 0.8; 95% CI, 0.56—1.21; and aOR, 0.75; 95% CI, 0.32—1.73, respectively). From 2008-2011 the proportion of hysterectomies with BS performed by open laparotomy decreased from 77-44% with uptake in laparoscopic, vaginal, and combined procedures ($P < .001$).

CONCLUSION: After our 2010 educational initiative, there has been a shift in surgical paradigm in our province. This cancer prevention approach does not increase the risk of operative/perioperative complications and appears both feasible and safe.

Key words: educational campaign, ovarian cancer, prevention, safety, salpingectomy

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In the developed world, ovarian cancer accounts for more deaths than any other cancer of the female reproductive tract. Each year >225,000 ★EDITORS' CHOICE★ women will experience ovarian cancer, and 140,000 women will die of the disease.[1] There are no effective screening tests,[2-6] and, in the past 30 years, advances in treatment have yielded marginal differences in overall survival.[7,8]

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See related editorial, page 385

VIDEO Click Supplementary Content under the article title in the online Table of Contents

Epithelial ovarian cancer is recognized now to encompass 5 distinct diseases that differ in histologic appearance, clinical presentation, response to therapy, likelihood of recurrence, molecular aberrations, and site of origin.[9,10] High-grade serous cancer is the most common histologic subtype; the belief is that most of these cancers originate in the distal fallopian tube.[11-18] In addition, the fallopian tube likely plays a permissive role in the development of the next 2 most common subtypes, endometriosis-associated clear cell and endometrioid ovarian cancers, which serve as conduits for the passage of ectopic endometrium and infectious/inflammatory agents[19-22] (Video 1). The importance of the role of the fallopian tube in ovarian cancer is further evident in studies that demonstrate lower rates of ovarian cancer in women who have had their fallopian tubes disrupted by tubal ligation.[23-25]

These observations prompted our gynecologic tumor group in British Columbia (BC) to initiate a province-wide ovarian cancer prevention initiative. We hypothesized that removal of the fallopian tubes (bilateral salpingectomy [BS]), even in the general population of women who are at baseline risk for the development of ovarian cancer, would reduce the incidence of ovarian cancer and change the histologic distribution of epithelial ovarian cancer in years to come. Further, we believed that this procedure was well within the surgical repertoire of gynecologic surgeons and that access to the fallopian tubes was feasible during other routine gynecologic procedures such as hysterectomy or sterilization. Finally, experience with BS over the past 5-10 years gave us confidence that the surgical removal of the tubes would not result in the negative consequences of oophorectomy.[26-28] In September 2010, we sent an informational and instructional DVD (Videos 1-5) that was directed at all obstetricians and gynecologic surgeons in BC and that outlined the role of the fallopian tube in ovarian cancer and explained the association of high-grade serous cancer with inherited *BRCA1/2* mutations. We made 3 recommendations: (1) consideration of surgical removal of the fallopian tubes at the time of hysterectomy, even when ovaries were being preserved, (2) consideration of excisional BS for permanent sterilization in place of tubal ligation, and (3) referral of all patients with high-grade serous cancer for hereditary cancer counselling and genetic testing for *BRCA1/2* mutations. The first 2 interventions were aimed at women who were in the general population who are at low risk for the development of ovarian cancer (ie, risk of approximately 1.5-2% over her lifetime). The third recommendation strived to identify women who were at high risk for the development of ovarian cancer (ie, risk of up to 50% over her lifetime), because identification of the incident case with a *BRCA1/2* mutation in a family enables other family members to be tested and risk-reducing strategies (chemical, surgical) to be initiated. In combination, these recommendations were projected to reduce ovarian cancer rates in the province of BC by 40% over the next 20 years.

Herein, we present the provincial statistics on the uptake of salpingectomy procedures in low-risk women across the province of BC before and after the 2010 campaign. We determine the additional operating room (OR) time that is required, address surgical approach and regional variation, and determine whether there are operative or perioperative complications that might be attributed to the performance of salpingectomy alone or in addition to other procedures.

Materials and Methods

Database and requested parameters

This large retrospective cohort study was conducted with the use of data from the Canadian Institute of Health Information Discharge Abstract Database that captures demographic, administrative, and clinical information for all hospital discharges (inpatient and day surgeries) in Canada. Previous studies that validated the Discharge Abstract Database have reported a high degree of accuracy in the procedure codes and primary diagnosis codes.[29] Ethics approval was obtained from the University of British Columbia Clinical Research Ethics Board. All women who underwent any or any combination of salpingectomy, hysterectomy, oophorectomy, fimbriectomy, or tubal ligation in the Canadian province of BC from Jan. 1, 2008 (before campaign initiation), to Dec. 31, 2011 (after the campaign and most recent complete calendar year data that were available at the time of our request), were included in this study. Patients who were <15 years old and patients who were not coded as being of female sex were excluded. Canadian Classification for Health Intervention codes were used to identify patients who underwent the surgical procedures of interest. A diagnosis code, *International Classification of Diseases,* 10th edition (ICD-10)-CA Z30.2, indicated that the encounter was for sterilization purposes specifically. The Discharge Abstract Database provided information on operating time (time from first skin incision until completed skin closure), surgical approach (vaginal, laparoscopic, combined vaginal and laparoscopic, open), surgical indication, and length of hospital stay (LOS). Data were also gathered for patients who required blood transfusion and/or readmission to hospital, which reflected possible surgical complications. Parameters that were chosen for this study are of interest from an educational/knowledge translation perspective and were selected based on a provincial and cross-Canada survey of practicing gynecologists who identified concerns that were associated with the recommended change in surgical practice.[30,31] This study will inform which patient groups are appropriate candidates for the preventative surgery and which surgical practices are feasible across health authorities of varying resources. All statistical analyses were performed with Stata software (version 12; StataCorp, College Station, TX).

Procedural uptake

The rates of salpingectomy between 2008-2011, which include the number of hysterectomies that were performed with and without BS or salpingo-oophorectomy and the number of sterilizations that were performed with BS or tubal ligation, were examined as measures of the baseline rates for the surgical procedures before the 2010 educational campaign and the uptake of the recommended change in practice after the campaign. χ^2 analysis was