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Salpingectomy for the Primary Prevention of Ovarian Cancer
A Systematic Review

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IMPORTANCE Most ovarian cancers originate in the fimbriated end of the fallopian tube. This has led to the hypothesis that surgical resection of the fallopian tubes at the time of gynecologic and nongynecologic surgical procedures—referred to as an opportunistic salpingectomy—may prevent the development of epithelial ovarian cancer for women at an average risk of developing the disease.

OBJECTIVE To compile a comprehensive, state-of-the-science review examining the current landscape of performing bilateral salpingectomy for ovarian cancer prevention.

EVIDENCE REVIEW A systematic review of the literature was performed on March 4, 2022, to identify studies examining salpingectomy for ovarian cancer prevention. This review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) 2020 statement. Four databases were selected: PubMed via the National Library of Medicine's PubMed.gov, Embase via Elsevier's Embase.com, Cochrane Central Register of Controlled Trials (CENTRAL) via Wiley's Cochrane Library, and Northern Light Life Sciences Conference Abstracts via Ovid. A total of 20 gray literature sources, including 1 database, 2 registers, 1 repository, 1 index, 1 archive, 1 preprint server, 1 agency, and 12 organizations, were also searched.

FINDINGS The initial search produced 1089 results; a total of 158 publications were included in the final review. Salpingectomy has been associated with ovarian cancer risk reduction of approximately 80%. Studies have demonstrated that salpingectomy was safe, cost-effective, and was not associated with an earlier age of menopause onset. With widespread implementation, salpingectomy has the potential to reduce ovarian cancer mortality in the US by an estimated 15%. Both physician and patient awareness regarding the adnexa as the origin for most ovarian cancers, as well as the existence of salpingectomy and its potential benefits in reducing ovarian cancer risk, has increased during the past decade. Raising awareness and developing effective implementation strategies are essential.

CONCLUSIONS AND RELEVANCE The results of this systematic review suggest that bilateral salpingectomy for ovarian cancer prevention was safe and feasible and has the potential to be a cost-effective and cost-saving strategy across the population. Prospective studies to demonstrate long-term survival outcomes and feasibility in nongynecologic surgical procedures are warranted.

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Supplemental content

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Ovarian cancer is the most fatal gynecologic malignant neoplasm in the US. More than 19 000 women in the US received a diagnosis of ovarian cancer in 2022, and approximately 13 000 patients died of this disease.[1] Women commonly receive a diagnosis of ovarian cancer when it is at an advanced stage with metastatic disease, and for these women, the 5-year overall survival rate is less than 50%.[2] Early prevention strategies are essential for decreasing the risk and overall mortality of ovarian cancer.

Scientific evidence suggests that most ovarian cancers originate in the fimbriated end of the fallopian tube. Molecular studies have shown that the outer cells of the distal fallopian tube may transform into malignant cells and subsequently spread to the neighboring ovary.[3,4] These findings have led to the hypothesis that surgical resection of the fallopian tubes may prevent the development of epithelial ovarian cancer, giving rise to salpingectomy as a promising ovarian cancer prevention strategy (**Figure 1**).

Salpingectomy refers to the removal of the fallopian tubes, while leaving the ovaries intact, at the time of a gynecologic or nongynecologic intra-abdominal surgery. This systematic review presents the development, outcomes, barriers, and future directives of salpingectomy for ovarian cancer prevention.

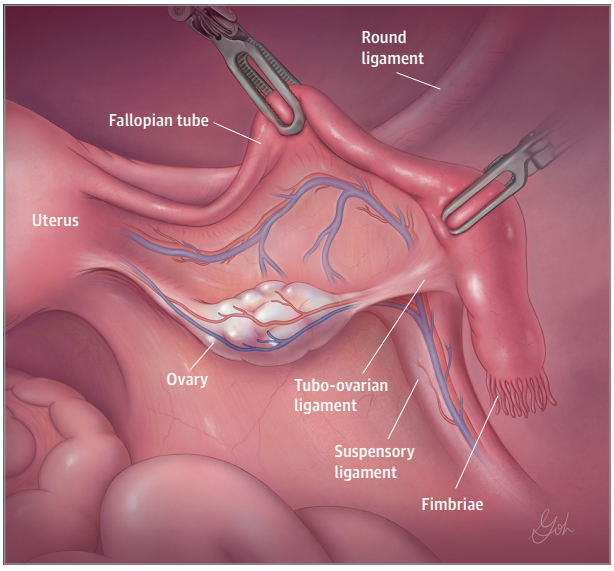
Key Points

Question What is the current landscape of performing bilateral salpingectomy for ovarian cancer prevention?

Findings This systematic review of 158 articles found that salpingectomy was associated with ovarian cancer risk reduction of approximately 80%; with widespread implementation, salpingectomy has the potential to reduce ovarian cancer mortality in the US by an estimated 15%. Raising awareness and developing effective implementation strategies are essential; prospective studies to demonstrate long-term survival outcomes and feasibility in nongynecologic surgical procedures are warranted.

Meaning This review suggests that bilateral salpingectomy for ovarian cancer prevention was safe and feasible and has the potential to be a cost-effective and cost-saving strategy across the population.

Figure 1. Fallopian Tube Lifted With Graspers Exposing the Tubo-Ovarian Ligament and Mesosalpinx With Its Vasculature



Scientific evidence supports the hypothesis that high-grade serous ovarian carcinoma arises from premalignant (serous tubal intraepithelial carcinoma) or malignant lesions originating in the fimbriated end of the fallopian tube instead of the ovary itself. The salpingectomy procedure requires transection of the tubo-ovarian ligament with excision of the mesosalpinx from the fimbriated end to the cornua of the uterus. Reproduced with permission from Gyyoung Oh, MA, Johns Hopkins University School of Medicine, Baltimore, Maryland.

Methods

We performed a systematic review of the literature on March 4, 2022, to identify studies examining salpingectomy for ovarian cancer prevention. This review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guideline and 2020 statement.[5] Four databases were selected: (1) PubMed via the National Library of Medicine's PubMed.gov, (2) Embase via Elsevier's Embase.com, (3) Cochrane Central Register of Controlled Trials via Wiley's Cochrane Library, and (4) Northern Light Life Sciences Conference Abstracts via Ovid. A research informationist (K.G.), in collaboration with the research team, developed the search strategy in PubMed using Medical Subject Headings (MeSH) and key words relevant to bilateral salpingectomy, opportunistic salpingectomy, and ovarian cancer. MeSH and key words were combined with the Boolean "AND" operator. A second research informationist performed a peer review of electronic search strategies, and edits were implemented.[6] The search strategy was then translated to the other databases using available filters and controlled vocabulary (eAppendix in the Supplement). Results were entered as RIS files in Covidence (Veritas Health Innovation Ltd), a web-based software platform for systematic review development, and duplicate records were removed.[7] In addition, 20 gray literature sources were searched, including 1 database, 2 registers, 1 repository, 1 index, 1 archive, 1 preprint server, 1 agency, and 12 organizations.

A total of 1089 results were identified; 345 duplicates were removed (319 by Covidence and 26 by hand), and the remaining 744 records were uploaded to Covidence. Each of the 744 records were screened independently by 2 authors (R.M.K. and S.G.), and 492 did not meet inclusion criteria of studies that discuss opportunistic salpingectomy and ovarian cancer. Next, 252 records were assessed for eligibility, of which 94 were excluded because they were deemed outside the scope of the review (ie, abstracts with no subsequent publication). Overall, 158 records were included in our final review (**Figure 2**; **Table 1**).

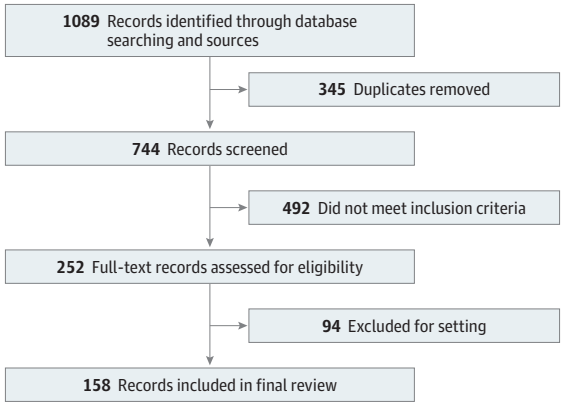
Results

Pathophysiologic Characteristics

Fallopian Tube Origin: Serous Tubal Intraepithelial Carcinoma

High-grade serous carcinoma (HGSC) of the ovary traditionally has been thought to derive from the ovarian surface epithelium or from inclusion cysts within the ovary. In 2001, a group of Dutch researchers first identified tubal intraepithelial carcinomas, which are now known as serous tubal intraepithelial carcinomas

Figure 2. PRISMA Diagram of Articles Included



(STICs).[8] The researchers found occult invasive HGSC in the fallopian tube, which closely resembled HGSC of the ovary, among women with a genetic predisposition to ovarian cancer; however, in their sample, HGSC was not present in the ovary. These findings led to the hypothesis that ovarian HGSC originates from implantation of malignant or premalignant cells from the fallopian tube.[9-11] Nearly 6 years after the initial reports of STIC lesions, Lee et al[12] published a sentinel study on p53 signatures, which are somatic *p53* suppressor gene mutations in these precursor lesions. Together, these findings suggest a pathogenesis characterized by DNA damage, *p53* mutation, and progressive loss of cell cycle control in benign tubal mucosa that can progress to malignant cells and spread to the ovary.[13-15]

Over the past 2 decades, numerous studies have established that STICs and small, early invasive tubal carcinomas are the precursor lesions of HGSC and can occur even among women who lack a genetic predisposition to ovarian cancer.[16] These carcinomas have been most frequently detected in the fimbria of the fallopian tube, with molecular changes beginning in the secretory-type cells. These developments in the understanding of the origins of epithelial ovarian cancers have heightened interest in salpingectomy as a primary prevention strategy for ovarian cancer.[17]

Treatment

Salpingectomy: Ovarian Function

Given that fallopian tubes derive their blood supply from branches of the uterine and ovarian arteries, it has been questioned whether their removal can alter the blood supply to ovarian tissues.[18] These concerns have led to numerous studies investigating the potential ovarian effects of salpingectomy for premenopausal women.

In 2017, Kotlyar et al[18] performed a review of 48 articles relevant to salpingectomy published from 1946 to 2016 and concluded that salpingectomy had no significant association with ovarian reserve across most findings. There were several conflicting studies included in the review, suggesting a slight impairment of the parameters of ovarian reserve; however, the conflicting studies mostly included patients who underwent salpingectomy for an ectopic pregnancy. In addition, salpingectomy did not appear to be significantly associated with ovarian stimulation parameters or pregnancy rates among patients who used assisted reproductive technology. In a 2017 population-based observational study in Canada, Venturella et al[19] found that the addition of bilateral salpingectomy at the time of laparoscopic hysterectomy did not alter ovarian age—as determined by follicle-stimulating hormone, anti–Müllerian hormone, antral follicle count, and ovarian vascular and flow index—in treated women up to 5 years after surgery.

Table 1. Summary of the Literature Included in the Final Review, by Topic and Reference Type

Reference type	No. (N = 158)	Range of years
Optional salpingectomy with obstetric or gynecologic surgery	130	2009-2022
Narrative review	23	2009-2020
Commentary	22	2012-2022
Survey	17	2012-2022
Retrospective cohort	16	2013-2022
Prospective cohort	11	2016-2022
Cost model	9	2015-2021
Cross-sectional	7	2013-2021
Retrospective case-control	6	2014-2019
Systematic review	6	2016-2020
Case report or series	3	2016-2020
Meta-analysis	3	2016-2020
Qualitative	3	2018-2021
Descriptive	3	2014-2018
Book chapter	1	2017
Optional salpingectomy with nongynecologic surgery	9	2016-2022
Survey	3	2016-2018
Cost model	2	2022
Case report or series	1	2020
Commentary	1	2018
Descriptive	1	2020
Prospective cohort	1	2020
Committee opinion	10	2015-2019
Clinical trial	9	2013-ongoing

Numerous clinical trials have investigated salpingectomy for ovarian cancer prevention (**Table 2**).[20-23] In 2018, Asgari et al[24] reported on a randomized clinical trial of 62 premenopausal women that compared surgical outcome and ovarian reserve after laparoscopic hysterectomy with vs without prophylactic bilateral salpingectomy. The authors concluded that the salpingectomy portion of the procedure did not have a negative association with ovarian reserve or increased surgical risk. In addition, studies over the past 5 years have demonstrated no significant association of ovarian function, quality of life, or sexuality with bilateral salpingectomy at the time of hysterectomy, myomectomy, and cesarean delivery.[23,25] Currently, Gelderblom et al[20] are conducting a multicenter, observational, noninferiority study (Stop Ovarian Cancer [STOPOVCA]) to determine age at menopause after salpingectomy via an annual questionnaire.

Salpingectomy at the Time of Gynecologic Surgery

Salpingectomy for ovarian cancer prevention at the time of gynecologic surgery, including salpingectomy at the time of hysterectomy for benign indications, as well as cesarean delivery, has been

Table 2. Clinical Trials Examining Salpingectomy for Ovarian Cancer Prevention

Clinical trial	Recruitment status	NCT No.	Date	
			First posted	Last update
Hysterectomy and Opportunistic Salpingectomy (HOPPSA)	Recruiting	NCT03045965	2/8/17	3/16/22
Stop Ovarian Cancer; Implementation of the Opportunistic Salpingectomy in the Netherlands (STOPOVCA)[20]	Enrolling by invitation	NCT04470921	7/14/20	11/14/22
Hysterectomy for Benign Gynaecological Conditions With or Without Tubectomy (HYSTUB)	Completed	NCT02281487	11/2/14	5/30/17
Impact of Opportunistic Salpingectomy on Ovarian Reserve in Patients Undergoing Laparoscopic Hysterectomy[21]	Completed	NCT01893086	7/8/13	1/28/16
Opportunistic Salpingectomy for Permanent Sterilization at the Time of Cesarean Delivery	Completed	NCT03135431	5/1/17	7/10/19
Standard Tubal Ligation vs Salpingectomy for Sterilization at the Time of Cesarean Delivery	Completed	NCT03028623	1/23/17	4/10/18
Prophylactic Salpingectomy for the Prevention of the Ovarian Cancer: Comparison Between Surgical Techniques (Rad_PBS)	Completed	NCT02086370	3/13/14	4/21/15
Salpingectomy at the Time of Elective Laparoscopic Cholecystectomy (SaLCHE)[22]	Completed	NCT03171467	5/31/17	4/17/18
Ovarian Reserve Following Bilateral Salpingectomy vs Tubal Ligation During Cesarean Section[23]	Unknown	NCT02377128	3/3/15	4/29/16

Abbreviation: NCT, National Clinical Trial.

rapidly adopted in the US.[26,27] Canada was the first country to routinely adopt salpingectomy at the time of benign gynecologic surgery. OVCARE, a group in British Columbia, found that after an educational initiative, salpingectomy for sterilization increased from 0.5% to 33% and salpingectomy with hysterectomy increased from 5% to 35%.[28] In the US, a nationwide study of inpatient and outpatient claims from 2010 to 2017 found a 17.8-fold (95% CI, 16.2-19.5) increase in salpingectomy for sterilization and a 7.6-fold (95% CI, 5.5-10.4) increase in salpingectomy with hysterectomy after the release of national guidelines.[29] A retrospective observational study of the National Inpatient Sample found that the rate of salpingectomy gradually increased from 2001 to 2010, from 2.4% to 5.7%; after 2010, the rate increased substantially, to 58.4% by 2015.[30] Smaller, single-institution studies have found similar increases in uptake of salpingectomy.[31,32]

Findings from a 2016 meta-analysis of 77 studies, which included 3509 patients who underwent salpingectomy and 5 655 702 controls, demonstrated a significant decrease in ovarian cancer incidence with salpingectomy (odds ratio, 0.51 [95% CI, 0.35-0.75]).[33] In 2022, a study of the British Columbia Cancer Registry by Hanley et al[31] followed up with 25 889 individuals who underwent salpingectomy and 32 080 individuals who underwent a control surgery (hysterectomy alone or tubal ligation) between 2008 and 2017. In the salpingectomy group, there were fewer than 5 cases of epithelial ovarian cancer and no cases of serous ovarian cancer, significantly fewer than the age-adjusted expected number of 9 cases and 5 cases, respectively. In the control group, there were 15 cases of serous ovarian cancer and 21 cases of epithelial ovarian cancer. These findings suggest that salpingectomy is associated with ovarian cancer risk reduction.

In addition to ovarian cancer risk, surgical outcomes such as operative time, blood loss, length of hospital stay, and perioperative complications do not appear to substantively increase with uptake of salpingectomy. In the 2014 OVCARE group study, there were no significant differences in the risk of hospital readmission or blood transfusions among women who underwent salpingectomy.[28] Compared with hysterectomy without salpingectomy, hysterectomy with salpingectomy required an additional 16 minutes of operative time ($P < .001$); salpingectomy for sterilization required an additional 10 minutes of operative time compared with tubal ligation ($P < .001$).

Several retrospective studies have reported no clinically significant differences in surgical outcomes among patients who underwent salpingectomy.[21,34-36] An analysis of perioperative outcomes for 49 275 patients in the 2 weeks after hospital discharge also found no increase in physician visits for surgical infections or complications, orders for laboratory tests or imaging, and filling a prescription for an antibiotic.[37] Individuals who underwent salpingectomy did have 20% increased odds for filling a prescription for an analgesic in the 2 weeks after discharge. Overall, salpingectomy does not appear to increase adverse outcomes among individuals at average risk.

Salpingectomy at the Time of Nongynecologic Surgery

Although salpingectomy at the time of gynecologic surgery for ovarian cancer risk reduction has been well accepted, salpingectomy uptake at the time of nongynecologic abdominal surgery has been slower. Gynecologic surgeons are comfortable with pelvic anatomy and routinely perform salpingectomy. Other surgeons, however, may be unaware of the procedure or lack the proper training to perform it. A 2017 survey of health professionals who may be involved in the care of women who undergo gynecologic or abdominal surgery, including general surgeons, found that 12 of 15 surgeons (80%) were unaware of the tubal origin of serous ovarian cancer.[38] Surgeons indicated a lack of confidence in discussing or offering salpingectomy for ovarian cancer prevention, and they expressed that written information for clinicians and patients would be helpful, along with teaching sessions or direct surgical training from a specialist.

One of the earliest studies investigating salpingectomy at the time of nongynecologic surgery was performed by Tomasch et al[22] in 2020. This study assessed whether salpingectomy for the reduction of ovarian cancer risk would be accepted and could be accomplished at the time of laparoscopic cholecystectomy. Women 45 years of age or older who were planning to undergo elective laparoscopic cholecystectomy received counseling on and were of-

fered salpingectomy. Overall, 105 patients were included from 5 different centers. General surgeons counseled and consented patients, as well as performed the salpingectomy for 79 patients (75%); 19 surgical procedures (18%) were performed by a gynecologist, and 7 surgical procedures (7%) were performed by both a gynecologist and a general surgeon. Salpingectomy was performed in 98 laparoscopic cholecystectomies (93%) among patients who consented to the procedure; opportunistic salpingectomy was not performed in the remaining 7 cases (7%) due to poor visibility or adhesions. The median additional operative time was 13 minutes (range, 4-45 minutes), and there were no complications associated with salpingectomy. This study showed that salpingectomy acceptance rates were high and that it could be performed at the time of elective nongynecologic surgery. Interestingly, 28 months after salpingectomy, 1 patient presented with ovarian cancer; reevaluation of the fallopian tube found focal STIC, which was previously undetected. The research presented here strongly suggests that salpingectomy at the time of nongynecologic surgery may have an immense impact because this potential strategy to reduce the risk of ovarian cancer can extend to a much larger population of women who undergo a variety of surgical procedures.

Cost-Effectiveness

Despite growing evidence on the utility and potential benefits associated with salpingectomy, there has been skepticism surrounding the potential population impact.[39,40] As a result, various population-based models have been developed to investigate the cost-effectiveness of salpingectomy for ovarian cancer prevention.

In 2015, Kwon et al[41] developed a Markov Monte Carlo model to conduct a cost-effectiveness analysis of salpingectomy. This study demonstrated that salpingectomy with hysterectomy is less costly than hysterectomy alone ($11 044 vs $11 206) or with bilateral salpingo-oophorectomy ($12 626). In 2017, Dilley et al[42] investigated 2 models to compare the cost-effectiveness of salpingectomy vs usual care. They demonstrated that salpingectomy was cost-saving and could yield $23.9 million in health care dollars saved. In addition, their simulation model demonstrated cost-effectiveness with salpingectomy at the time of hysterectomy in 62% of trials.[42] Since then, various studies have demonstrated that salpingectomy at the time of other surgical procedures is both a cost-effective and cost-saving strategy to prevent ovarian cancer in select women.[43-45] Most recently, Naumann et al[46] estimated that the total savings for universal salpingectomy could be as high as $445 million annually in the US.

A population statistics model including all patients who underwent cholecystectomy, ventral hernia repair, and gastric weight loss procedures at a single institution over a 3-year period found that 341 of 604 cases (57%) would potentially be eligible for salpingectomy.[47] Assuming a 1.7% baseline population risk of developing ovarian cancer and a 65% reduction in risk of ovarian cancer with a salpingectomy, up to 5394 cases of epithelial ovarian cancer could be eliminated per year in the US; this would represent a 39% reduction in the incidence of the disease.

Hughes et al[48] developed a recursive Markov model to examine the effects of salpingectomy among women older than 40 years of age using age-adjusted rates for appendectomy, cholecystectomy, hernia repair, and colon resection. Salpingectomy during elective nongynecologic surgery was associated with a reduction in ovarian cancer deaths by 7%. Considering the costs of caring for women with ovarian cancer and of new drug approvals for maintenance therapy, the health care cost savings of salpingectomy during gynecologic and nongynecologic surgery could be as high as $626 million annually in the US.

A 2022 cost-effectiveness analysis examined the utility and cost-effectiveness of salpingectomy when performed at the time of elective cholecystectomy.[49] Among 5000 women assigned to 3 age-based cohorts (40, 50, and 60 years of age), salpingectomy was associated with a reduction in the number of ovarian cancer cases by 39, 36, and 30, respectively, and the number of deaths by 12, 14, and 16, respectively. The incremental cost-effectiveness ratio demonstrated that salpingectomy during cholecystectomy was cost-effective because 91% or more of 1000 simulations were less than $100 000 per quality-adjusted life-year.

Public Perception

There is a growing need to evaluate both patient and physician knowledge, attitudes, and beliefs regarding salpingectomy to assist with individualized risk assessment and shared decision-making.[50] In 2013, Kamran et al[51] conducted one of the earliest survey-based studies to examine physician perceptions of salpingectomy for ovarian cancer prevention. The authors conducted an electronic survey among obstetricians and gynecologists who were working in Irish hospitals, and they identified more difficult surgery (44%) and irreversibility (36%) as the 2 primary concerns regarding the adoption of salpingectomy. In 2015, Kapurubandara et al[52] administered an anonymous online survey to 280 physician members of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG). Respondents indicated insufficient evidence to benefit patients (36%) and being unaware of recent evidence (33%) as the primary reasons for not offering salpingectomy at time of gynecologic surgery.

In 2016, studies of physicians in the UK and France demonstrated that 33% and 12% to 44%, respectively, were already performing salpingectomy at the time of gynecologic surgery.[53,54] In the US, surveys in 2013 and 2014 suggested that 60% of physicians counseled patients on salpingectomy at the time of hysterectomy, with approximately 54% performing the procedure at the time of hysterectomy and 7% performing the procedure for sterilization.[55,56] A 2017 study by Jones et al,[57] however, found that 75% of physicians reported performing salpingectomy at the time of hysterectomy and that more than 95% did so to decrease risk of ovarian cancer.

Patient-centered interviews and survey-based studies have demonstrated varying opinions surrounding salpingectomy. In 2015, Kang et al[58] surveyed 100 healthy volunteers to assess barriers to performing salpingectomy; 71% of respondents did not realize the seriousness of ovarian cancer, 79% were unaware of the theory that the fallopian tube is the origin of epithelial ovarian cancer, and 87% had never heard of salpingectomy as a preventive method for ovarian cancer. A 2020 study by Collins et al[59] found varying patient opinions of salpingectomy, and the decision to undergo salpingectomy at the time of hysterectomy was perceived to be dependent on the counseling gynecologist. Similar findings were demonstrated by Gelderblom et al[60] in 2021; the main barriers to implementing salpingectomy were lack of knowledge about the existence of the pro-

cedure (45%) and concerns about the removal of healthy organs (46%).

In a 2020 prospective cohort study of 54 women, Yassa and Pulatoğlu[61] found that the acceptance rate of salpingectomy at the time of cesarean delivery was 94% and that the acceptance rate of salpingectomy as an elective procedure among nonpregnant women was 75%. They found that the main factors associated with the preference for salpingectomy vs tubal ligation were ovarian cancer prevention and superior pregnancy prevention.

Disparities

Despite the increasing adoption of salpingectomy in the US, there have been criticisms of the literature regarding disparities across populations. It has been suggested that most of the previous studies have limited generalizability because they were restricted to inpatient settings, which is not representative of where most benign gynecologic surgical procedures are performed in the US.[62,63] In their 2021 population-based retrospective observational study, Mandelbaum et al[64] suggested possible salpingectomy disparities based on patient race and ethnicity. Their multivariable analysis demonstrated that patients who identified as Asian or Pacific Islander (hazard ratio [HR], 0.65 [95% CI, 0.64-0.66]), Black (HR, 0.74 [95% CI, 0.74-0.75]), Native American (HR, 0.86 [95% CI, 0.83-0.90]), and other race or ethnicity (HR, 0.78 [95% CI, 0.76-0.79]) were significantly less likely to undergo salpingectomy at the time of cesarean delivery compared with patients who identified as White. In addition, their analysis demonstrated a significantly higher risk of perioperative morbidity among patients who identified as Asian or Pacific Islander, Black, and Hispanic compared with White.

A 2022 study by Karia et al[65] used data from the Premier Healthcare Database from 2011 to 2018 to investigate racial and ethnic differences in salpingectomy uptake across inpatient and outpatient settings. Their findings demonstrated that salpingectomy adoption has not been equitable across racial and ethnic groups. Patients who identified as Hispanic, non-Hispanic Black, and non-Hispanic other race were less likely to undergo salpingectomy than patients who identified as non-Hispanic White. These disparities were present even after adjusting for sociodemographic, clinical, procedural, hospital, and clinician variables. The authors also analyzed trends after the societal and committee guidelines were published, and the racial and ethnic disparities persisted.

Committee Opinions

As more studies suggested an association between salpingectomy and a decreased risk of developing ovarian cancer, multiple national societies began to recommend consideration of salpingectomy for appropriately selected women. In 2010, the Society of Gynecologic Oncology of Canada became one of the first organizations to release a committee opinion or consensus statement on salpingectomy for the prevention of ovarian cancer, with the launch of a program promoting salpingectomy in British Columbia.[28,66] Subsequently, British Columbia saw an increase in the uptake of salpingectomy among women younger than 50 years, and it was ultimately concluded that this cancer prevention strategy was feasible and did not increase the risk of operative or perioperative complications.[28] Shortly thereafter, RANZCOG and the Royal College of Obstetricians and Gynaecologists in Great Britain released statements supporting salpingectomy for cancer prevention in 2012 and 2014, respectively.[66]

In the US, the Society of Gynecologic Oncology released their first clinical statement regarding salpingectomy for ovarian cancer prevention in 2013, stating: "Salpingectomy may be appropriate and feasible as a strategy for ovarian cancer risk reduction."[27] The American College of Obstetricians and Gynecologists released a Committee Opinion in 2015, which was updated in 2019 to include new information on the benefits associated with salpingectomy for cancer reduction and long-term follow-up of women after salpingectomy.[26] Also in 2015, the Austrian Society of Gynecology and Obstetricians[67] and Germany's Kommission Ovar of the AGO both began to recommend counseling for salpingectomy in appropriate women.[68]

By 2018, a systematic review by Ntoumanoglou-Schuiki et al[69] demonstrated that 13 International Federation of Gynecology and Obstetrics member societies representing 14 countries had statements regarding salpingectomy for ovarian cancer prevention; 9 were separate, stand-alone statements, most of which were in support of the consideration of salpingectomy for appropriate women.

Conclusions

This systematic review examined the origins and current landscape of salpingectomy for ovarian cancer prevention. Salpingectomy has been associated with an ovarian cancer risk reduction of approximately 80%.[49] Studies have also demonstrated that salpingectomy was safe, cost-effective, and was not associated with an earlier age of menopause onset.[25,28,41] With widespread implementation, salpingectomy has the potential to reduce ovarian cancer mortality in the US by an estimated 15%.[46] Physician and patient awareness regarding the adnexa as the origin for most ovarian cancers, and the existence of salpingectomy and its potential benefits in reducing ovarian cancer risk, have increased over the past decade. Raising awareness and developing effective implementation strategies are essential. In addition, the medical community should advance interventions and policies that promote racial and ethnic equity in salpingectomy uptake. Prospective studies to demonstrate long-term survival outcomes and feasibility of salpingectomy in nongynecologic surgical procedures are warranted.

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Concept and design: All authors.
Acquisition, analysis, or interpretation of data: Kahn, Gordhandas, Godwin, Stone, Worley, Long Roche.
Drafting of the manuscript: Kahn, Gordhandas, Godwin, Stone, Long Roche.
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