

How often are residual adnexal structures identified at surgery on a gynecologic oncology service after previous bilateral salpingo-oophorectomy?

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Summary

Objective: To determine how often adnexal remnants are found surgically after documented bilateral salpingo-oophorectomy. **Materials and Methods:** Retrospective chart review of all referrals to gynecologic oncology service. Patients undergoing surgery on the gynecologic oncology service after previous hysterectomy and bilateral salpingo-oophorectomy were analyzed. **Results:** Seventy-two patients met the inclusion criteria including having obtainable operative reports. Dysfunctional bleeding was the most common indication for the surgery involving bilateral salpingo-oophorectomy, while a suspicious pelvic mass was the most common indication for referral to the gynecologic oncology service. Twenty-nine patients (40.3%) were found to have residual ovarian tissue. Residual fallopian tube tissue was found in seven patients. No specific diagnosis was statistically more likely to lead to remnant tissue ($p = 0.7$). **Conclusion:** Although the majority of patients undergoing bilateral salpingo-oophorectomy had no residual ovarian or adnexal tissue, over 40% of patients were found to have residual ovarian tissue after a previous bilateral salpingo-oophorectomy.

Key words: Ovarian remnant; Bilateral salpingo-oophorectomy; Surgery.

Introduction

Ovarian remnant syndrome (ORS) is a condition occurring after a bilateral salpingo-oophorectomy in which residual ovarian tissue later causes pain or a pelvic mass. ORS differs from a residual ovarian syndrome, in which an ovary that is intentionally left in place causes pelvic pain at a later time [1]. ORS was first described by Shemwell and Weed in 1970, and it was found that the residual cortical tissue could remain hormonally responsive [2]. In many patients, pelvic pain is the most common symptom, although they may also present with other symptoms such as dyspareunia, pelvic mass, or vaginal bleeding [3]. Risk factors for incomplete removal of the ovary include conditions that cause increased adhesions in the pelvis, such as endometriosis, pelvic inflammatory disease, multiple previous surgeries, and pelvic adhesive disease [4]. Treatment of ORS is surgical removal of the remnant ovarian tissue.

In the past, ORS has been surgically treated via laparotomy, although laparoscopy and robotic surgery can also be used and have a lower rate of complications and shorter length of stay in the hospital [3].

While ORS is a condition which is symptomatic, allowing the discovery of remnant ovarian tissue, there is very little information about how often residual ovarian tissue occurs after a bilateral salpingo-oophorectomy [5]. One study demonstrated a rate of at least 22% after hysterectomy and bilateral salpingo-oophorectomy for endometrio-

sis; however, all of these patients had undergone surgery previously of ORS [6]. Also, there was no description of any standard procedure to look for adnexal tissue.

Ovarian cortical tissue can develop into epithelial ovarian carcinoma. Thus, although rare, residual ovary can cause problems beyond that of even ORS. The goal of this study was to determine the rate of residual ovarian cortical tissue after bilateral salpingo-oophorectomy in women undergoing surgery on a gynecologic oncology service for known or suspected gynecologic malignancy.

Materials and Methods

Data was collected on patients from 2003-2012 on an IRB approved study on all patients status post previous bilateral salpingo-oophorectomy who were referred to the gynecologic oncology team for evaluation for further surgery for malignancy or potential malignancy. Only patients undergoing surgery by the gynecologic oncology service were included. Patients with a previous vaginal approach to removing the ovaries were excluded. No patients with only pelvic pain as a symptom were included. To be considered, the operative report had to be obtained and had to document that both ovaries were removed. When possible pathology records were obtained and examined also. No patients were knowingly excluded. Data extracted (and made unidentifiable) included surgical reports, pathology reports, operative time, operative description, body mass index, estimated blood loss, transfusion rate, presence of co-morbidities, and complications were all collected from patient records. All pathology was reviewed by the gynecologic tumor board. In patients with a prior oophorectomy undergoing surgery for malig-

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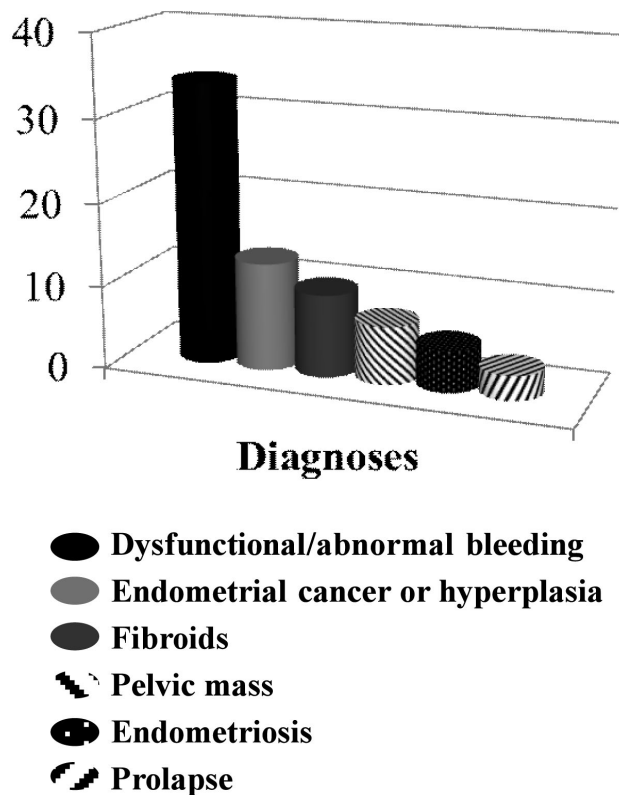


Figure 1. — Reasons for initial surgery.

nancy or suspected malignancy, the standard practice of the involved gynecologic oncology service is the removal of the residual distal infundibulopelvic pedicle to look for residual ovary and perform a high ligation [3]. Any identified mass or masses were excised for pathology.

Statistics were performed utilizing SPSS version 21, namely, Chi-square for categorical data, Wilcoxon-rank sum for non-normal data, and Student's *t*-test for continuous normal data.

Results

Seventy-two women were identified that were sent to the gynecologic oncology service after a documented bilateral salpingo-oophorectomy. Sixty-seven women had pathology reports confirming bilateral ovarian removal during the initial surgery. Indications for referral to the gynecologic oncology service were suspicious pelvic mass in 43 patients (59.7%), ovarian cancer found at time of hysterectomy in 14 patients (19.4%), endometrial cancer found at the time of hysterectomy in 12 (16.7%), and cervical cancer found at the time of hysterectomy in three patients (4.2%). There was no significant difference in the reason for referral and the rate of finding residual ovary (p value = 0.7).

All of these women underwent surgical exploration by the gynecologic oncology service. The mean age of patients evaluated was 52-years-old, with a range of 28-75-years-

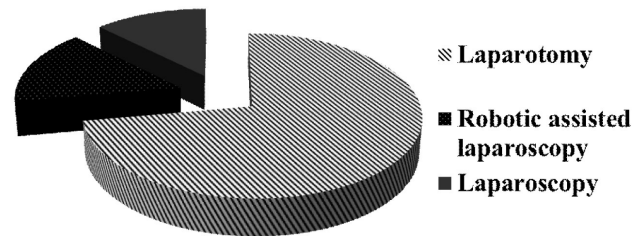


Figure 2. — Approach of initial surgery with bilateral salpingo-oophorectomy.

old. Indications for the initial surgery in which the ovaries were removed varied: dysfunctional uterine bleeding (34 patients), possible cancer or endometrial hyperplasia (13 patients), fibroids (ten patients), pelvic mass (seven patients), endometriosis (five patients), and prolapse (three patients) (Figure 1). There was no significant difference in ovarian remnants based on the indication for the primary surgery (p value = 0.09). Interestingly, several (five) of these patients had family history of ovarian cancer or known BRCA 1 or 2 deleterious mutation as a secondary indication. The initial surgical approach was laparotomy in 52 patients, robotic assisted laparoscopy in 11 patients, and laparoscopy in nine patients (Figure 2). There was no difference in the chance of residual ovarian tissue based on the surgical approach of the initial surgery (p value = 0.3).

Twenty-nine of 72 patients (40.3%) were found to have residual cortical ovarian tissue at the time of surgery. Seven patients (9.7%) were found to have residual fallopian tube after previous bilateral salpingo-oophorectomy. Five of these patients had residual fallopian tube tissue and ovary with two patients having just residual fallopian tube, giving 31 patients (43.1%) with residual adnexal structures (ovary(ies) and/or tube(s)). In two patients who had undergone previous hysterectomy with bilateral salpingo-oophorectomy and colon resection with permanent colostomy, the pelvic mass for which the patients were referred as a blind loop of residual colon.

Discussion

An ovarian remnant results from the unintentional incomplete removal of ovarian tissue at the time of unilateral or bilateral salpingo-oophorectomy. It is most commonly associated with conditions such as previous surgery, endometriosis, pelvic inflammatory disease, and others causing adhesions to surrounding tissues and structures. Another reason for occurrence of an ovarian remnant may be fear of damaging the ureter and then not adhering to surgical principles. By hugging the edge of the visible ovary, surgeons try to avoid the ureter rather than identifying the ureter, separating it from the ovarian vasculature and taking a more proximal portion of the ovarian vessels with the ovary as described in TeLinde's *Operative Gynecology* [7].

None of these patients were referred for the specific diagnosis of ORS. All were referred for known or suspicion of malignancy. Despite this fact, remnant cortical tissue was found in over 40% of the patients when the distal aspect of the remaining infundibulopelvic ligament was removed with a high ligation. So, if the patients were not symptomatic with ORS, is there significance in the findings of this study? The short answer is yes. Not only can remnant tissue cause pain and/or a mass, residual ovarian tissue places the patient at risk for development of malignancy just because the organ was not fully resected [3, 8]. This can be truly significant in women who have undergone a bilateral salpingo-oophorectomy for breast/ovarian syndrome family history or a germline BRCA 1/2 mutation, which several of these patients had. Patients are counseled that undergoing the prophylactic surgery decreases their risk of developing a malignancy, but if a remnant occurs frequently, how much is their risk decreased?

Recently, several authors, including Callahan *et al.* and Kurman *et al.*, have documented the relationship between ovarian cancer and the fallopian tube [9, 10]. This relationship may be especially significant in those women with BRCA 1/2 germline mutations [9]. So, the 9% of patients with residual fallopian tube fragments may also be a potentially significant finding.

Several biases exist in the current study. These are not randomly selected patients, each of the patients in this study either had a newly diagnosed gynecologic malignancy or suspected malignancy for which they were referred to the gynecologic oncology service. Also, mistakes can occur in dictation of operating reports. Furthermore, the presence of the newly diagnosed malignancy and/or adhesions may have made the surgery on the ovary and adnexa difficult. Because of these factors, the percentage of residual tissue may be higher than expected. Still, even if the percentage was cut in half, one out of five patients would have residual ovarian tissue after surgery. Although still high, a 20% rate would correspond closely with what has been previously reported [6].

Anatomically, it may not be possible to ever have an ovarian remnant. First, ovarian tissue which is devascularized is able to develop a blood supply to survive after implantation in the peritoneal cavity [11]. Second, even when high ligations are performed, it possible to have residual ovary above the level of ligation. This can happen because the ovary descends, just like the testis, from its embryonic rest. However, these two circumstances are not common and strict adherence to good surgical practice should min-

imize the chance of remnant cortical tissue and remnant fallopian tube [3, 12, 13]. Although remnant adnexal tissue may not be symptomatic, it is important to try and remove the entire adnexa if it is planned to avoid future symptoms and the uncommon, but devastating, development of a malignancy in the residual tissue.

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