Laparoscopic total fallopian tube removal at the time of bilateral salpingo-oophorectomy in BRCA2 positive women

J. Wabersich[1], G. Artioli[2], R. Giordano[3], F. De Lorenzi[3], G. Azzarello[2], F. Garbin[1]

[1]Department of Gynecologyand Obstetrics, Mirano; [2]Department of Medical Sciences, Oncology-Haematology, Mirano
[3]Department of Pathology, Mirano (Italy)

Summary

About 10% of all serous ovarian cancer has BRCA1 and/or BRCA2 mutations. Recent data showed that following the SEE FIM protocol it is possible to evidence more fimbriae cancers. Due to those studies, fallopian tube cancer in recent years has become the predominant site of cancer in BRCA1 and/or 2 mutation carriers. The pathological study of the fallopian tube is not complete during salpingo-oophorectomy because a small part (intramural site) is situated inside the uterus. In this case report we demonstrate how it is possible to remove the tubes entirely for pathological analysis without hysterectomy by laparoscopic surgery.

Key words: Fallopian tube carcinoma; BRCA; Laparoscopy.

Introduction

The lifetime risk of developing an ovarian cancer (OC) in BRCA positive women is 35-60% for BRCA1 and 10-27% in BRCA2 by the age of 70. Most of those OCs are situated in the tubes and account for approximately 0.5% of all gynecologic malignancies in the genaral population [1, 2]. Recently data show that 60% of gynecological cancers due to BRCA1 and/or BRCA2 mutations take origin from the distal part of the tubes and then spread to the ovaries and peritoneum.

Consequently, surgeons asked themselves how to remove all of the tubes because a small part of the fallopian tubes are inside the uterus (hostium). The part of the oviduct that crosses the uterine wall, the intramural segment, is 1-2 cm long and constitutes the uterine-tubal junction. This section extends through the wall of the uterus and the ostium opens within the uterine cavity. The wall of the oviduct has the same basic components as the wall of the uterus.

Although in this residual tissue where columnar cells can be found as in the distal part of the tubes, all these cells are at risk of developing a cancer because the BRCA mutation is present in all cells [3]. To the best of our knowledge there is no report in the literature of cancer at this site.

Since a surveillance program with transvaginal ultrasound (TVS), pelvic examination and CA125 serum is not able to reduce mortality and its efficacy is not proven [4], risk-reducing bilateral salpingo-oophorectomy (RRSO) seems to be the only way to reduce ovarian and fallopian tube cancer by up to 96% [5] and also breast cancer up to 50% [6].

In this case report we describe how to perfom a laparoscopic RRSO removing the entire fallopian tube without performing hysterectomy because the residual proximal tubal epithelium could be the site of tumor origin. The aim of the study was to assess the surgical results, complications and pathological findings of laparoscopic salpingo-oophorectomy without hysterectomy.

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Case Report

The case of 49-year-old premenopausal Caucasian women affected by BRCA2 mutation is presented. When she was 37 years old she underwent left lumpectomy and axilla node dissection for a lobular breast cancer, Stage pT1c N1a Mo (AJCC Staging System) with positive estrogen and progesterone receptors. She was treated with adjuvant chemotherapy and tamoxifen for five years and remains disease-free.

She undergoes breast surveillance annually with breast RMI, mammography and breast ultrasound (Health-Istitute protocol, Italy), CA125 serum dosage and TVS.

In October 2010 she underwent her annual TVS and a cyst with septum on her left ovary of 5 cm was found.

After a mutidisciplinary meeting with the patient and counselling on surgery treatment the patient agreed to undergo a modified RRSO.

Surgical technique

Usually during laparotomic RRSO the proceedings include the ligature of the fallopian tubes and the uteroovarian ligament, which are then dissected. In a second step the gynecologist performs a double sequence procedure and then section of the infundibulus. During laparoscopic surgery, the infundibulus and the uteroovarian ligament with the emergence of the fallopian tubes are dissected by diathermocoagulation.

Even during the standard surgical laparotomic procedure for RRSO, the uterine cornua is left behind the residual fallopian tubes. In this particular case we performed resection of both ovaries and fallopian tubes completely with the cyst after peritoneal washing. The fallopian tubes were resected until the intramural site dissectioning the uterine cavity where the ostium is situated (Figure 1).

The surgical specimens were placed in a large bag which was brought out through the intraabdominal incision with trocar clamps and scissors (Figure 2).

During the surgical procedure of this case anatomical isolation of both fallopian tubes was performed with section of the intramural site. The steps of the surgery procedures were:

1) isolation of the pelvic infundibulus prior to identification of ureter, as described by Crum *et al*.;

2) diathermocoagulation of the pelvic-infundibulum and uterus-ovarian ligament to reduce mesosalpinx vascular flow;

3) isolation and dissection of the mesosalpinx;

Fig. 1

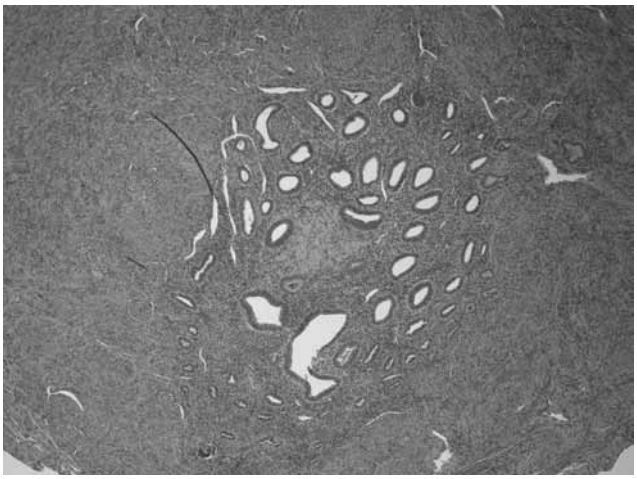

Fig. 2

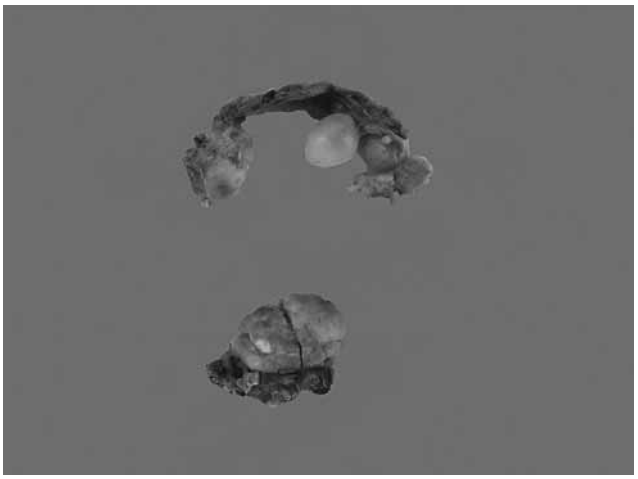

Fig. 3

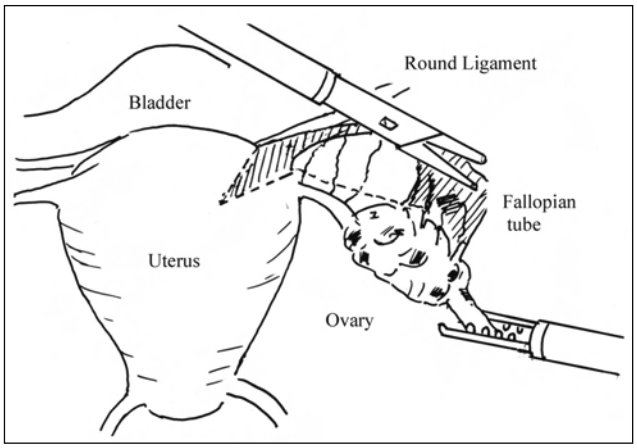

Figure 1. — Tube epithelium (H&E 50x).

Figure 2. — Tube and/ovary macroscopic image.

Figure 3. — Surgical tecnique for removal (tube and ovary).

4) removal of the total tube with the intramural portion by endobag;
5) pressure points;
6) removal of the ovaries (Figure 3).

Pathological findings

The sectioning and extensively examining the fimbria protocol was developed to ensure maximal examination of the fimbria by sectioning and extensively examining the fimbriated end. Recent reports indicate that the fimbria is the site for most tubal cancers irrespective of BRCA status [7-9]. In recent studies of ovarian and peritoneal serous carcinoma, approximately 50% had a plausible origin in the fimbria [10, 11].

Based on the hypothesis that the fimbriated end is unique and susceptible to tubal neoplasia [8-12] we analyzed the composition of the intramural fallopian tube to assess if it was composed of ciliated cells at the distal part.

The findings were: Peritoneal washing was negative. Fallopian tubes were both 8 cm length and the intramural portion was 1 cm in length. The cyst was a mucinous cystadenoma of the ovary.

The intramural tubal epithelium was not stratified and consisted of two cell types: ciliated cells with a nucleus placed centrally and secreting type with cubic-cylindrical cells The two cell types were equally represented.

The tissues from tubes to the uterus were defined by the presence of endometrial stroma and loss of tubal epithelium. Immunocytochemical assay was performed by p53 and Ki-67 tests and was negative.

Discussion

The literature about the origin of cancer in the fallopian tube in BRCA positive woman shows a greater frequency of early malignant lesions in the distal fallopian tube which can spread to the ovarian surface and peritoneum. The reason early cancer is often found in the fimbria is not yet clear. Some authors suggest that it may be due to the increased surface area of this site, or potential differences in characteristics of the cells from this region versus more proximal sections of the tube. Carlson *et al*. described 79% of endosalpingeal involvement [13]. Many literature reports describe fallopian tube cancer in the fimbria and in the midportion in BRCA women [14].

There have been no reported cases of tubal carcinoma occurring in the tubal remnant following RRSO. Whether this residual proximal tubal epithelium could be the site of tumor origin in the rare cases of primary peritoneal carcinoma that follow RRSO is unknown at this time [3].

The issue related to the residual fallopian tubes have induced some surgeons to perform hysterectomy as well at the time of surgery. Hysterectomy seems to simplify the use of tamoxifen in reducing the risk of breast cancer and its related increased risk of developing endometrial cancer [15, 16].

The role of hysterectomy is important in decision making, as well as the use afterwards of hormone

replacement therapy (HRT). Performing total abdominal hysterectomy (TAH) at the time of RRSO implicates the use of HRT with estrogen alone to reduce menopause symptoms [17].

However we have to consider that TAH at the time of RRSO adds some risk of slightly higher morbidity and prolonged time of hospitalization, and consequently costs. TAH does not seem to contribute to reducing the risk of serous ovarian carcinoma.

Consequently TAH at the time of RRSO still remains a controversial issue. TAH may simplify HRT for women who decide to take it, but its role in reducing ovarian/fallopian cancer risk by removing the small remnant of fallopian tubes left attached to the uterine wall is not clear yet [17, 18].

Some authors agree that TAH in women who underwent RRSO could be performed later.

However, in this particular patient we decided not to use HRT because of her previous history of hormone positive breast cancer [19].

Conclusion

Whether the residual intramural tubal epithelium could be the site of tumor origin in the rare cases of primary peritoneal carcinoma that follow RRSO is still unknown [5, 20, 21].

The optimal prophylactic surgical procedure for BRCA mutation carriers at this time is RRSO with or without hysterectomy. The reasons to perform hysterectomy at the time of surgery could be the use of tamoxifen to reduce breast cancer risk and the use of HRT without progesterone, but data suggests that the risk of carcinoma from residual tubal tissue following RRSO is the least compelling reason for hysterectomy [3]. Women who do not need to use tamoxifen and HRT maybe do not need to have hysterectomy performed. Laparoscopic RRSO modifified with the removal of the total fallopian tube could be a safety option with short hospitalization and with a favorable cosmetic outcome and minor cost. To answer the question whether the intramural site is the place where cancer originates after RRSO as published by Cass *et al*. [3], we should be familiar with its anatomopathology, and this surgical technique could be a way to study it.

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Address reprint requests to:
G. ARTIOLI, M.D.
Department of Medical Science
Oncology-Haematology
Via L. Mariutto, 78
30035 Mirano-VE (Italy)
e-mail: grazia.artioli@yahoo.it