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REVIEW

Current Updates on Salpingectomy for the Prevention of Ovarian Cancer and Its Practice Patterns Worldwide

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Abstract A paradigm shift of the origin of ovarian cancer to fallopian tube has brought more focus on bilateral salpingectomy as a preventive method for ovarian cancer. Bilateral salpingectomy has shown a dramatic reduction in the risk of ovarian cancer. Bilateral salpingo-oophorectomy has been a long-used practice to prevent ovarian cancer, but it brings surgical menopause and an increased mortality rate to women undergoing such a surgery at the age of <47.5. With the prophylactic bilateral salpingectomy, however, the ovarian function remains unaltered. Recent studies have shown that prophylactic salpingectomy was helpful not only in preventing high-grade serous type ovarian cancer, but also in decreasing adnexal pathologies. With the publication of committee opinion, more practitioners have accepted this proposal, but some are more concerned about its disadvantages. This review illustrates the latest updates on salpingectomy as a preventive method for ovarian cancer, including its advantages and disadvantages, clinicians' opinions, public opinions, so as to find out Obstetricians' and Gynecologists' practice pattern related to opportunistic salpingectomy worldwide.

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OVARIAN cancer is the fifth leading cancer in women and of all gynecological neoplasms, and it has the highest mortality rate.[1] In the USA, it is estimated that 22 280 new cases will be diagnosed with ovarian cancer in 2016 and 14 240 deaths are expected.[2]

In an annual screening with CA125 and trans-vaginal ultrasound in 35 000 women among which, 70% of screen-detected ovarian cancer women were reported with an advanced stage of disease.[3] The aggressiveness of this disease is a matter of concern for its early detection, treatment and prevention. The risk of ovarian cancer increases in women who have ovulated more over their lifetime, like those who never have children, whose ovulation started at a younger age, who reached menopause late, and those with a family history of ovarian cancer and being breast cancer mutation (BRCA) carriers. It was found that the use of oral contraceptive pills lowered the risk of ovarian cancer with *OR*=0.70 (95%*CI* 0.52-0.94) in hospital studies and *OR*=0.66 (95%*CI* 0.55-0.78) in population studies.[4] The presence of serous intraepithelial neoplasm in the fallopian tube in women with BRCA1 and BRCA2 mutations who had undergone bilateral salpingo-oophorectomy (BSO) has brought more curiosity to researchers. Due to the site of tumor being the ovary, fallopian tubes were always neglected. After the lesion was discovered in women with heredity predisposition, various studies started emerging stating about the cells origin of ovarian cancer shifting from the ovary to the fallopian tube.[5-6] Since the focus was taken on the fallopian tube, a few clinicians started conducting bilateral salpingectomy in women undergoing hysterectomy for benign causes, and even in women with genetic mutation who deny for BSO, and this resulted in significant decrease in ovarian cancer. Bilateral salpingectomy, unlike BSO, does not hamper the quality of life. Ovarian blood supply and ovarian function remain unaltered if the surgery is performed cautiously. Clinicians still hesitate to discuss with patients about the benefit of bilateral salpingectomy. And many clinicians are still unaware about the new cancer pathogenesis and the risk reducing strategy.

Our objective of this study is to review the latest studies done on salpingectomy as a preventive method for ovarian cancer, including the advantages and disadvantages, latest clinician opinions, public opinions on this matter, and to find out Obstetricians' and Gynecologists' practice patterns related to opportunistic salpingectomy worldwide.

THE ORIGIN OF OVARIAN CANCER, IS IT THE FALLOPIAN TUBE?

The origin and pathogenesis of ovarian cancer are poorly understood. Evidence from different research hints that the origin of ovarian cancer is from the fallopian tube rather than the ovary. According to the dualistic model of carcinogenesis, epithelial ovarian cancer has been divided into two categories: type I and type Ⅱ. Type Ⅰ tumors include low-grade serous, low-grade endometrioid, clear cell, and mucinous carcinomas; whereas type Ⅱ tumors consist of high-grade serous carcinomas, high-grade endometrioid carcinomas, malignant mixed mesodermal tumors, and undifferentiated carcinomas. Type Ⅰ tumors are genetically stable and undergo KRAS, BRAF, PTEN, PIK3CA, CTNNB1, ARID1A and PPP2RIA mutations, but rarely TP53 mutation; Type Ⅱ tumors are mainly high grade serous carcinoma (HGSC), highly unstable, and undergo TP53 mutation. BRCA inactivation occurs in up to 40%-50% of HGCS, but it has not been reported in type Ⅰ tumors.[7] It has been proposed that low-grade and high-grade serous tumors arise from the implantation of the epithelium from the fallopian tube but not the ovary. During ovulation, fimbria comes close in contact with ovary, and tubal epithelial cells are implanted on the disrupted ovarian surface and thus to form cortical inclusion cysts.[6] Endometrioid and clear cell tumors are associated with endometrial tissue implanted in the ovary *via* retrograde menstruation.[8] Mucinous and transitional tumors are said to arise from the transitional-type epithelium nests at tubal-epithelial junction.[5-6]

HGSC is the most common subtype of ovarian cancer, and we will be discussing in detail about its fallopian origin. Firstly, the gene expression of HGSC is closely related to fallopian tube rather than ovarian epithelial surface. Immunohistochemical study showed that HGSC expressed PAX8, a müllerian marker, but not calretinin, a mesothelium marker,[6] whereas ovarian surface epithelium is mesothelium in origin. HGSC shows TP53 mutation, and normal fallopian tubes also show TP53 signatures with TP53 mutation occasionally occurring.[6] Secondly, serous tubal intraepithelial carcinoma (STIC) was identified in a specimen of women with hereditary predisposition to ovarian cancer.[9] Previously fallopian tube was not carefully examined in ovarian cancer patients, so lesions in the fallopian tube were missed. After careful examination, it was found that STICs were even seen in 50%-60% of women without known BRCA mutation.[10-11] Concomitant presence of TP53 mutation in women with STIC and HGSC made it clear that HGSC might have arisen from the fallopian tube but not