Aim: A questionnaire survey was conducted to establish whether opportunistic salpingectomy has been performed at cesarean delivery or is intended in the future and also to clarify the steps taken to achieve the goal of performing opportunistic salpingectomy at cesarean delivery in Japan.

Methods: We distributed anonymous questionnaires on opportunistic salpingectomy at cesarean delivery to registered physicians of the Maternal Fetal Intensive Care Unit Liaison Council of Japan using a mailing list in 2019. Answer sheets were returned by fax with an unscripted name.

Results: Valid responses were obtained from 68 physicians; 28% (n = 19/68) performed opportunistic salpingectomy at cesarean delivery, while 16% (n = 8/49) hoped to conduct opportunistic salpingectomy in the future. Most of the physicians performing opportunistic salpingectomy (74%: n = 14/19) had conducted salpingectomy as one of the permanent surgical contraception procedures provided for by law without the approval of an Ethics Committee.

Conclusions: Opportunistic salpingectomy at cesarean delivery to reduce the risk of ovarian, fallopian tube, and peritoneal carcinoma in patients at average risk has not yet been widely practiced in Japan. Approximately 25% of physicians have performed opportunistic salpingectomy, 75% of whom conducted this procedure instead of tubal ligation for pregnant women who requested sterilization at cesarean delivery.

Introduction

Since salpingectomy in benign gynecologic surgery has demonstrated efficacy at reducing the risk of ovarian cancer, opportunistic salpingectomy is now being performed at the time of total hysterectomy in the USA; the rate of opportunistic salpingectomy at hysterectomy increased from 14.7% in 2011 to 72.7% in 2014. Recent studies in Obstetrics confirmed that salpingectomy at cesarean delivery is superior to tubal ligation as sterilization for reducing the risk of ovarian cancer and is also more cost-effective. To the best of our knowledge, the frequency at which opportunistic salpingectomy is performed, how many physicians hope to conduct this procedure at cesarean delivery, and the steps taken to achieve the goal of performing opportunistic salpingectomy at cesarean delivery currently remain unknown in Japan. Therefore, we herein conducted a questionnaire survey to be completed by registered physicians of the Maternal Fetal Intensive Care Unit (MFICU) Liaison Council in Japan.

Methods

We distributed anonymous self-administered questionnaires to 236 registered physicians of the MFICU Liaison Council in Japan at 164 facilities using a mailing list between June 25, 2019 and July 31, 2019. In 56 out of 164 facilities, several physicians from one facility were on the mailing list. Answer sheets were returned
to Jichi Medical University by fax without the names of physician and facility. Therefore, the duplicate decisions from each facility could not be excluded in present study. The present study was performed without approval by our Institutional Ethics Committee because this questionnaire was not covered by the Japanese ethical guidelines for medical and health research involving human subjects, was anonymous, and was research that did not involve the handling of sensitive personal information. It was clearly stated in the request statement for the questionnaire that “Consent to this research will be agreed by responding to the questionnaire and sending the answer sheets to our institute by fax”.

The first question was on the type of facility of the responders (general perinatal medical centers, regional perinatal centers, and facilities without a perinatal medical center), and was followed by three key questions:

Question 1: Do you perform opportunistic salpingectomy at cesarean delivery to reduce the risk of ovarian cancer?
Answer: 1. Yes, 2. No.

Question 2: If you have not performed opportunistic salpingectomy at cesarean delivery yet, do you hope to conduct this procedure at cesarean delivery to reduce the risk of ovarian cancer?
Answer: 1. Yes, 2. No, 3. Answer pending.

Question 3: If you have already performed opportunistic salpingectomy at cesarean delivery, what steps did you take to achieve the goal of conducting this procedure at cesarean delivery?
Answer: 1. “Performed salpingectomy at cesarean delivery at own expense after receiving approval from the Ethics Committee for clinical practice”, 2. “Performed salpingectomy at cesarean delivery with no additional costs after receiving approval from the Ethics Committee for clinical practice”, 3. “Performed salpingectomy at cesarean delivery as clinical research after receiving approval from the Institutional Review Board”, 4. Others (free writing).

Data were shown as numbers (percentages). In the present study, statistical analyses were not performed among groups. Data were processed using EZR (R version 3.4.1).

**Results**

Responses were received from 69 (29.2%) out of 236 registered physicians of the MFICU Liaison Council in Japan. After the exclusion of one answer sheet due to insufficient responses, information from the remaining 68 answer sheets was summarized. The distribution of facilities was as follows: the numbers (percentages) of general perinatal medical centers, regional perinatal centers, and facilities without a perinatal medical center were 48 (71%), 19 (28%), and 1 (1.5%), respectively.

Nineteen physicians (28%) answered “Yes” to Question 1, whereas 49 (72%) answered “No”; therefore, only 25% had performed opportunistic salpingectomy at cesarean delivery (Figure 1).

Among the 49 physicians who had not yet performed opportunistic salpingectomy at cesarean delivery, 8 (16%) answered “Yes” to Question 2, 19 (39%) “No”, and 21 (43%) “Answer pending”, while one physician did not respond (Figure 2). Therefore, one-sixth of physicians who did not perform opportunistic salpingectomy at cesarean delivery appeared to want to conduct this procedure.

![Figure 1. Answers to Question 1: “Do you perform opportunistic salpingectomy at cesarean delivery to reduce the risk of ovarian cancer?”](image1)

![Figure 2. Answers to Question 2: “If you have not performed opportunistic salpingectomy at cesarean delivery yet, do you hope to conduct this procedure at cesarean delivery to reduce the risk of ovarian cancer?”](image2)
procedure in the future, while nearly half appeared to be hesitant about performing opportunistic salpingectomy.

Among the 19 physicians who had already performed opportunistic salpingectomy at cesarean delivery, 14 (74%) answered “Infertility treatment”, whereas 2 (11%), 2 (11%), 0 (0%), and 1 (5%) answered “Own expense through the Ethics Committee”, “Free through the Ethics Committee”, “Clinical research”, and others, respectively (Figure 3). Therefore, most cases of opportunistic salpingectomy at cesarean delivery in Japan were performed as legal salpingectomy for sterilization without the approval of an Ethics Committee.

Discussion

Opportunistic salpingectomy at cesarean delivery to reduce the risk of ovarian, fallopian tube, and peritoneal carcinoma in patients at average risk has not yet been widely practiced in Japan. In the present study, approximately 25% of physicians have performed opportunistic salpingectomy, 75% of whom conducted this procedure instead of tubal ligation for pregnant women who requested sterilization at cesarean delivery.

Based on the survey results, the frequency of supporters for opportunistic salpingectomy at cesarean delivery appears to be approximately 40% in Japan. Recent studies confirmed that salpingectomy at cesarean delivery was superior to tubal ligation for reducing the risk of ovarian cancer.3–5 In a case-control study from Denmark that targeted cases of epithelial ovarian cancer (n = 13,241) and controls (n = 194,689), salpingectomy and tubal ligation reduced the risk of ovarian cancer (for salpingectomy: odds ratios [OR] and 95% confidence interval [CI], 0.58 [0.36–0.95]; for tubal ligation: OR and 95% CI, 0.87 [0.78–0.98]), suggesting the superiority of salpingectomy to tubal ligation.3 Subramaniam et al. estimated that salpingectomy at cesarean delivery reduced the incidence of ovarian cancer and number of deaths from ovarian cancer per 10,000 people by 17 and 13 per year, respectively, from those with tubal ligation.5 Furthermore, salpingectomy was more cost-effective than tubal ligation.5,1 Three randomized controlled studies reported no significant differences in complications (e.g., the amount of bleeding, the number of blood transfusions, surgical site infection, length of hospital stay, and the ICU admission rate) between salpingectomy and tubal ligation; however, the total operation time of the former was slightly longer.6–8

One of the reasons why opportunistic salpingectomy at cesarean delivery has not been widely performed in Japan is the ease of the tubal ligation procedure. It may be relatively easy to perform salpingectomy in facilities that routinely perform gynecological surgeries, whereas it may be difficult in facilities that only conduct obstetrics. Another reason is the effects of opportunistic salpingectomy and tubal ligation at cesarean delivery on the risk of ovarian cancer have not yet been examined in Japan. Furthermore, there are currently no guidelines in Obstetrics or Gynecology in Japan that recommend opportunistic salpingectomy at cesarean delivery. None of the responders to our questionnaire provided answers to “What steps did you take to achieve the goal of conducting this procedure at cesarean delivery?” Our survey is the first to reveal real-world practices for opportunistic
salpingectomy at cesarean delivery in Japan. The results obtained showed that opportunistic salpingectomy has already been performed in approximately 20% of institutes as a permanent surgical contraception procedure provided for by law, instead of tubal ligation, without receiving approval from an Ethics Committee.

Risk-reducing salpingo-oophorectomy for patients with hereditary breast and ovarian cancer (HBOC) syndrome is now being covered by the national health insurance system in Japan to reduce the risk of ovarian cancer in the field of gynecology. However, there is currently no sufficient consensus to actively perform salpingectomy solely to reduce the risk of ovarian cancer in pregnant patients who do not have HBOC syndrome. It may be a treatment that goes beyond the scope of current Japanese clinical practices. Since salpingectomy is listed as one of the permanent surgical contraception procedures provided for by law, it has been performed by most of the physicians who responded to the questionnaire. The ACOG Committee Opinion recommends that the risks and benefits of opportunistic salpingectomy as a strategy to prevent epithelial ovarian cancer need to be discussed with patients who request permanent sterilization. In current Japanese clinical practices, pregnant patients desiring sterilization at cesarean delivery may request a permanent surgical contraception procedure, either salpingectomy or conventional tubal ligation, after sufficient informed consent about their risks and benefits.

As limitations of the present study, responses to the questionnaire were only obtained from 29.2% of registered physicians of the MFICU Liaison Council, and may have duplicate decisions from each facility because several physicians from one facility were on the mailing list. Therefore, the true percentage of responses may be lower. Furthermore, the questionnaire survey was not completed by physicians who belong to other obstetrics and gynecology societies. Hence, the results obtained may not accurately reflect current Japanese practices.

In conclusion, approximately 25% of physicians have performed opportunistic salpingectomy, 75% of whom have conducted salpingectomy instead of tubal ligation for pregnant women who requested sterilization at cesarean delivery. However, this procedure may become more widespread once the inhibitory effects of opportunistic salpingectomy instead of tubal ligation at cesarean delivery on the occurrence of ovarian cancer are clarified in on-going observational studies. In current Japanese clinical practices, it may be appropriate for pregnant patients desiring sterilization to select salpingectomy or tubal ligation with sufficient informed consent about their risks and benefits.

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**Conflict of interest**

The authors declare no competing interests.

**Informed consent for reporting**

Obtained.

**References**

1. Falconer H, Yin L, Grönberg H, Altman D. Ovarian cancer risk after salpingectomy: a nationwide population-based study. J Natl Cancer Inst. 2015; 107: dju410.
2. Garcia C, Martin M, Tucker LY, et al. Experience with opportunistic salpingectomy in a large, community-based health system in the United States. Obstet Gynecol. 2016; 128: 277–283.
3. Madsen C, Baandrup L, Dehendorff C, Kjaer SK. Tubal ligation and salpingectomy and the risk of epithelial ovarian cancer and borderline ovarian tumors: a nationwide case-control study. Acta Obstet Gynecol Scand. 2015; 94: 86–94.
4. Venkatesh KK, Clark LH, Stamilio DM. Cost-effectiveness of opportunistic salpingectomy vs tubal ligation at the time of cesarean delivery. Am J Obstet Gynecol. 2019; 220: 106.e1–10.
5. Subramaniam A, Einerson BD, Blanchard CT, et al. The cost-effectiveness of opportunistic salpingectomy versus standard tubal ligation at the time of cesarean delivery for ovarian cancer risk reduction. Gynecol Oncol. 2019; 152: 127–132.
6. Subramaniam A, Blanchard CT, Erickson BK, et al. Feasibility of complete salpingectomy compared with standard postpartum tubal ligation at cesarean delivery: a randomized controlled trial. Obstet Gynecol. 2018; 132: 20–27.
7. Herman HG, Gluck O, Keidar R, et al. Ovarian reserve following cesarean section with salpingectomy vs tubal ligation: a randomized trial. Am J Obstet Gynecol 2017; 217: 472.e1–6.
8. Garcia C, Moskowitz OM, Chisholm CA, et al. Salpingectomy compared with tubal ligation at cesarean delivery: a randomized controlled trial. Obstet Gynecol. 2018; 132: 29–34.
9. ACOG committee opinion No.774: Opportunistic salpingectomy as a strategy for epithelial ovarian cancer prevention. Obstet Gynecol. 2019; 133: e279–284.