Available online at
www.heca-analitika.com/ijcr

Indonesian Journal of Case Reports

Vol. 3, No. 1, 2025

Hope After Cancer: Pregnancy Outcomes Following Fertility-Sparing Surgery – A Case Report

Richardo Marpaung [1], Ferry Armanza [2], Hariadi Yuseran [2], Setyo Teguh Waluyo [2] and Yosef Dwi Cahyadi Salan [3]

[1] Residency Program, Department of Obstetrics and Gynecology, Ulin General Hospital, Medical Faculty – Universitas Lambung Mangkurat, Banjarmasin, Indonesia; richardomarpaung2@gmail.com (R.M.)
[2] Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Ulin General Hospital, Medical Faculty – Universitas Lambung Mangkurat, Banjarmasin, Indonesia; f.armanza@gmail.com (F.A.); hariadiyuseran@yahoo.com (H.Y.); setyoteguhw@gmail.com (S.T.W.)
[3] Department of Obstetrics and Gynecology, Ulin General Hospital, Medical Faculty – Universitas Lambung Mangkurat, Banjarmasin, Indonesia; salanyosef@gmail.com (Y.D.C.S.)

* Correspondence: richardomarpaung2@gmail.com

Article History

Received 15 January 2025
Revised 29 March 2025
Accepted 8 April 2025
Available Online 4 June 2025

Keywords:
Ovarian cancer
Incomplete surgical staging
Successful pregnancy

Abstract

Pregnancy after diagnosis of ovarian cancer is a rare event. Ovarian Cancer is associated with difficulty in achieving pregnancy. Little is known about the mechanism of this condition due to limited literature and studies. In this paper, the authors report a rare case of successful pregnancy in a patient with ovarian cancer. Patient initially diagnosed with cystadenocarcinoma mucinous of the ovary, two years prior to pregnancy, and later diagnosed with suspected ovarian cancer in the third trimester. The patient was then treated with optimal debulking surgery and cesarean section at 35 weeks of pregnancy. The patient delivered a healthy baby girl. Debulking surgery was carried out, and the patient was scheduled for chemotherapy. The findings from this case conclude that patients with ovarian cancer who receive conservative surgical treatment could have successful pregnancy outcomes. The quality of the patient's life should be a priority, and follow-up for further treatment is essential.

1. Introduction

In recent years, women are increasingly postponing childbirth to later in life [1, 2]. Early-stage ovarian cancer refers to cancer that is limited to one or both ovaries and corresponds to Stage I A or B according to the International Federation of Gynecology and Obstetrics (FIGO), a global organization that provides standardized cancer staging guidelines [3]. As fertility preservation becomes increasingly important, many young women diagnosed at an early stage are seeking options to maintain their reproductive potential [4]. These patients are, in some cases, identified at an early stage of disease and could potentially receive a conservative surgical treatment, with the preservation of the uterus and the contralateral ovary.

Fertility and hormone preservation are key quality of life (QoL) considerations for premenopausal patients diagnosed with ovarian cancer [5]. Nonetheless, many surgeons hesitate to pursue conservative approaches due to concerns about the potential for undetected microscopic cancer remaining in the retained ovary.

For early-stage epithelial ovarian cancer (EOC), the standard surgical treatment has traditionally been total

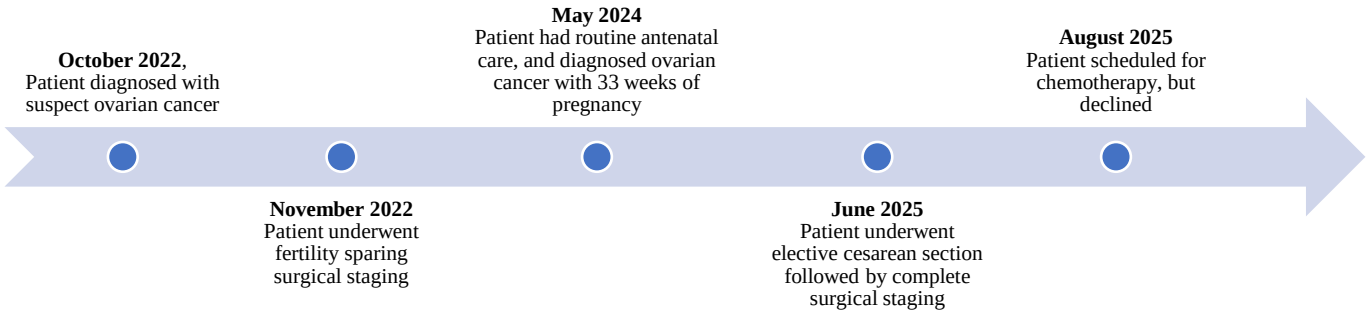

Figure 1. Timeline of the case report.

hysterectomy, bilateral salpingo-oophorectomy (BSO), plus peritoneal and lymph-node sampling [6]. While definitive evidence is still lacking, a growing body of research supports the safety of fertility-sparing surgery (FSS) in young women diagnosed with early-stage ovarian cancer [7–9]. Ditto et al. suggest that FSS upholds the oncologic effectiveness of radical–comprehensive surgical staging, preserving reproductive and endocrine functions [10]. However, there is still no clear consensus on the selection criteria for FSS. The medical literature presents a broad spectrum of restrictive criteria across various studies. While most research supports the safety of FSS in patients with well-differentiated tumors confined to the ovaries, only a limited number of studies have assessed its effectiveness in cases of poorly differentiated EOC [11, 12]. Ratanasrithong and Benjapibal showed that selected patients with early-stage ovarian cancer who underwent conservative surgery along with suitable adjuvant chemotherapy were able to achieve favorable pregnancy outcomes, reporting a 51.7% pregnancy rate among those who attempted to conceive [4].

Ovarian cancer limited to the ovaries (FIGO Stage I) is potentially curable in up to 90% of cases, while cancer confined to the pelvis (Stage II) is associated with a five-year survival rate of approximately 70%. In contrast, once the disease has spread beyond the pelvis (Stages III–IV), long-term survival drops significantly, with rates of 20% or lower [13]. In this report, we aimed to present our experience in managing a case of a pregnant patient who previously underwent conservative surgical staging for ovarian cancer, became pregnant, and was then diagnosed with ovarian cancer; we also review the related literature.

2. Cases

We present the case of a 30-year-old woman, in her third pregnancy, with two previous deliveries and no history of miscarriage, who was referred to the antenatal clinic at Ulin General Hospital, Banjarmasin. The timeline of this case is illustrated in Figure 1. A routine ultrasound examination at 35 weeks revealed a single fetus consistent with 35 weeks of gestation, along with a unilateral, multilocular-solid cystic adnexal mass in the left ovary, measuring over 16 cm in maximum diameter (Figure 2). Color Doppler imaging revealed that the mass was vascular. Ascites was also present. Both the kidneys and liver appeared normal. The patient had no significant medical history and no known family history of endometrial, ovarian, colorectal, or breast cancer. The result of the biological markers was elevated, suggestive of malignancy, with cancer antigen 125 (CA-125) value 395,39 IU/ml (reference range: < 10 IU/ml). The patient was diagnosed with Stage IB Ovarian Cancer 2 years prior. Under consideration of early-stage ovarian cancer in young patients, and the patient's demand to preserve fertility function, the patient underwent conservative surgical staging with the risk of leaving microscopic cancer cells. The Histopathology Result shows, “Cystadenocarcinoma Mucinous Ovary.” The patient was initially scheduled for chemotherapy to reduce the risk of cancer recurrence, but she declined chemotherapy treatment because her house was located far from the hospital, and she was short of money. The patient also stopped attending appointments (loss to follow up) and didn’t have antenatal care until 32-33 weeks.

Multidisciplinary counseling was used: the patient and family were informed about surgical operations at 35 weeks, the possible outcomes of laparotomy, the maternal and fetal risks, and the possibility of chemotherapy treatment after delivery. The patient was referred at 35 weeks; chemotherapy wasn’t given because pregnancy termination was due. Up until the admission, pregnancy went smoothly: obstetric ultrasounds confirmed normal fetal growth and development. At 35 weeks, the fetus is considered viable, with an estimated fetal weight of 2,200 g, and fetal lung maturity has been achieved. Thus, a cesarean section followed by optimal debulking surgery was performed to prevent further cancer progression. The patient, the baby (female, 2,300 g), was born alive, with no congenital

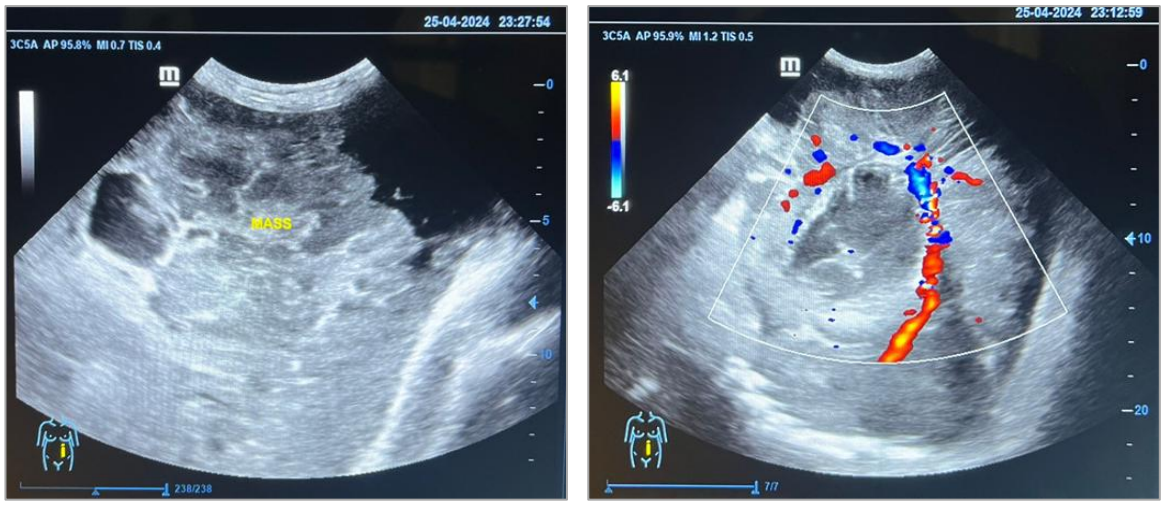

Figure 2. Ultrasound image of the ovarian mass.

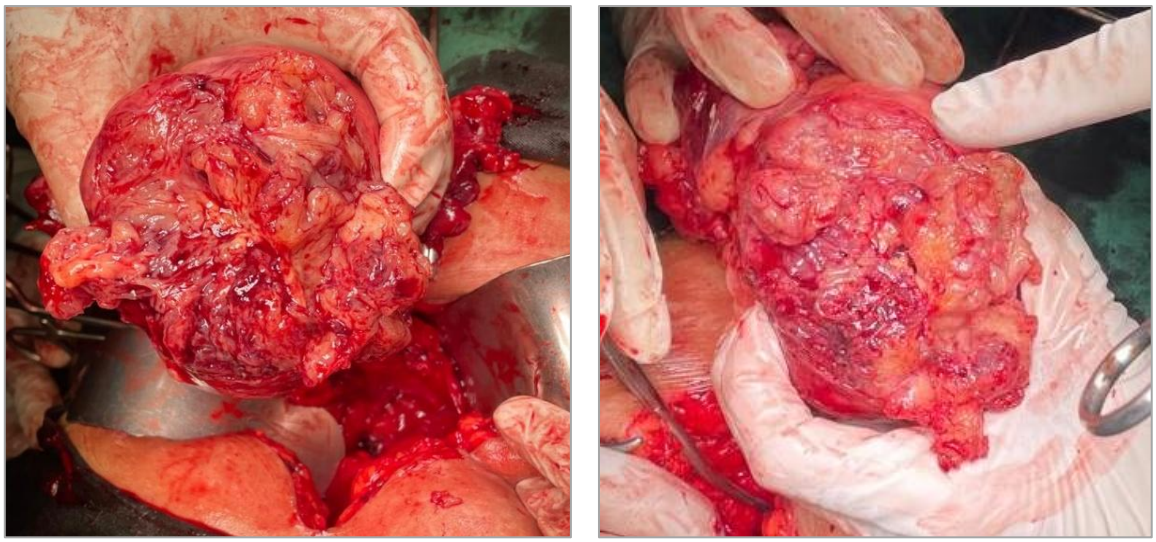

Figure 3. Clinical image of the left ovarian mass.

defects and an Apgar score of 7-8-9. At the moment of birth, the placenta appeared normal. Exploration revealed ascites, with a 25 x 20 cm left ovarian mass, intact capsules, with adhesion to omentum, transverse and descending colon (Figure 3). A nodular mass was found in the peritoneum and colon. A total abdominal hysterectomy, left salpingo-oophorectomy, omentectomy, peritoneal washing, bilateral pelvic lymph node dissection, and several peritoneal biopsies were performed. Histopathology assessment of the left ovarian mass showed mucinous carcinoma (Figure 4), lymph nodes, and peritoneal fluid showed negative results, with positive results on the omental mass (sized <2 cm). The patient was therefore diagnosed with ovarian cancer stage IIIB based on the International Federation of Gynecology and Obstetrics (FIGO) classification. Detailed counseling of the patient and her family with multidisciplinary staff has been given; no gross fetal anomalies were documented at examination. The postpartum check-up went smoothly. The follow-up ultrasound and chest radiograph revealed no evidence of metastasis. We scheduled paclitaxel-carboplatin chemotherapy for this patient's postpartum treatment. However, the patient declined due to a similar matter. Even though the patient has been provided with government assistance funds, the patient still refuses to undergo chemotherapy. She currently has no abdominal-related issues 2 months after surgery. She continues to breastfeed and has no concerns about her infant's health or development.

3. Discussions

Complete surgical staging is widely regarded as the standard treatment for early-stage ovarian cancer. This procedure typically includes aspiration of ascitic fluid or peritoneal lavage, total hysterectomy, bilateral salpingo-oophorectomy, infracolic omentectomy, selective peritoneal biopsies, and sampling of both pelvic and

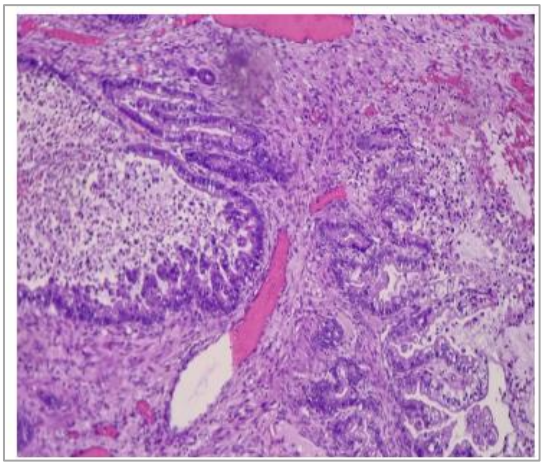

Figure 4. Histopathological findings of the ovarian mass.

para-aortic lymph nodes. Hysterectomy and bilateral salpingo-oophorectomy are essential components of treatment, as the uterine serosa and endometrium are common sites for occult metastases. Additionally, there is a relatively high incidence of synchronous endometrial carcinoma in these patients. The risk of occult metastasis in a macroscopically normal contralateral ovary also ranges from 2% to 12%, influenced by the tumor's histological subtype, grade, and stage [14–17]. The patient underwent FSS and failed to comply with the scheduled chemotherapy. Hence, while the patient achieved a successful pregnancy, she also experienced ovarian cancer relapse.

Although ovarian cancer primarily affects postmenopausal women, around 12% of cases are diagnosed in women under the age of 45 [18, 19]. For these younger patients who wish to preserve fertility, conservative surgery may be a viable option. However, this approach presents challenges, including concerns about tumor recurrence, the necessity and timing of postoperative chemotherapy, and the potential impact of cytotoxic agents on the remaining ovary and any future pregnancies. As a result, gynecologic oncologists must carefully weigh the desire for fertility preservation against optimal oncologic outcomes. The criteria for selecting candidates for conservative surgery in early-stage ovarian cancer remain a topic of debate. According to the European Society for Medical Oncology (ESMO), fertility-sparing treatment is appropriate for patients with Stage IA epithelial ovarian cancer, excluding clear cell histology, and limited to grade 1 or 2 tumors [20]. More recently, the Fertility Taskforce of the European Society of Gynecologic Oncology (ESGO) has advised against offering conservative surgery to patients with grade 3 epithelial ovarian cancer [16].

Cass et al. reported that recurrence was more common among patients who had undergone incomplete surgical staging [20]. Even in clinically diagnosed stage I ovarian cancer, occult intra-abdominal metastases including retroperitoneal lymph node involvement, have been documented. Metastases to pelvic and/or para-aortic lymph nodes occur in approximately 10–15% of cases [21]. Re-staging procedures in patients initially thought to have early-stage disease have led to upstaging in up to 30% of cases, highlighting the significance of thorough surgical staging as a key prognostic factor [22–24]. Therefore, for patients being considered for fertility-sparing surgery, it is critical that complete surgical staging is performed, including pelvic and para-aortic lymph node sampling, peritoneal washings, multiple peritoneal biopsies, and omentectomy [25].

The patient was diagnosed with ovarian cancer and underwent FSS 2 years prior. Guideline recommended complete surgical staging, but FSS might be an option for the patient who wishes to preserve fertility function. The patient was scheduled for chemotherapy, but failed to comply. Although the patient successfully achieved pregnancy after the diagnosis and surgery, she never had routine antenatal care until the pregnancy was in the third trimester. Unfortunately, there is a loss to follow up in a two-year gap between the initial ovarian cancer diagnosis and pregnancy. When we evaluate the patient with suspected ovarian cancer, we perform biomarker evaluation to investigate the probability of causation. The antigenic determinant CA-125 is expressed in ovarian epithelial tumors, but it is physiologically raised during pregnancy; increased CA-125 is detected between 30 and 40 days of gestation, with a peak between 35 and 60 days of gestation and a reduction by the end of the first trimester. However, only 50% of early-stage tumors in pregnant patients with stage I ovarian cancer have a CA125 score larger than thirty international units. Alpha-fetoprotein (AFP), lactate dehydrogenase (LDH), and human chorionic gonadotropin (hCG) are all altered during pregnancy, reducing their therapeutic value [26, 27]. We discovered normal CA-125 in this investigation, while the final pathology result was Mucinous Ovarian cancer. Based on the surgical staging and histopathology results, the patient was diagnosed with stage IIIB of Ovarian Cancer. Hence, the risk of recurrence is high, with overall survival worse compared with nonmucinous ovarian cancer [28]. Freeman et al. suggest that the timing for initiation of chemotherapy for the most optimal survival in ovarian cancer is between 20-39 days after surgery [29]. The decision to delay chemotherapy was made by the patient herself, even though the patient had been given detailed counseling on her disease, including the treatment plan and the risks. Hence, the patient has a poor prognosis.

Nitecki et al. found that women who conceived at least three months following fertility-sparing surgery for stage IA or IC ovarian cancer did not face a higher risk of adverse obstetric outcomes, such as preterm birth, small-for-gestational-age infants, cesarean delivery, neonatal complications, or severe maternal morbidity compared to matched controls [27]. Further analysis based on time from diagnosis to conception and exposure to chemotherapy showed no significant differences in the rates of adverse pregnancy outcomes. Although national guidelines have emphasized the importance of discussing fertility preservation with young cancer patients for over a decade, data on obstetric outcomes following fertility-sparing surgery have remained limited [30–33]. This study offers promising evidence that pregnancy after fertility-preserving treatment in early-stage ovarian cancer is generally safe.

Previous research has produced mixed results regarding the association between a history of cancer and the risk of preterm birth [30–32]. A systematic review examining obstetric outcomes following reproductive cancers found that the majority of studies were limited to small case series with low numbers of births. Notably, more than one-third of these studies did not report key outcomes such as gestational age at delivery or neonatal viability, highlighting significant gaps in the available evidence.

There is limited data available to inform the optimal timing of pregnancy following cancer treatment. Some experts recommend that cancer survivors, especially those who have undergone chemotherapy, delay conception for 12 to 24 months after completing treatment [33]. This recommendation is based on concerns about potential oocyte damage and extended immunosuppression, which may increase the risk of adverse outcomes such as preterm birth, small-for-gestational-age infants, and miscarriage [34].

A recent systematic review involving 614 patients with epithelial ovarian cancer found that 50% attempted to conceive, and among those, 79% (242 patients) achieved pregnancy, with live-birth rates ranging from 76% to 96%, figures that align with findings from other reviews [35, 36]. These outcomes offer reassurance to patients considering fertility-sparing surgery, suggesting that pregnancy following ovarian cancer treatment does not appear to be linked to increased risks of preterm birth, neonatal complications, cesarean delivery, or severe maternal morbidity.

Due to the rarity of cancer during pregnancy [26], there is a limited body of research to guide clinical decisions for affected women and their healthcare providers. However, some reports suggest that pregnancy does not negatively impact cancer prognosis. These studies support preserving the pregnancy whenever feasible, emphasizing that treatment outcomes largely depend on the individual patient's condition and the ability to manage the cancer effectively while also protecting the health of the fetus [26].

4. Conclusions

Patients with early-stage ovarian cancer who want to preserve fertility function might undergo fertility-sparing surgical staging, as long as they also comply with the chemotherapy suggested. The goal of treating ovarian cancer in young females has to consider the patient's desire for pregnancy, which is part of the quality of life. In Ovarian Cancer during pregnancy, the goal of the treatment is to achieve the best oncologic outcome while preserving the viability of the fetus. In conclusion, the findings of this case suggest that pregnancy after fertility sparing surgical staging may be an option in patient with early-stage ovarian cancer, with good obstetric outcome, treatment on a near term pregnancy patient with ovarian cancer, may be performed safely to limit the danger to the fetus, and the deterioration of maternal health. More studies are needed to provide knowledge about these mother-infant dyads' survival and health outcomes.

Author Contributions: Conceptualization, Y.D.C.S. and R.M.; methodology, F.A.; software, R.M.; validation H.Y.; formal analysis, F.A.; investigation, H.Y.; resources, F.A. and H.Y.; data curation, S.T.W.; writing—original draft preparation, R.M.; writing—review and editing, Y.D.C.S.; visualization, S.T.W.; supervision, H.Y., F.A. and S.T.W.; project administration, Y.D.C.S.; funding acquisition, R.M. All authors have read and agreed to the published version of the manuscript.

Funding: This study does not receive external funding.

Ethical Clearance: The Health Research Ethics Committee of RS Sari Mulia approved the report in this case.

Informed Consent Statement: The patient who had undergone this procedure gave written informed consent to publish this paper.

Data Availability Statement: This case report includes all the data supporting the results.

Acknowledgments: The authors would like to thank the Department of Obstetrics and Gynecology, Faculty of Medicine, Lambung Mangkurat University / Ulin Hospital, which helped and collaborated on completing this case report.

Conflicts of Interest: All the authors declare no conflicts of interest.

References

1. US Census Bureau. (2022). Fertility Rates : Declined for Younger Women, Increased for Older Women, from

https://www.census.gov/library/stories/2022/04/fertility-rates-declined-for-younger-women-increased-for-older-women.

2. Livingston, G. (2018). They're Waiting Longer, but U.S. Women Today More Likely to Have Children Than a Decade Ago, *Pew Research Center*, from https://www.pewresearch.org/social-trends/2018/01/18/theyre-waiting-longer-but-u-s-women-today-more-likely-to-have-children-than-a-decade-ago/.

3. Zand, B., and Freedman, R. S. (2011). Early-Stage Ovarian Cancer, *Encyclopedia of Cancer*, Springer Berlin Heidelberg, Berlin, Heidelberg, 1196–1200. doi:10.1007/978-3-642-16483-5_6895.

4. Ratanasrithong, P., and Benjapibal, M. (2017). Pregnancy Outcomes after Conservative Surgery for Early-Stage Ovarian Neoplasms., *Asian Pacific Journal of Cancer Prevention : APJCP*, Vol. 18, No. 8, 2083–2087. doi:10.22034/APJCP.2017.18.8.2083.

5. Zapardiel, I., Diestro, M. D., and Aletti, G. (2014). Conservative Treatment of Early Stage Ovarian Cancer: Oncological and Fertility Outcomes, *European Journal of Surgical Oncology (EJSO)*, Vol. 40, No. 4, 387–393. doi:10.1016/j.ejso.2013.11.028.

6. Lee, C., Chiang, C., Tai, Y., Hsu, H., Chen, Y., Chiang, Y., Wu, C., Lee, W., Hwa, H., and Cheng, W. (2024). Outcomes after Fertility-Sparing Surgery of Early-Stage Ovarian Cancer: A Nationwide Population-Based Study, *Cancer Medicine*, Vol. 13, No. 7. doi:10.1002/cam4.7132.

7. Zimmermann, J. S. M., Ramisch, P., Radosa, M. P., Radosa, C. G., Kaya, A. C., Brucker, S. Y., Taran, F. A., Ulrich, U. A., Hackethal, A., Deeken, M., Sütterlin, M., Tuschy, B., Solomayer, E.-F., and Radosa, J. C. (2023). Laparoscopic Fertility-Sparing Surgery for Early Ovarian Malignancies, *Cancers*, Vol. 15, No. 20, 5099. doi:10.3390/cancers15205099.

8. Ditto, A., Martinelli, F., Lorusso, D., Haeusler, E., Carcangiu, M., and Raspagliesi, F. (2014). Fertility Sparing Surgery in Early Stage Epithelial Ovarian Cancer, *Journal of Gynecologic Oncology*, Vol. 25, No. 4, 320.

9. Fruscio, R., Corso, S., Ceppi, L., Garavaglia, D., Garbi, A., Floriani, I., Franchi, D., Cantù, M. G., Bonazzi, C. M., Milani, R., Mangioni, C., and Colombo, N. (2013). Conservative Management of Early-Stage Epithelial Ovarian Cancer: Results of a Large Retrospective Series, *Annals of Oncology*, Vol. 24, No. 1, 138–144. doi:10.1093/annonc/mds241.

10. Ditto, A., Martinelli, F., Bogani, G., Lorusso, D., Carcangiu, M., Chiappa, V., Reato, C., Donfrancesco, C., De Carrillo, K. J. A., and Raspagliesi, F. (2015). Long-Term Safety of Fertility Sparing Surgery in Early Stage Ovarian Cancer: Comparison to Standard Radical Surgical Procedures, *Gynecologic Oncology*, Vol. 138, No. 1, 78–82. doi:10.1016/j.ygyno.2015.05.004.

11. Satoh, T., Hatae, M., Watanabe, Y., Yaegashi, N., Ishiko, O., Kodama, S., Yamaguchi, S., Ochiai, K., Takano, M., Yokota, H., Kawakami, Y., Nishimura, S., Ogishima, D., Nakagawa, S., Kobayashi, H., Shiozawa, T., Nakanishi, T., Kamura, T., Konishi, I., and Yoshikawa, H. (2010). Outcomes of Fertility-Sparing Surgery for Stage I Epithelial Ovarian Cancer: A Proposal for Patient Selection, *Journal of Clinical Oncology*, Vol. 28, No. 10, 1727–1732. doi:10.1200/JCO.2009.24.8617.

12. Essmat, A. (2021). Role of Ovarian Fertility Sparing Surgery (FSS) in Cases of Early Stage 1 Ovarian Cancer in Patients in Reproductive Age Group, *Open Journal of Obstetrics and Gynecology*, Vol. 11, No. 06, 732–741. doi:10.4236/ojog.2021.116068.

13. Elias, K. M., Guo, J., and Bast, R. C. (2018). Early Detection of Ovarian Cancer, *Hematology/Oncology Clinics of North America*, Vol. 32, No. 6, 903–914. doi:10.1016/j.hoc.2018.07.003.

14. Yin, J., Wang, Y., Shan, Y., Li, Y., Jin, Y., and Pan, L. (2019). Pregnancy and Oncologic Outcomes of Early Stage Low Grade Epithelial Ovarian Cancer after Fertility Sparing Surgery: A Retrospective Study in One Tertiary Hospital of China, *Journal of Ovarian Research*, Vol. 12, No. 1, 44. doi:10.1186/s13048-019-0520-6.

15. Morice, P., Denschlag, D., Rodolakis, A., Reed, N., Schneider, A., Kesic, V., and Colombo, N. (2011). Recommendations of the Fertility Task Force of the European Society of Gynecologic Oncology About the Conservative Management of Ovarian Malignant Tumors, *International Journal of Gynecological Cancer*, Vol. 21, No. 5, 951–963. doi:10.1097/IGC.0b013e31821bec6b.

16. Park, J.-Y., Kim, D.-Y., Suh, D.-S., Kim, J.-H., Kim, Y.-M., Kim, Y.-T., and Nam, J.-H. (2008). Outcomes of Fertility-Sparing Surgery for Invasive Epithelial Ovarian Cancer: Oncologic Safety and Reproductive Outcomes, *Gynecologic Oncology*, Vol. 110, No. 3, 345–353. doi:10.1016/j.ygyno.2008.04.040.

17. Howlader, N., Noone, A. M., and Krapcho, M. (n.d.). *SEER Cancer Statistics Review 1975-2012,* Bethesda, MD, National Cancer Institute.

18. Siegel, R. L., Miller, K. D., and Jemal, A. (2016). Cancer Statistics, 2016, *CA: A Cancer Journal for Clinicians*, Vol. 66, No. 1, 7–30. doi:10.3322/caac.21332.

19. Aebi, S., and Castiglione, M. (2008). Epithelial Ovarian Carcinoma: ESMO Clinical Recommendations for Diagnosis, Treatment and Follow-Up, *Annals of Oncology*, Vol. 19, ii14–ii16. doi:10.1093/annonc/mdn073.

20. Cass, I., Li, A. J., Runowicz, C. D., Fields, A. L., Goldberg, G. L., Leuchter, R. S., Lagasse, L. D., and Karlan, B. Y. (2001). Pattern of Lymph Node Metastases in Clinically Unilateral Stage I Invasive Epithelial Ovarian Carcinomas, *Gynecologic Oncology*, Vol. 80, No. 1, 56–61. doi:10.1006/gyno.2000.6027.

21. Trimbos, J. B., Vergote, I., Bolis, G., Vermorken, J. B., Mangioni, C., Madronal, C., Franchi, M., Tateo, S., Zanetta, G., Scarfone, G., Giurgea, L., Timmers, P., Coens, C., and Pecorelli, S. (2003). Impact of Adjuvant Chemotherapy and Surgical Staging in Early-Stage Ovarian Carcinoma: European Organisation for Research and Treatment of Cancer-Adjuvant ChemoTherapy in Ovarian Neoplasm Trial, *JNCI Journal of the National Cancer Institute*, Vol. 95, No. 2, 113–125. doi:10.1093/jnci/95.2.113.

22. Engelen, M. J. A., Kos, H. E., Willemse, P. H. B., Aalders, J. G., de Vries, E. G. E., Schaapveld, M., Otter, R., and van der Zee, A. G. J. (2006). Surgery by Consultant Gynecologic Oncologists Improves Survival in Patients with Ovarian Carcinoma, *Cancer*, Vol. 106, No. 3, 589–598. doi:10.1002/cncr.21616.

23. Grabowski, J. P., Harter, P., Buhrmann, C., Lorenz, D., Hils, R., Kommoss, S., Traut, A., and du Bois, A. (2012). Re-operation Outcome in Patients Referred to a Gynecologic Oncology Center with Presumed Ovarian Cancer FIGO I-IIIA after Sub-standard Initial Surgery, *Surgical Oncology*, Vol. 21, No. 1, 31–35. doi:10.1016/j.suronc.2010.08.006.

24. Mantia Smaldone, G. M., Richard, S. D., and Edwards, R. P. (2010). Pregnancy Outcomes After Conservative Surgical Management of Ovarian Neoplasms Treated at a Single Institution, *International Journal of Gynecological Cancer*, Vol. 20, No. 6, 926–931. doi:10.1111/IGC.0b013e3181e5c45a.

25. Korenaga, T.-R. K., and Tewari, K. S. (2020). Gynecologic Cancer in Pregnancy, *Gynecologic Oncology*, Vol. 157, No. 3, 799–809. doi:10.1016/j.ygyno.2020.03.015.

26. Mukhopadhyay, A., Shinde, A., and Naik, R. (2016). Ovarian Cysts and Cancer in Pregnancy, *Best Practice & Research Clinical Obstetrics & Gynaecology*, Vol. 33, 58–72. doi:10.1016/j.bpobgyn.2015.10.015.

27. Nitecki, R., Clapp, M. A., Fu, S., Lamiman, K., Melamed, A., Brady, P. C., Kaimal, A., del Carmen, M. G., Woodard, T. L., Meyer, L. A., Giordano, S. H., Ramirez, P. T., and Rauh-Hain, J. A. (2021). Outcomes of the First Pregnancy After Fertility-Sparing Surgery for Early-Stage Ovarian Cancer, *Obstetrics & Gynecology*, Vol. 137, No. 6, 1109–1118. doi:10.1097/AOG.0000000000004394.

28. Brown, J., and Frumovitz, M. (2014). Mucinous Tumors of the Ovary: Current Thoughts on Diagnosis and Management, *Current Oncology Reports*, Vol. 16, No. 6, 389. doi:10.1007/s11912-014-0389-x.

29. Freeman, A. H., Mann, A. K., Liao, C. I., Kapp, D. S., and Chan, J. K. (2018). Timing of Initiation of Chemotherapy after Primary Surgery for Women with Epithelial Ovarian Cancer: Does It Matter?, *Gynecologic Oncology*, Vol. 149, 185.

30. Melin, J., Heinävaara, S., Malila, N., Tiitinen, A., Gissler, M., and Madanat-Harjuoja, L. (2015). Adverse Obstetric Outcomes Among Early-Onset Cancer Survivors in Finland, *Obstetrics & Gynecology*, Vol. 126, No. 4, 803–810. doi:10.1097/AOG.0000000000001035.

31. Madanat-Harjuoja, L., Malila, N., Lähteenmäki, P. M., Boice, J. D., Gissler, M., and Dyba, T. (2010). Preterm Delivery among Female Survivors of Childhood, Adolescent and Young Adulthood Cancer, *International Journal of Cancer*, Vol. 127, No. 7, 1669–1679. doi:10.1002/ijc.25157.

32. Stensheim, H., Klungsøyr, K., Skjaerven, R., Grotmol, T., and Fosså, S. D. (2013). Birth Outcomes among Offspring of Adult Cancer Survivors: A Population-Based Study, *International Journal of Cancer*, n/a-n/a. doi:10.1002/ijc.28292.

33. National Comprehensive Cancer Network. (2024). Pregnancy After Cancer, from https://www.nccn.org/patientresources/patient-resources/resources/life_after_cancer/pregnancy.aspx, accessed 4-12-2024.

34. Gerstl, B., Sullivan, E., Vallejo, M., Koch, J., Johnson, M., Wand, H., Webber, K., Ives, A., and Anazodo, A. (2019). Reproductive Outcomes Following Treatment for a Gynecological Cancer Diagnosis: A Systematic Review, *Journal of Cancer Survivorship*, Vol. 13, No. 2, 269–281. doi:10.1007/s11764-019-00749-x.

35. Eskander, R. N., Randall, L. M., Berman, M. L., Tewari, K. S., Disaia, P. J., and Bristow, R. E. (2011). Fertility Preserving Options in Patients with Gynecologic Malignancies, *American Journal of Obstetrics and Gynecology*, Vol. 205, No. 2, 103–110. doi:10.1016/j.ajog.2011.01.025.

36. Dobashi, M., Isonishi, S., Morikawa, A., Takahashi, K., Ueda, K., Umezawa, S., Kobayashi, Y., Iwashita, M., Takechi, K., and Tanaka, T. (2012). Ovarian Cancer Complicated by Pregnancy: Analysis of 10 Cases, *Oncology Letters*, Vol. 3, No. 3, 577–580. doi:10.3892/ol.2011.545.