FERTILITY PRESERVATION IN AN 18-YEAR-OLD FEMALE WITH AN OVARIAN GRANULOSA CELL TUMOR: A CASE REPORT

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ABSTRACT

Objective: Ovarian granulosa cell tumors (GCTs) are rare malignancies that can profoundly affect fertility, particularly in young women. This case report describes a successful fertility preservation strategy in an 18-year-old female diagnosed with a Stage I ovarian granulosa cell tumor.

Methods: A multidisciplinary team implemented a fertility preservation protocol involving preoperative ovarian stimulation, oocyte retrieval, and cryopreservation. This was followed by staging laparotomy and unilateral salpingo-oophorectomy.

Results: A total of 10 mature oocytes were successfully cryopreserved. Histology confirmed a Stage I granulosa cell tumor with no evidence of metastasis. The patient tolerated adjuvant therapy well and remains disease-free at follow-up.

Conclusion: The successful application of controlled ovarian stimulation and oocyte cryopreservation prior to definitive surgery demonstrates the feasibility of proactive fertility preservation in hormonally active tumors when managed with careful monitoring. Furthermore, the patient's positive postoperative course and continued disease-free status at 18 months reinforce the safety and efficacy of fertility-sparing surgical strategies in Stage I GCTs.

Keywords: 18-year-old female; ovarian granulosa cell tumor; fertility preservation; cryopreservation.

Introduction

Granulosa cell tumors (GCTs) are rare, estrogen-secreting ovarian neoplasms that originate from the sex cord-stromal tissue and account for approximately 2-5% of all ovarian malignancies.[1] They are typically indolent with low malignant potential, but can recur many years – even decades – after initial treatment, necessitating long-term surveillance.[2] The adult sub-

type is the most common and usually presents in perimenopausal or postmenopausal women; however, approximately 5-10% of cases occur in adolescents or young adults.[3]

In young patients, the management of GCT requires careful consideration of fertility preservation, as standard surgical treatment often includes oophorectomy and staging procedures that can compromise reproductive potential. With the advent of assisted reproductive technologies, strategies such as oocyte cryopreservation prior to surgical intervention have become increasingly viable, particularly when the tumor is detected at an early stage.[4]

This case report represents the fertility preservation approach employed in an 18-year-old female diagnosed with a Stage I granulosa cell tumor.

It highlights the critical role of early multidisciplinary coordination in ensuring oncologic safety while preserving future reproductive options.

Methods

An 18-year-old nulligravid woman presented with lower abdominal discomfort. Initial imaging, including transrectal ultrasound and pelvic magnetic resonance imaging (MRI), revealed a 7.5 cm solid-cystic mass localized to the left ovary, with no evidence of extra-ovarian extension. Serum tumor markers showed elevated inhibin B and anti-Müllerian hormone (AMH) levels, suggestive of a sex cord-stromal origin. CA-125, AFP, β-hCG, and LDH were within normal limits.

Following evaluation by a gynecologic oncologist, the patient was clinically diagnosed with a presumed Stage I granulosa cell tumor (GCT). Given her strong desire for future fertility and the likelihood of early-stage disease, a multidisciplinary team – including specialists in gynecologic oncology, reproductive endocrinology, and clinical psychology – was assembled to coordinate a fertility preservation plan.

Fertility Preservation Strategy was:

- Controlled Ovarian Stimulation (COS): Ovarian stimulation was initiated using recombinant follicle-stimulating hormone (rFSH) with a GnRH antagonist protocol to minimize the risk of excessive estrogen exposure. Stimulation was directed to the contralateral (right) ovary, while closely monitoring tumor size and hormonal levels.
- Oocyte Retrieval and Cryopreservation: After 10 days of COS, oocyte retrieval was performed under ultrasound guidance. A total of 10 mature metaphase II oocytes were successfully retrieved and cryopreserved via vitrification for future assisted reproductive use.
- Surgical Management: Definitive surgical staging was performed via midline laparotomy. Procedures included left salpingo-oophorectomy, infracolic omentectomy, peritoneal biopsies, and pelvic washing for cytology. The uterus and right adnexa were preserved to maintain reproductive potential. Intraoperative frozen section was suggestive of granulosa cell tumor, confirming the indication for fertility-sparing surgery.

Postoperative histopathological analysis confirmed an adult-type granulosa cell tumor, FIGO Stage IA, with no evidence of capsular rupture, lymphovascular invasion, or metastatic spread.

Results

The patient underwent fertility preservation followed by fertility-sparing surgical management without perioperative complications. Her postoperative recovery was uneventful.

Pathological Findings:

Histopathological evaluation confirmed an adult-type granulosa cell tumor confined to the left ovary, measuring 7.5 × 6.2 × 5.8 cm. The tumor displayed characteristic Call-Exner bodies and nuclear grooves. The ovarian capsule was intact, with no evidence of surface involvement or rupture. Peritoneal washings were negative for malignant cells, and biopsies from the omentum and peritoneum showed no metastatic disease. The final diagnosis was Stage IA (FIGO) granulosa cell tumor (Fig.1,2).

Fertility Preservation Outcomes:

A total of 10 mature metaphase II oocytes were retrieved and successfully vitrified. Follow-up assessments confirmed normal function of the preserved right ovary, with recovery of spontaneous menstrual cycles three months post-surgery. Anti-Müllerian hormone (AMH) levels remained within the age-appropriate range, suggesting preserved ovarian reserve.

Postoperative Management:

Given the early-stage disease and favorable histologic features, adjuvant therapy was not indicated. The patient was enrolled in an active surveillance program consisting of physical examinations, pelvic imaging (ultrasound or MRI every 6 months), and serial serum inhibin B and AMH measurements.

Psychosocial and Reproductive Support:

The patient received integrated psychological counseling and reproductive health education throughout the treatment and follow-up period. Discussions regarding potential future use of cryopreserved oocytes and assisted reproductive options were initiated.

Follow-Up:

At 18 months postoperatively, the patient remains clinically well and disease-free. Imaging studies and tumor markers show no evidence of recurrence. She continues to be monitored by the multidisciplinary care team and is actively exploring reproductive planning options for the future.

Discussion

Granulosa cell tumors (GCTs) are rare ovarian neoplasms, representing approximately 2-5% of all ovarian cancers, with the adult subtype being the most common.[1] Although they typically present in peri- or postmenopausal women, about 5-10% occur in adolescents and young adults.[3] In this population, treatment decisions must carefully balance oncologic safety with fertility preservation, which can have profound implications for quality of life and future reproductive choices.

The standard treatment for early-stage GCTs in young patients involves fertility-sparing surgery – typically unilateral salpingo-oophorectomy with comprehensive surgical staging – while preserving the uterus and contralateral ovary.[5] In our case, preoperative imaging and tumor markers were consistent with a localized, hormonally active tumor, and the patient underwent successful staging surgery after fertility preservation efforts.

Our case is notable for the successful use of controlled ovarian stimulation (COS) and oocyte cryopreservation prior to definitive surgery. This strategy enabled the collection and vitrification of ten mature oocytes, preserving the patient's reproductive potential without delaying oncologic treatment. While ovarian stimulation in the context of a hormonally active tumor may raise concerns about tumor progression, emerging evidence supports the safety of carefully monitored stimulation protocols in this setting.[6,7]

In a similar case reported by Sanchez et al., a 17-year-old female with a Stage IA GCT underwent fertility preservation with COS and oocyte vitrification prior to laparoscopic unilateral salpingo-oophorectomy.[8] Like our patient, she remained disease-free during follow-up and retained reproductive options. Such cases reinforce the feasibility of integrated fertility preservation in adolescents with early-stage GCTs when performed under close interdisciplinary supervision.

Long-term surveillance is essential due to the potential for late recurrence, even decades after initial treatment.[9] Our patient remains under active surveillance with periodic imaging and serial serum inhibin B and AMH assessments, consistent with current follow-up guidelines. Notably, inhibin B serves as a sensitive marker for recurrence in granulosa cell tumors and is critical in longitudinal monitoring.[10]

This case underscores several key considerations:

- Timing of fertility preservation is crucial and must be coordinated rapidly in the preoperative setting.
- Multidisciplinary collaboration ensures comprehensive care, addressing oncologic, reproductive, and psychosocial dimensions.
- Individualized care plans are vital in adolescent oncology, where reproductive autonomy and future family planning are high priorities.

While prospective data remain limited, accumulating case reports and small cohort studies support the growing role of fertility preservation in gynecologic oncology. Further research is warranted to establish standardized protocols and long-term outcomes for fertility preservation strategies in GCT patients.

Conclusion

This case highlights the critical importance of integrating fertility preservation into the early management of adolescent patients diagnosed with ovarian granulosa cell tumors (GCTs). Through prompt diagnosis, multidisciplinary coordination, and the use of assisted reproductive technologies, it is possible to achieve both oncologic safety and safeguard future fertility. The successful application of controlled ovarian stimulation and oocyte cryopreservation prior to definitive surgery demonstrates the feasibility of proactive fertility preservation in hormonally active tumors when managed with careful monitoring. Furthermore, the patient's positive postoperative course and continued disease-free status at 18 months reinforce the safety and efficacy of fertility-sparing surgical strategies in Stage I GCTs.

As reproductive considerations become increasingly central to the care of young oncology patients, this case underscores the need for early involvement of reproductive endocrinology and psychological support services. Such comprehensive, patient-centered care empowers young women to retain reproductive autonomy without compromising cancer treatment outcomes.

Ultimately, this report contributes to the growing body of evidence supporting the role of fertility preservation in gynecologic oncology and advocates for its routine consideration in the treatment of adolescents with early-stage ovarian tumors.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Yerevan State Medical University (#3/14-15, 20.11.2014).

Informed Consent Statement: Informed consent was obtained from the parent of the participant before enrollment.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The access numbers will be provided prior to the publication.

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Conflict of Interest: The authors declare that they have no conflicts of interest related to this study.

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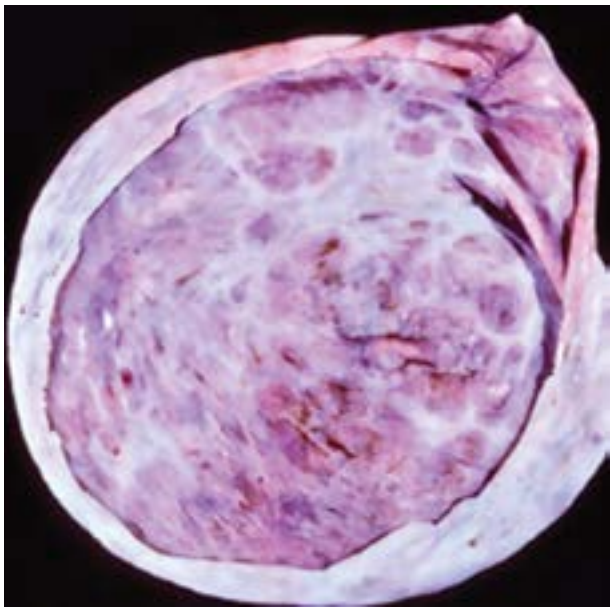

Figure 1. Ovarian Granulosa Cell Tumor.

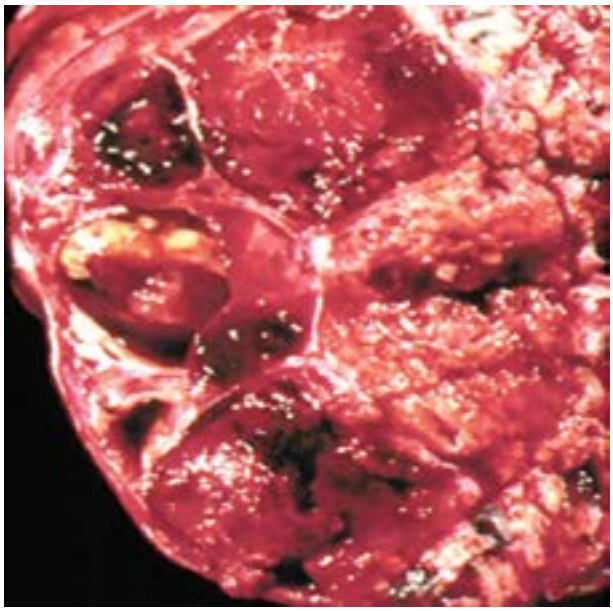

Figure 2. Stage IA (FIGO) granulosa cell tumor.