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Clinical Case Reports

Endocrine Dysregulation and Functional Ovarian Cyst: A Case from Adolescent Gynecology

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Abstract

Summary: Functional ovarian cysts are common in women of reproductive age; however, their occurrence secondary to hypothyroidism is rare. We report a case of a 21-year-old female with poorly controlled hypothyroidism who presented with bilateral multiloculated ovarian cysts that mimicked neoplastic pathology. Emergency laparotomy was performed due to worsening symptoms, and bilateral cystectomy with ovarian conservation was performed. Histopathological examination confirmed the diagnosis of corpus luteal cysts. Postoperative thyroid hormone replacement therapy led to the normalisation of menstrual cycles and resolution of the cysts. This case highlights the importance of thyroid evaluation in young women with ovarian masses to avoid unnecessary surgeries and preserve fertility.

Keywords: Ovarian Cysts, Corpus Luteum, Hypothyroidism, Thyroid Hormones/therapeutic use, Adolescent, Young Adult, Gynecology, Fertility Preservation.

Introduction

Ovarian cysts are fluid-filled sacs that may arise from normal ovulatory processes or pathological conditions. Ovarian cysts are a common gynaecological finding in adolescents; however, their evaluation and management require careful consideration owing to age-specific risks and outcomes.[1] Updated guidelines emphasise structured approaches for diagnosis and treatment in children and adolescents, ensuring both safety and fertility preservation.[2] Recent retrospective studies further highlight the clinical spectrum of adolescent ovarian cysts and the importance of individualised management strategies.[3] Endocrine disorders, such as hypothyroidism, can disrupt the hypothalamic–pituitary–ovarian axis.[4]

It may affect ovarian function through complex endocrine and immune pathways.[5] Recognition of this link is crucial, as thyroid hormone replacement can reverse these changes and restore reproductive function.[6]

Case Presentation

A 21-year-old unmarried female postgraduate student from Rawalpindi presented to the Gynaecology outpatient department of Rawalpindi Teaching Hospital on 11 April 2025 with complaints of lower abdominal pain ongoing for two years, with acute worsening over the preceding week, along with menstrual irregularities. She had a three-year history of hypothyroidism but was noncompliant with levothyroxine therapy.

Her menstrual cycles were previously regular (5/28); however, for the past two years, she had become oligomenorrheic, with scant flow every 40–60 days. She reported progressive weight gain but denied cold intolerance, constipation, acne, hirsutism, galactorrhea, and urinary and bowel disturbances.

On examination, she was well-oriented with a BMI of 29.8 kg/m², pulse rate 106/min, and blood pressure of 100/60 mmHg. The abdomen was protuberant with a palpable, firm, non-tender, irregular pelvic mass measuring approximately 20 cm with restricted mobility.

Investigations:

- Hemoglobin: 10.1 g/dL
- TSH: 41 mIU/L (↑), Free T4: low
- CA-125: 18.4 IU/mL
- Ultrasound: Bilateral multilocular adnexal cysts- right cyst (16×11×4) and left cyst (10 × 11 × 5 cm)—with normal uterus.
- CT scan: Confirmed complex cysts with mild ascites
- Tumour markers: CA-125 18.4 IU/ml, β-hCG < 1 IU/ml, and AFP 5 IU/ml.

Treatment

We planned laparoscopy; however, due to worsening pain, an emergency laparotomy was performed. Bilateral multilocular cysts with haemorrhagic areas were observed. Bilateral cystectomy with ovarian conservation was performed. Histopathological examination confirmed the presence of corpus luteal cysts. Levothyroxine (100 µg/day) was initiated postoperatively.

Outcome and Follow-Up

At 3-month follow-up:

- Menstrual cycles normalized
- Ultrasound showed normal ovaries
- TSH decreased to 4 mIU/L

Contributions:
TK - Conception, Design
TK - Acquisition, Analysis, Interpretation
TK RAN AIUH SB - Drafting
TK RAN AIUH SB - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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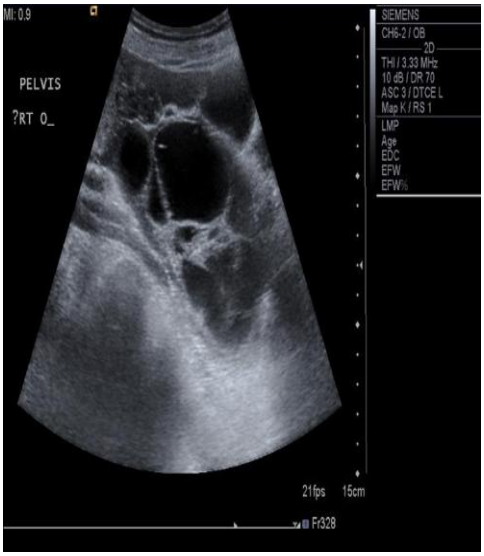

Figure 1A: (ultrasound image showing multiloculated ovarian cysts)

Figure 1B: (C-T Scan showing bilateral complex cysts with ascites)

Discussion

Functional ovarian cysts arise from disturbances in normal follicular development and are most common in women of reproductive age.
The corpus luteal cysts observed in this patient are typically transient structures that may enlarge because of hormonal dysregulation. Primary hypothyroidism has been implicated in the pathogenesis of these diseases through complex interactions between the hypothalamic and pituitary–ovarian axis. In hypothyroidism, several mechanisms can lead to the development of large ovarian cysts, including:

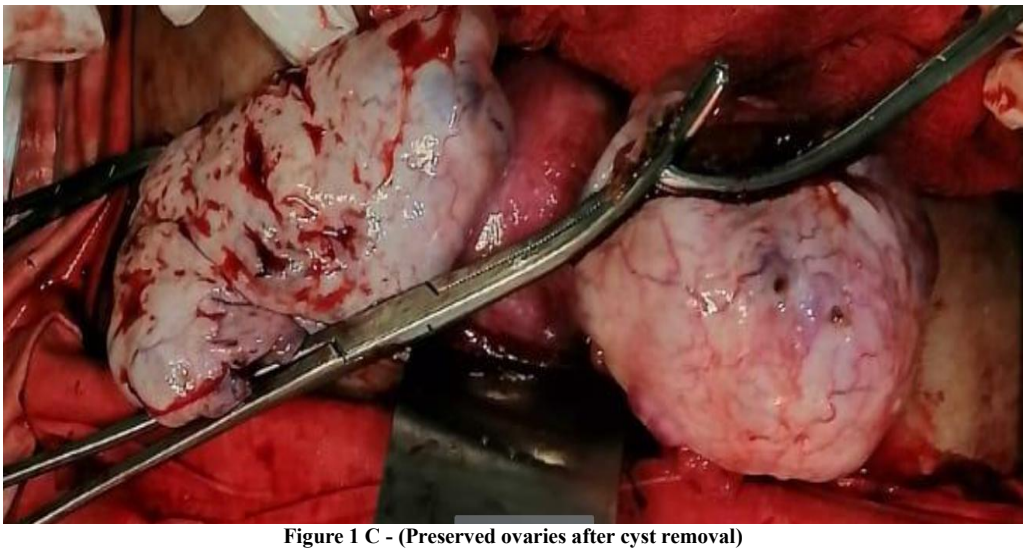

Figure 1 C - (Preserved ovaries after cyst removal)

Elevated thyroid-stimulating hormone (TSH) levels can cross-react with follicle-stimulating hormone (FSH) receptors on ovarian tissue, promoting excessive follicular growth. Increased thyrotropin-releasing hormone (TRH) causes hyperprolactinemia, which disrupts gonadotropin-releasing hormone (GnRH) pulsatility, leading to anovulation and follicular persistence. Additionally, altered gonadotropin ratios, with relatively low luteinizing hormone (LH) and higher FSH levels, prevent normal luteinization, resulting in cyst formation. Chronic hypothyroidism may also increase ovarian sensitivity to gonadotropins and insulin-like growth factors, further stimulating cyst development. Finally, thyroid hormone deficiency directly impairs ovarian follicular maturation and angiogenesis, contributing to the persistence of large functional cysts.
Hypothyroidism presenting with ovarian cysts is an uncommon but clinically significant condition. Large cysts may mimic neoplastic diseases, creating diagnostic uncertainty and the risk of unnecessary surgical intervention. Similar to our patient, huge bilateral ovarian cysts associated with hypothyroidism have been reported, highlighting the potential for misinterpretation as ovarian malignancy.[7]
Other reports have described bilateral ovarian masses due to primary hypothyroidism, further emphasising the spectrum of presentations and the importance of considering endocrine causes in the differential diagnosis.[8] Rare complications such as pituitary adenoma and chronic adnexal torsion have also been documented in hypothyroid patients, underscoring the need for timely recognition and multidisciplinary management.[9]

Additionally, giant ovarian cysts have been described following thyroidectomy, reinforcing the link between thyroid dysfunction and ovarian pathology.[10] Collectively, these cases demonstrate that ovarian cysts secondary to hypothyroidism can regress with appropriate thyroid hormone replacement, thereby avoiding unnecessary surgical procedures. Our case adds to this growing body of evidence, supporting routine thyroid evaluation in adolescents and young women with ovarian cysts.

Collectively, these cases demonstrate that ovarian cysts secondary to hypothyroidism can regress with appropriate thyroid hormone replacement therapy, thereby avoiding unnecessary surgical procedures. Our case adds to this growing body of evidence, supporting the need for routine thyroid evaluation in adolescents and young women presenting with ovarian cysts. Thus, a multidisciplinary team approach involving gynaecologists, endocrinologists, and radiologists is essential for accurate diagnosis, timely intervention, and fertility preservation, as functional cysts secondary to hypothyroidism are reversible with appropriate hormonal therapy.

Conclusion

Functional ovarian cysts secondary to hypothyroidism, although uncommon, should be considered in reproductive-age females presenting with bilateral ovarian masses. Early recognition and thyroid hormone replacement can lead to complete regression of cysts and normalisation of reproductive function, thereby avoiding unnecessary surgical procedures and preserving fertility.

Learning points

- Thyroid function testing should be routine in young women presenting with bilateral ovarian cysts.
- Functional cysts secondary to hypothyroidism may mimic malignancy but regress with thyroid hormone therapy.
- Multidisciplinary management involving gynaecologists, endocrinologists, and radiologists is essential to prevent unnecessary surgery and preserve fertility.

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