

# Abnormally High CA 19-9 in an Ovarian Mature Cystic Teratoma: A Case Report

Chen Ben David MD<sup>1,2</sup>, Dima Khatib ScB<sup>2</sup>, Yoav Siegler MD<sup>1,2</sup>, Revital Linder MD<sup>1,2</sup>, Amnon Amit MD<sup>1,2</sup>, and Emad Matanes MD<sup>1,2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Rambam Health Care Campus, Haifa, Israel

<sup>2</sup>Rappaport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

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Ovarian dermoid cysts, also known as mature cystic teratomas (MCT), are common benign germ cell tumors that account for approximately 20% of all ovarian neoplasms. They are composed of tissues derived from the three germ layers: ectoderm, mesoderm, and endoderm, and are most frequently diagnosed in women of reproductive age [1]. Diagnosis is typically based on imaging, with ultrasound often revealing characteristic features such as echogenic mural nodules, fat–fluid levels, or calcifications [1].

Carbohydrate antigen 19-9 (CA 19-9) is a sialylated glycoprotein commonly used as a biomarker for pancreatic and gastrointestinal malignancies, although it lacks specificity for malignancy and can also be elevated in several benign conditions [1,2]. Elevated CA 19-9 levels have been reported in some cases of ovarian MCT (dermoid cyst), particularly when the cyst is large, inflamed, or ruptured [1–3]. Our case describes a patient with a small ovarian MCT and markedly elevated CA 19-9 levels, which normalized after surgical removal. This case underscores the need for care-

ful interpretation of tumor markers in the context of benign adnexal lesions.

## PATIENT DESCRIPTION

A 51-year-old woman, post-menopausal for 2 years, presented for follow-up of a known ovarian mass. She had no prior surgeries or systemic illnesses. Imaging over the past 5 years had been consistent with a right ovarian MCT. On her most recent evaluation, laboratory findings were as follows: CA-125: 18.9 U/ml (normal range), CEA: 0.6 ng/ml, tumor marker human chorionic gonadotropin: negative, and CA 19-9: elevated to 467 U/ml (previously 267 U/ml).

Transvaginal ultrasound demonstrated a 25 × 17 mm right ovarian lesion with classic dermoid features, including echogenic components with posterior acoustic shadowing and internal echogenic nodules suggestive of sebaceous material, without vascularized solid components or ascites. Further workup, including upper and lower endoscopy, computed tomography of the chest, abdomen, and pelvis, and magnetic resonance imaging (MRI) with magnetic resonance cholangiopancreatography, revealed no abnormalities in the gastrointestinal tract or pancreas, apart from the right ovarian cyst. Pel-

vic MRI demonstrated a right ovarian cyst with a well-circumscribed lesion containing macroscopic fat with signal loss on fat-suppressed sequences. No enhancing solid components, mural nodules with vascularity, or diffusion restriction suggestive of malignancy were identified. There was no associated ascites or evidence of peritoneal disease.

Given the persistently elevated CA 19-9 and the patient's age, laparoscopic right oophorectomy and left salpingectomy were performed. Intraoperatively, the right ovary was cystic and contained thick sebaceous material. No other pelvic or abdominal abnormalities were identified.

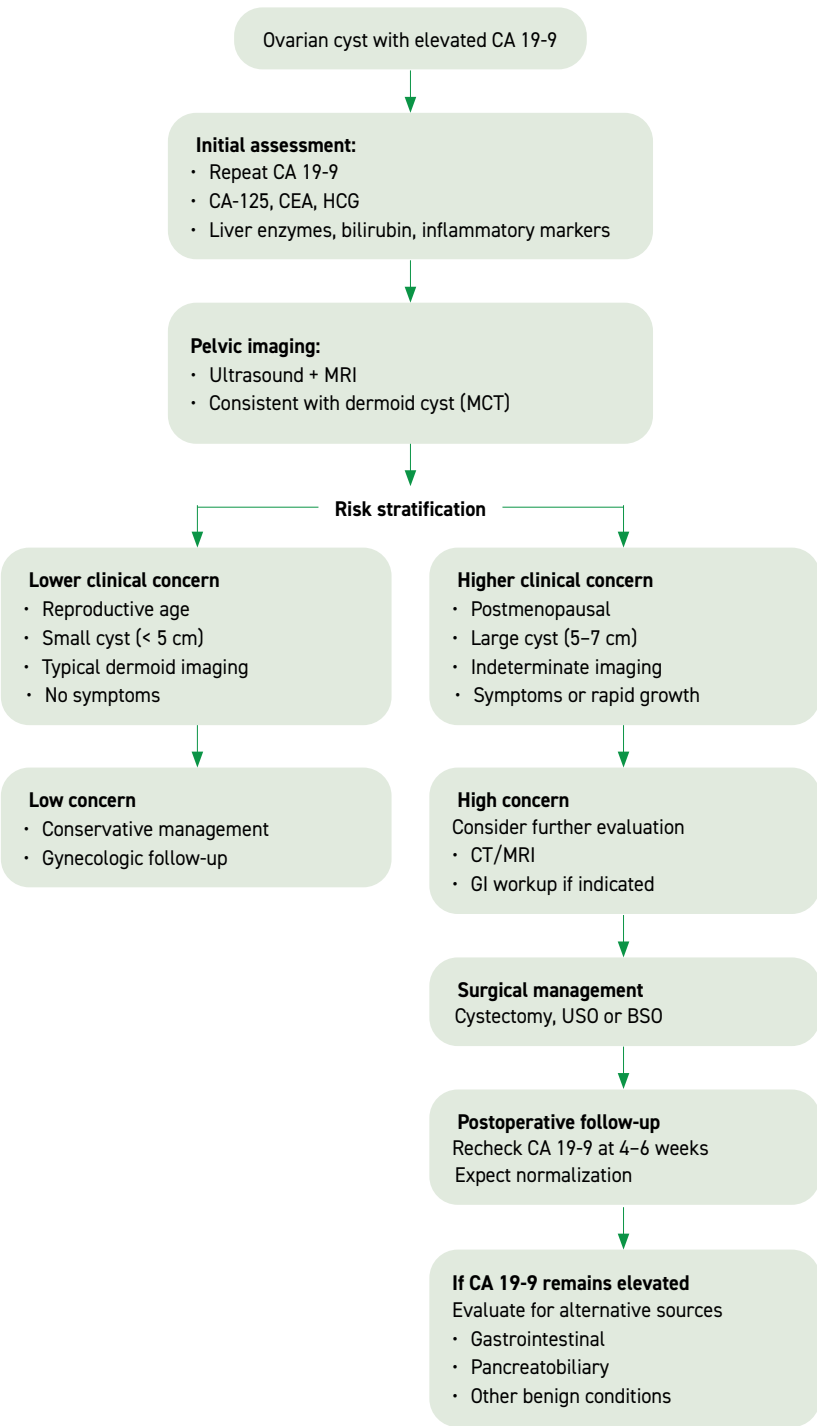
Histopathology confirmed an MCT of the right ovary. Postoperatively, CA 19-9 declined to 86 U/ml after 2 weeks and normalized to 31 U/ml at one month. The patient's postoperative recovery was uneventful.

## COMMENT

Our case highlights that markedly elevated CA 19-9 levels may occur in benign ovarian MCT, potentially leading to diagnostic confusion and unnecessary investigations for gastrointestinal or ovarian malignancy. The postoperative normalization of CA 19-9 confirmed that the MCT was the source of the elevation, consistent with prior reports [2–4].

**Figure 1.** Hypothesis-generating evaluation pathway for isolated CA 19-9 elevation with imaging-consistent dermoid cyst

BSO = bilateral salpingo-oophorectomy, CA = carbohydrate antigen, CEA = carcinoembryonic antigen, CT = computed tomography, GI = gastrointestinal, HCG = human chorionic gonadotropin, MRI = magnetic resonance imaging, MCT = mature cystic teratoma, USO = unilateral salpingo-oophorectomy



Several mechanisms have been proposed to explain the elevation of CA 19-9 in MCT. The epithelial lining of MCT may secrete CA 19-9 into the cystic fluid. When the cyst wall becomes inflamed, ruptured, or permeable, this antigen can leak into the bloodstream [2,5]. In addition, mucin-producing elements within the cyst can increase serum levels [5]. Larger cysts or those complicated by torsion or ischemia may demonstrate more pronounced elevations, likely due to inflammation-induced permeability changes [2-4].

Although several studies have suggested a correlation between CA 19-9 levels and MCT size [1,2], other investigations have not confirmed this association [5]. Therefore, CA 19-9 levels should not be interpreted as a reliable indicator of cyst size or disease severity, and clinical decision-making should rely primarily on imaging findings and overall clinical context.

When isolated CA 19-9 elevation is identified, initial evaluation may include repeat measurement of CA 19-9, basic laboratory tests to exclude benign causes such as cholestasis or inflammatory processes, and careful imaging evaluation of the adnexal mass. Escalation to cross-sectional imaging or endoscopic investigations should be individualized based on clinical context, symptoms, age, and imaging findings.

In the present case, extensive gastrointestinal and pancreatic investigations were performed despite benign imaging findings. This decision was influenced by two factors: the patient's postmenopausal status and the marked elevation of CA 19-9, which raised concern for occult gastrointestinal or pancreatobiliary malignancy. While many MCTs

occur in reproductive-age women and may be managed conservatively when imaging is characteristic, clinicians may adopt a more cautious approach in postmenopausal patients or when tumor marker levels are markedly elevated. Figure 1 illustrates a hypothesis-generating stepwise approach for evaluating isolated CA 19-9 elevation in patients with imaging features consistent with ovarian MCT.

## CONCLUSIONS

When interpreting CA 19-9 elevation in patients with MCT, markedly elevated CA 19-9 may occur even

in small benign mature cystic teratomas. Clinical management should incorporate imaging findings, patient age, and cyst characteristics. Tumor marker interpretation should always be individualized within the broader clinical context.

## Correspondence

Dr. C. Ben David

Dept. of Obstetrics and Gynecology, Rambam Health Care Campus, Haifa 3109601, Israel  
Email: chenbd0412@gmail.com

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## Capsule

### Mutation-dependent responses to sleep and exercise in clonal hematopoiesis

Clonal hematopoiesis (CH) is an age-associated condition in which hematopoietic stem cells acquire somatic mutations that promote clonal expansion and increase the risk of cardiovascular disease, hematologic malignancies, and mortality. **Gerhardt** and colleagues investigated whether lifestyle interventions influence CH progression. Using genetically engineered mouse models together with human observational data, the authors demonstrated that adequate sleep and regular physical exercise significantly reduced expansion of mutant hematopoietic

clones. However, the magnitude of benefit depended on the underlying driver mutation, with certain mutations showing greater responsiveness than others. Mechanistic studies revealed that improved sleep quality and exercise reduced systemic inflammation and limited mutant cell-driven vascular inflammation, thereby attenuating the development of atherosclerosis.

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## Capsule

### Human vaccine responses regulated by parallel cytokine pathways

**Chen** et al. identified two largely parallel cytokine signaling pathways that independently contribute to the generation of protective immune responses. One pathway primarily promoted activation and expansion of T-cell responses, whereas the second preferentially supported B-cell activation, antibody production, and germinal center development. Rather than functioning sequentially, these pathways operated simultaneously and together determined the magnitude and quality of vaccine-induced

immunity. Importantly, individuals exhibiting stronger activation of both pathways developed more robust humoral and cellular immune responses. The study also demonstrated substantial inter-individual variability in cytokine signatures, providing a biological explanation for differences in vaccine responsiveness among healthy individuals.

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