Ovarian Dermoid Tumor

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Abstract

Ovarian dermoid cysts are a common benign tumor. Although there is often a genetic component to this abnormality, this report discusses the case of a patient with an ovarian dermoid tumor with no family history of gynecological cancer. The diagnosis, surgical management, and malignancy of ovarian dermoid cysts are discussed.

Categories: Emergency Medicine
Keywords: emergency medicine, cyst, tumor, ovary, ovarian dermoid tumor

Introduction

Ovarian dermoid cysts, or mature cystic teratomas (MCT), are the most common benign ovarian tumor in adults and adolescents. They make up 70% of benign masses before menopause and 20% post-menopause [1,2]. They are characterized by adult ectodermal, mesodermal, and endodermal tissue and can contain skin, hair, teeth, fat and muscle, and even thyroid and brain tissue [1,3]. When an MCT contains primarily ectodermal tissue, it is described as a dermoid cyst [3].

One pathophysiological hypothesis about their origins is that they develop from the self-fertilization of an oocyte [4]. There are also male reproductive tumors. The compositional difference between an ovarian tumor and the testicular teratoma, the male gonadal tumor, is that ovarian tumors are typically cystic, while testicular tumors are typically solid [5]. A study has shown that patients with a first-degree relative with an ovarian dermoid cyst were at a greater risk of developing one themselves, so the cause is likely in part genetic [4]. The authors present the case of a premenopausal woman with no history of ovarian cancer, in whom imaging revealed a dermoid tumor.

Case Presentation

A 38-year-old woman was transported to the emergency department (ED) experiencing left-sided flank pain and bloating. She had mild discomfort the night before, but it did not cause any disturbances in sleep. However, early the next morning, she had a sudden onset of pain described as radiating from her lower left quadrant to her midline. The patient had a history of polycystic ovarian disease and had not menstruated in the past few months. Her medical history was also significant for hypothyroidism and hypertension. After a COVID-19 infection, she had noticed hypoglycemic episodes and near-fainting spells that have caused her to take time off of work. She had no known history of diabetes, breast, or ovarian cancer. She had never smoked. Her past surgical history included a Cesarean section and tonsillectomy. Her vital signs included normal pulse oximetry of 98% and pulse of 91 beats per minute. She had a temperature of 97.8°F and a respiratory rate of 20 breaths per minute. Her blood pressure was 165/101 mmHg. Physical examination was unremarkable except for guarding and tenderness in the left lower quadrant. Laboratory analyses were unremarkable except for a mild leukocytosis. The patient also had elevated immature granulocytes, neutrophils, lymphocytes, and monocytes (Table 1).
|                | Normal range          | Patient results |
|----------------|-----------------------|-----------------|
| **Hematology** |                       |                 |
| White blood cells | 4.1 - 9.3 K/mm³       | 13.4 K/mm³      |
| Red blood cells  | 3.28 - 5.50 M/mm³     | 4.89 M/mm³      |
| Hemoglobin       | 12.1 - 15.1 gm/dL     | 13.1 gm/dL      |
| Hematocrit       | 35.5 - 46.9%          | 40.40%          |
| Platelets        | 150 - 450 K/mm³       | 298 K/mm³       |
| Absolute basophils | 0.0 - 0.2 K/mm³     | 0.1 K/mm³       |
| Nucleated red blood cells % | 0 - 0% | 0% |
| Immature granulocytes | 0 - 0 K/mm³ | 0.1 K/mm³ |
| Neutrophils      | 1.4 - 6.5 K/mm³       | 8.3 K/mm³       |
| Lymphocytes      | 1.2 - 3.4 K/mm³       | 4.2 K/mm3       |
| Monocytes        | 0.1 - 0.6 K/mm³       | 0.7 K/mm³       |
| Eosinophils      | 0 - 0.7 K/mm³         | 0.2 K/mm³       |
| **Chemistry**    |                       |                 |
| Sodium           | 135 - 145 mmol/L      | 136 mmol/L      |
| Potassium        | 3.5 - 5.3 mmol/L      | 4.3 mmol/L      |
| Chloride         | 98 - 107 mmol/L       | 103 mmol/L      |
| Carbon dioxide   | 21 - 32 mmol/L        | 23 mmol/L       |
| Anion gap        | 8 - 12 mEq/L          | 10 mEq/L        |
| Blood urea nitrogen | 7 - 18 mg/dL        | 9 mg/dL         |
| Creatinine       | 0.6 - 1.3 mg/dL       | 0.6 mg/dL       |
| Glucose          | 74 - 106 mg/dL        | 142 mg/dL       |
| Calcium          | 8.4 - 10.2 mg/dL      | 10.2 mg/dL      |

**TABLE 1: Hematology and chemistry profiles of the patient**

The patient had a small amount of blood in the urine, large leukocyte esterase, and elevated white blood cells (WBCs) in the urine (Table 2).
**TABLE 2: Urinalysis of the patient**

| Urinalysis                        | Normal range          | Patient result |
|-----------------------------------|-----------------------|----------------|
| Urine color                       | Yellow                | Yellow        |
| Urine appearance                  | Clear                 | Clear        |
| Urine pH                          | 5.0 - 8.5             | 6.0           |
| Urine specific gravity            | 1.005 to 1.030        | 1.015         |
| Urine protein                     | Negative              | Negative      |
| Urine glucose (stick; mg/dL)      | Negative              | Negative      |
| Urine ketones                     | Negative              | Negative      |
| Urine blood                       | Negative              | Small         |
| Urine nitrate                     | Negative              | Negative      |
| Urine bilirubin                   | Negative              | Negative      |
| Urine urobilinogen                | 0.2 - 1.0 EU/dL       | 0.2 EU/dL     |
| Urine leukocyte esterase          | Negative              | Large         |
| Urine RBC                         | 0 - 5 /Hpf            | 0-5 /Hpf      |
| Urine WBC                         | 0 - 5 /Hpf            | 10-20 /Hpf    |
| Urine WBC clumps                  | Negative              | Rare          |
| Urine epithelial cells            | 0 - 5 /Hpf            | 0-5           |
| Urine HCG, qual                   | Negative              | Negative      |

Noncontrast computed tomography (CT) of the abdomen and pelvis showed a large right adnexal mass made up of solid and fatty tissue. Differential diagnoses included a large teratoma that could potentially be malignant (Figure 1), prompting ultrasonographic evaluation.
FIGURE 1: Abdominal and pelvic CT

Arrow denotes ovarian mass.

The pelvic ultrasound showed an endometrial thickening of 2.8 cm (Figure 2).
Doppler evaluation on pelvic sonogram did not reveal any evidence of ovarian torsion. A large heterogeneous right adnexal lesion was noted. It was characteristic of a dermoid cyst and comprised of fat and soft tissue (Figure 3).

The patient was treated with intravenous fluids and given ketorolac for analgesia and ceftriaxone for the urinary tract infection (UTI). The patient was discharged home with a prescription for nitrofurantoin and given follow-up to gynecology for her ovarian mass.

**Discussion**

Typically found in the second and third decades of life, dermoid ovarian cysts are the most common germ cell tumor and are difficult to diagnose based on symptoms alone [6]. This may be in part due to their inconspicuous nature. They do not grow quickly and rarely produce symptoms unless secondary to complications [6]. These complications can include torsion, abdominal pain or distension, infection, vaginal
bleeding, nausea and vomiting, rupture, and on rare occasions, active hormone production [6,7]. The larger
the cyst, the greater the risk of torsion. In two applicable case studies involving ovarian dermoid tumors,
prolactin levels were found to be associated with dermoid tumors [6,8]. The high likelihood of an ovarian cyst
going undetected makes imaging essential to its diagnosis.

For all asymptomatic women, regardless of whether they are pre- or postmenopausal, a transvaginal
ultrasound scan, as was used in this case, is preferred [2]. Dermoid cysts are fairly simple to recognize on
pelvic imaging by the presence of bones or teeth [1]. However, in some cases, it is easy to confuse these
findings with a complex hemorrhagic cyst. In these situations, signs such as the ‘dot-dash’ sign occur when
hyperechoic lines and dots resembling Morse code appear on the image. These ‘dots’ and ‘dashes’ originate
from the hairs in the dermoid cyst. Due to their strength in detecting fat, cross-sectional CTs and magnetic
resonance imaging (MRI) are very effective for detecting dermoid cysts as well [3].

Several different surgeries are used to remove ovarian dermoid cysts. Operative laparoscopy tends to be
preferred to a laparotomy due to benefits such as less blood loss, reduced pain, and a more pleasing cosmetic
result; however, it also has a longer operating time and a higher chance of cyst spillage, in addition to a
higher recurrence rate [2]. Cyst spillage on rare occasions causes chemical peritonitis and can be challenging
to treat. However, if it does occur, it is more easily treated during laparoscopy [2]. In the case of ovarian
cystectomy, as opposed to oophorectomy, fertility status is typically used to determine a course of action.
Cystectomy is commonly chosen for younger women unless the patient dictates otherwise, and oophorectomy is more common for post and perimenopausal women [2].

Ovarian cancer, behind endometrial and cervical cancer, is the third most common female cancer [9].
Fortunately, dermoid tumors are rarely malignant [1]. Only one to two percent of ovarian dermoid cysts are
malignant, and they are more common in women fifty years and older [7]. A dermoid tumor is malignant
only when the tissues are immature. However, although a tumor may be primarily benign, there could be
some immature, malignant components still present [1]. Cancers, such as squamous cell carcinoma,
adenoacarcinoma, melanoma, thyroid carcinoma, and many others, can originate from the dermoid cyst [7].
There are also non-ovarian cancers that can mimic ovarian cancer. One such cancer is primary fallopian tube
carcinoma. It typically occurs in women 40-65 years old and is a very rare tumor. However, the prevalence
estimate of the tumor could be hindered by an incorrect diagnosis. It can present similarly to an ovarian cyst
with symptoms such as vaginal bleeding and abdominal pain [10]. Up to seventy percent of tumors are in
phase three or four when they are diagnosed [8]. Surgery, radiotherapy, and chemotherapy are typically used
to manage it. However, the survival rate is 30% over five years. In situations of early detection, however, it
increases to 90% [8]. This underscores the importance of follow-up assessment even if the lesion is
asymptomatic and found incidentally on imaging.

Conclusions
Ovarian dermoid cysts, while mostly benign, do have the potential to cause serious health issues if untreated
in the early phases. However, as demonstrated in this case, they can occur even in the absence of positive
family history. The earlier a dermoid cyst is found, the lower the morbidity for the patient. While a definitive
diagnosis may not be possible in the ED, the liberal use of ultrasonography is helpful in detecting ovarian
masses.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. HCA Centralized
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