

Demons-Meigs syndrome – Diagnosis and therapeutic conduct

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Abstract: Demons-Meigs syndrome is a rare benign pathology that can be confused with other benign and malignant pathologies. The clinical picture is marked by an increase in abdominal volume, pelvic-abdominal pain, but it can also be associated with breathing difficulties due to excess ascites fluid and pleurisy. Imaging paraclinical examination easily reveals the three components: ascites, pleurisy, and ovarian mass.

Surgical treatment helps to relieve symptoms in a relatively short time.

Keywords: Meigs, ovarian tumor, imaging examinations

INTRODUCTION

Demons-Meigs syndrome is represented by three elements: benign ovarian tumor – fibroids, ascites, and pleural effusion. Most often, it is a diagnosis of exclusion. Sometimes, the ovarian tumor can also be represented by thecoma, fibrothecoma, granular cell tumor, less often Brenner tumor. The prevalence and incidence of this syndrome are not fully known; an increase proportional to age was observed, the average of this pathology being around 50 years of age. At the same time, cases of pseudo-Demons-Meigs syndrome were reported in prepuberty in which the benign tumor was represented by another type of ovarian tumor formation (teratoma or cystadenoma). Of the ovarian masses surgically excluded, a percentage between 2 and 5% is represented by ovarian fibroids, and only 1-2% of

them meet the criteria necessary for Demons-Meigs syndrome [1].

Demons-Meigs syndrome was first described in 1937 by gynecologist Joe Vicent Meigs, professor at Harvard Medical School, and by the pulmonologist John Class, in the American Journal of Obstetrics and Gynecology. The name Demons associated with the syndrome is given by Albert Jean Octave Demons, in 1887, when he communicates 9 cases of ovarian tumors that associate ascites fluid and hydrothorax [1].

Demons-Meigs syndrome involves the remission of ascites and pleural fluid when a benign ovarian tumor is surgically excluded – this fact is noticed and established by Albert Jean Octave Demons in 1903. Life expectancy after surgical treatment is the same as that of the general population [1].

Ascites was found in 10-15% of patients with ovarian fibromatous formations, while pleural fluid was identified in 1% of them. Pleural effusion is frequently located on the right side – in about 70%, while in 15% it is located on the left or bilateral side [1, 2].

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In addition to this syndrome, the pseudo-Demon-Meigs syndrome has been described, in which, along with ascites and hydrothorax, there is another benign ovarian tumor such as struma ovarii tumor, a teratoma, or a mucinous cystadenoma. The associated tumor may also belong to the salpinx, uterus, or may be a distant metastasis or a gastrointestinal tumor.

Ovarian tumors can be classified into germ cell tumors, gonadal germ cell tumors, and surface epithelial tumors [2].

Germ cell tumors account for 10-15% of all ovarian tumors and can be classified: (mature and immature) teratoma, dysgerminoma, gonadoblastoma, embryonal carcinoma, non-gestational choriocarcinoma. Only mature teratoma and gonadoblastoma are benign tumors [2].

The group of sex cord-stromal tumors includes granular cell tumors, fibroids-thecoma group (95% benign), Sertoli-Leydig cell tumors (5% malignant), gynandroblastoma (always malignant), and steroid cell tumors (70% benign).

Surface epithelial-stromal tumors come from the coelomic epithelium and account for 80-85% of all ovarian tumors. They include serous and mucinous cystadenoma (80-85 % benign), endometrioid tumors, clear cell tumors (which are 95-98% malignant), and Brenner tumor (benign in 98% of cases) [2].

PHYSIOPATHOLOGY

The etiology of ascitic fluid is poorly understood. A possible explanation for its appearance is due to the phenomenon of peritoneal irritation caused by ovarian fibroids. Also, the ovarian tumor could favor the appearance of ascites by the effect on the surrounding vessels represented by both the lymphatic vessels and capillaries. Another explanation would be the discharge of certain cytokines and interleukins that would increase capillary permeability, the result being ascites. Other hypotheses suggest that ovarian tumor torsion or hormonal stimulation may cause ascites. Many authors claim that tumors with an increased diameter of more than 10 cm could stimulate the secretion of ascitic fluid [2, 3].

The etiology of hydrothorax is unclear. The accumulation of pleural fluid is frequently on the right side, but can also be on the left or bilateral side. It is speculated that it was due to the transfer through the transdiaphragmatic lymphatics from the ascitic fluid. The amount of pleural fluid is directly proportional to that of ascitic fluid. The blockage of transdiaphragmatic lymphatics has been found to prevent pleural fluid from accumulating, while the amount of ascitic fluid increases [3].

It has been shown that both ascitic and pleural fluid can be exudative (rich in protein, caused by increased membrane permeability due to inflammation) and transudative (low in protein, by the increase of the hydrostatic pressure and decrease of the colloid osmotic pressure). However, pleural fluid is often exudative. Electrophoresis has shown that pleural fluid and ascitic fluid are of the same nature [3].

Figure 1: Giant ovarian fibroids. A 69-year-old woman who was brought to the Emergency Room of the Central Military Emergency University Hospital for altered general condition, dyspnea with orthopnea, loss of appetite, and enlarged abdominal volume, CA 125 is dosed – it's the value being 2317.7 U/mL



The signs and symptoms of this etiology include altered general condition, physical asthenia, fatigue, dry cough, weight gain, or loss. Among the gynecological signs and symptoms found in Meigs syndrome is amenorrhea, menstrual disorders (menometrorrhagia for women in the perimenopause period or metrorrhagia in the climax), iron deficiency anemia. A unilateral abdominal ovarian mass may be found, more often on the left or bilateral side, solid, asymptomatic, or symptomatic due to the presence of abdominal-pelvic pain, mass effect on surrounding organs [4].

The appearance of ascitic fluid generates abdominal distension, dyspeptic disorders (nausea and vomiting) due to increased intra-abdominal pressure, and constipation.

The appearance of pleural fluid leads to tachycardia, tachypnea, dyspnea with orthopnea, the abolition of the transmission of vocal vibrations, decrease or reduction of vesicular murmur, declivitous dullness to percussion. Pleural effusion is more common on the right side, may be exudative, protein-rich, or transudative. In the case of diagnosis or evacuation paracentesis or thoracentesis, it is found that the fluid does not contain malignant cells even if

it is exudative or transudative [5].

The differential diagnosis of Demons-Meigs syndrome is broad and includes benign and malignant pathologies, and most often it is a diagnosis of exclusion.

The main differential diagnosis is with ovarian neoplasm, metastases from a breast neoplasm, colorectal, liver failure, nephrotic syndrome, Milroy's disease, tuberculosis, lung cancer, gastrointestinal tumors.

LABORATORY TESTS

The blood count shows information about hemoglobin, platelet count, and hematocrit. If the hemoglobin level is low, further investigations may be performed including syderemia, ferritin, total iron-binding capacity, and reticulocyte count. Iron deficiency anemia may require iron therapy before surgery or in more severe cases may be corrected by blood transfusion. Treatment with iron-containing supplements is continued postoperatively.

Carrying out clotting time is imperative before surgery. The ionogram is determined by checking and correcting any anomalies [1, 4].

Thoracentesis and paracentesis indicate whether the nature of the fluid is exudative or transudative type, and the cytological examination refutes the existence of malignant cells.

One blood biomarker used is CA 125. It is the antigenic representative of a 220-kD glycoprotein, and the physiological sources are represented by the coelomic epithelium and derivatives: pleura, pericardium, peritoneum as well as the epithelium of the fallopian tubes, endometrium, endocervix. Elevated values of this biomarker can be found in pregnancy, ovarian neoplasm, uterine fibromatosis, endometriosis, pelvic inflammatory disease, cancer of the fallopian tubes, but also in other non-gynecological pathologies (liver failure, kidney failure, autoimmune diseases) [5, 6].

In Demons-Meigs syndrome, there is an increase in the value of CA 125 which does not correlate in this case with the malignancy and which remits after the surgical exclusion of ovarian fibroids.

IMAGING EXPLORATIONS

Ultrasound is an investigation that detects tumor mass. The ultrasound appearance depends on the degree of compromise of vascularity, ovarian formations, and the presence or absence of adnexal hemorrhages. Ultrasound is the method of choice for symptomatic women but is limited

in differentiating an ovarian lesion from a para ovarian one.

The radiography confirms and quantifies the existence of pleural effusion.

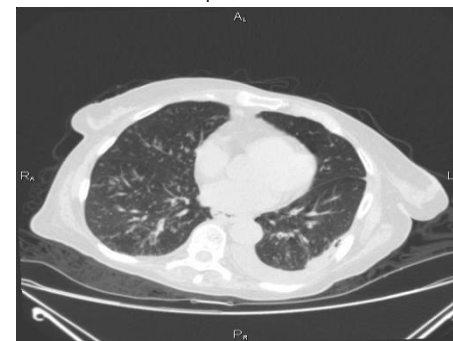
Figure 2: CT sections in the coronal plane. Tumor formation with probably left ovarian starting point, which includes tissue areas and areas of necrosis; ascitic fluid in increased amounts.



Figure 3: CT sections in the axial plane. Tumor formation with probably left ovarian starting point, which includes tissue areas and areas of necrosis; ascitic fluid in increased amounts.



Figure 4: CT section of the thoracic region in the axial plane, parenchymal window. Accentuation of the interstitial lung disease and left pleural effusion.



CT exploration of the abdomen and pelvis is a quick way to explore with great accuracy. Serial images formed during the exploration can be viewed on a screen, stored, and with

them, three-dimensional reconstructions can be obtained, that provide precise details about the location of the tumor, vascular intake, but also useful information for the surgical approach. It can be done natively or after injecting an intravenous contrast-enhancing agent. CT examination may also be helpful when attempting tumor punch biopsy. The risks associated with this investigation are the cumulative effect of radiation. CT examination is contraindicated in pregnancy. Contrast enhancing agent allergy allows only the performance of native CT. Kidney failure is also a contraindication to the administration of the contrast-enhancing agent. In Demons-Meigs syndrome, CT examination confirms the existence of pleural fluid, ascitic fluid, ovarian tumor mass, and excludes distant metastases or the existence of other neoplasms [7, 8].

Figure 5: CT sections in the axial plane. Heterodense tumor formation with tissue structures and areas of necrosis included, clearly delimited, developed ilio-pelvic on the left side.



Figure 6: CT sections in the axial and sagittal plane. Heterodense tumor formation with tissue structures and areas of necrosis included, clearly delimited, developed ilio-pelvic on the left side.



Figure 7: CT section of the upper abdomen in the axial plane. Fat densifications in the supramesocolic space.



Magnetic resonance imaging characterizes suspicious adnexal masses, establishes ovarian affiliation in inconclusive ultrasound cases, argues in favor of benignity or malignancy of ovarian tumor mass, and specifies other associated abnormalities – peritoneal carcinomatosis, adenopathies.

Figure 8: CT section in the axial plane in the mediastinum. No mediastinal tumor adenomegalies; left pleurisy.



TREATMENT

The treatment of Demons-Meigs syndrome is surgical and is represented by exploratory laparotomy with surgical staging. Biopsy of ovarian mass, omentum, and lymph nodes that reveal benign nature can be performed [7, 9].

If the patient is in the prepubertal period, tumorectomy, partial oophorectomy, and unilateral salpingectomy are used. In women of childbearing potential, surgical treatment involves unilateral adnexectomy. Surgical treatment of menopausal patients may include total hysterectomy with bilateral adnexectomy [7, 8].

Figure 9: Woman 69-year-old – intraoperative: ascitic fluid is found (approximately 500 ml which is collected and sent for histopathological examination); fibroid uterus; right adnexa modified according to age, and at the level of the left adnexa a tumor formation with dimensions of 18/14/10 cm, firm consistency, white-yellowish color, irregular, pedunculated shape. Total hysterectomy with bilateral adnexectomy is performed (with the sending of the samples to anatomopathological examination).



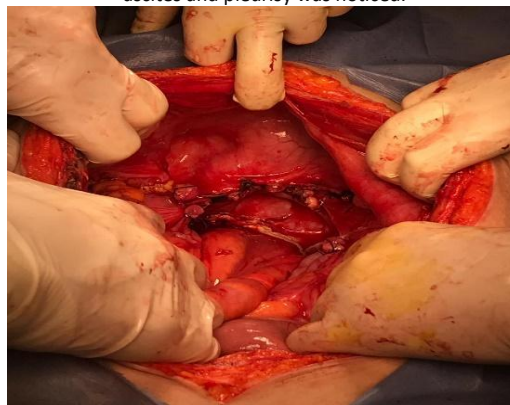
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The cure rate is high and no recurrences have been reported after the disappearance of the ovarian tumor. Ascites and pleural effusion disappear within a few weeks after surgical exclusion of the pelvic mass [7, 8].

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Figure 10: Intraoperative image after total hysterectomy with bilateral abdominal adnexectomy for giant ovarian fibroids. The postoperative evolution was favorable under antibiotic, anticoagulant, anti-inflammatory treatment, and the treatment of the underlying pathology. Gradual remission of postoperative ascites and pleurisy was noticed.



CONCLUSIONS

Demon's-Meigs syndrome is defined by ovarian tumor with pleural effusion and ascites. Ovarian tumor is benign and is usually ovarian fibroids. After excluding the ovarian tumor, ascites, and pleural effusion remit. CA 125 tumor marker has elevated values similar to ovarian cancers, but values return to normal after surgical treatment. Even though this syndrome has been described for more than 100 years, it still poses problems in diagnosis, having an uncharacteristic picture. Molecular, hormonal, genetic, and mechanical factors are involved in its etiopathogenic mechanism.

The only treatment available for the remission of symptoms is surgery.

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