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ULTRASOUND EVALUATION OF THE UTERUS AND OVARIES IN A CASE OF AMENORRHEA OCCURING DURING THE ADMINISTRATION OF COMBINED ORAL CONTRACEPTIVES IN A YOUNG SMOKING WOMAN

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ABSTRACT

The subject of this paper is the presentation of a clinical case of amenorheea occuring during the administration of combined oral contraceptives în a young smoking woman. The ultrasound examination of the uterus after 51 days of amenorrhea showed a hyperechoic and thickened endometrium. The measurement of the chorionic gonadotrophin showed a value of 835.8 mUI/ml, which corresponds to a pregnancy of 5 or 6 weeks of gestation. The ultrasound examination was repeted after 66 days of amenorrhea and an intrauterine pregnancy with a viable embryo was observed. The embryo had a crown-rump length of 6.1 mm, corresponding to a pregnancy of 6 weeks and 3 days of gestation.

INTRODUCTION

Sonography is the imaging modality of choice for evaluation of the female pelvis, including the uterus and the adnexal structures. A combination of transabdominal scanning and transvaginal examination is performed in most patients. The transvaginal ultrasound allows obtaining high-resolution imaging. Ultrasound examination correlated with clinical information is often sufficient for diagnosis and patient management (Poder 2017).

Normal sonographic findings in the early first-trimester for an intrauterine pregnancy include the visualization of the gestational sac and embryo. Approximately 1 week after fertilization, the pregnancy implants în the decidua, but it is not visible on ultrasound for about 2 more weeks. Embryo grows at the rate of 1 mm/ day and it is first visible at 6.0 weeks (Doubilet & Benson 2017).

Human chorionic gonadotrophin (hCG) is the first specific molecule synthesized by the embryo. The blastocist produces the protein before its implantation. HCG RNA is transcribed as early as the eight-cell stagemmRahman & Rao 2009, Gridelet et al. 2020).

A populational-based study made between 2012 and 2018 determined the accuracy of first-trimester serum human chorionic gonadotrophin for estimating gestational age. The study included 273 584 singleton live births that had a first-trimester ultrasound. Between 4 to 8 weeks of gestation, sensitivity of hCG was over 88% and specificity over 51%. The positive predictive value was under 42% and negative predictive value was over 96% (Velez et al. 2023).

MATERIALS AND METHODS

The uterus and ovaries were examined by ultrasound, using a Siemens Aloka-5-alpha ultrasound and a transducer with a frequency of 6.5 MHz for transvaginal examination. Longitudinal, transverse and coronal sections of the uterus were performed and the following aspects were evaluated:

- the dimensions of the uterine body and cervix;
- the net or diffuse outline of the uterus;
- the appearance of the myometrium, the symetry of the anterior and posterior walls;
- the thickness of the endometrium and the hypoechoic/ echogenic/ hyperechoic aspect;
- the appearance of the endocervical canal;
- the presence/ absence of a quantity of fluid in the Douglas retrouterine space.

The sizes of the ovaries and ovarian follicles were measured. For each structure, the vascularity was evaluated using the pulsed color Doppler examination.

The first ultrasound evaluation was performed after a period of 51 days of amenorrhea and the second one 15 days later, after a period of 66 days (9w3d) of amenorrhea.

A commercial pregnancy test performed by the pacient at home was negative. After the first examination, the beta chorionic gonadotrophin hormone was measured, which proves with certainty the development of a pregnancy before it becomes visible on the ultrasound.

RESULTS AND DISCUSSIONS

The ultrasound examination performed on day 51 of amenorrhea showed that the uterus was placed in retroversion position and had dimensions of 5.30 cm/ 5.67 cm and irregular outline. The cervix had dimensions 2.77 cm/ 2.17 cm and a linear endocervical canal (Figure 1).

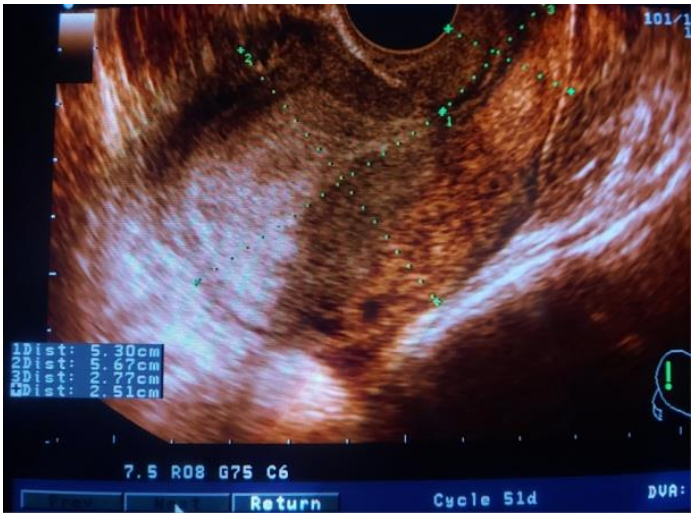

Figure 1. Longitudinal transvaginal sonographic image of the uterus

The myometrium had a diffuse inhomogeneous appearance. A hypoechoic heterogeneous image was observed into the anterior wall, with dimensions of 3.58 cm/ 2.40 cm and color Doppler arterial signal inside. This appearance is suggestive for a leyomioma. (Figure 2, 3, 4).

Figure 2. Well-circumscribed, heterogeneous leyomioma in the anterior wall of the uterus

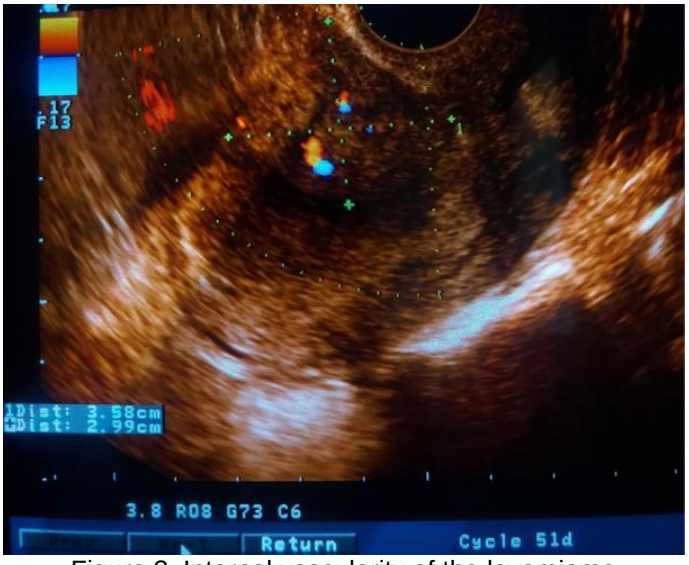

Figure 3. Internal vascularity of the leyomioma - color Doppler image

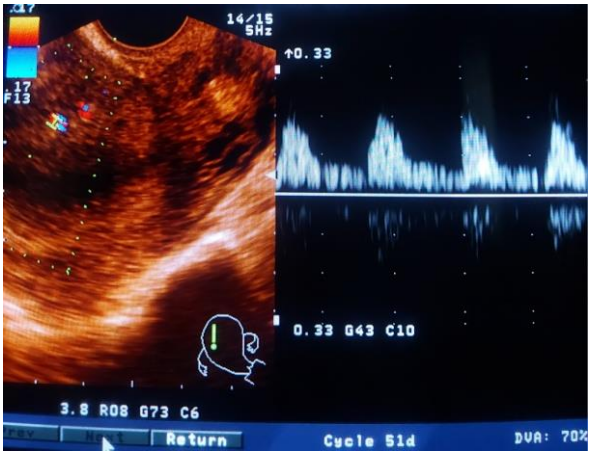

Figure 4. Arterial spectral Doppler flow recording

The endometrium had an hyperechoic appearance and a thickness of 3.20 cm (Figure 5).

The right ovary had dimensions of 4.02 cm/ 3.06 cm and three round-oval formations were observed in its structures. Two of them had dimensions of 1.39 cm and, respectively 1.26 cm, and an heterogeneous appearance, partially anechoic, partially echogenic, with “suspended” appearance (suggestive for a hemorrhage). The third formation had a diameter of 0.97 cm and a hypoechoic appearance. There was no fluid in the Douglas space (Figure 6, 7, 8, 9).

The left ovary was absent, having been surgically removed.

The hyperechoic and thickened endometrium is characteristic, but not sufficient to support the diagnosis of pregnancy (Pelinescu-Onciul & Bari 2005).

The measurement of the chorionic gonadotrophin showed a value of 835.8 mUI/ ml, which corresponds to a pregnancy of 5 or 6 weeks of gestation. For a pregnancy of 5 weeks of gestation, the values of the chorionic gonadotrophin varies between 217 mUI / ml and 7138 mUI/ml. For a pregnancy of 6 weeks, the values varies between 158 mUI/ ml and 31 795 mUI/ml (www.synevo.ro)

Because the pregnancy was not visialized inside the uterine cavity, it cannot be determined at this time if it is a pregnancy too small to be seen, or if it may be an ectopic pregnancy.

The differential diagnosis is more difficult considering the clinical context in which the pregnancy occurred, during the administration of combined oral contraceptives.

The patient stated that she forgot to take some pills, but she could not specify the number of pills she forgot and if there were several consecutive days. The contraceptives that the patient was using had a concentration of 0.02 mg of ethinylestradiol and 0.075 mg of gestodene.

Another factor that may have interfered with the effectiveness of the contraceptive is the factor that the patient is a smoker, the amount of tobacco consumed being one pack per day.

The aromatic hydrocarbons contained in cigarette smoke have enzyme-inducing properties and determine the faster metabolism of hormones, thus reducing their concentration (Basu et al. 1992, Kroon 2007).

The patient probably needed an oral contraceptive with a higher concentration of the estrogen hormone.

Figure 5. Transverse transvaginal sonographic image of the uterus – shows endometrial thickening

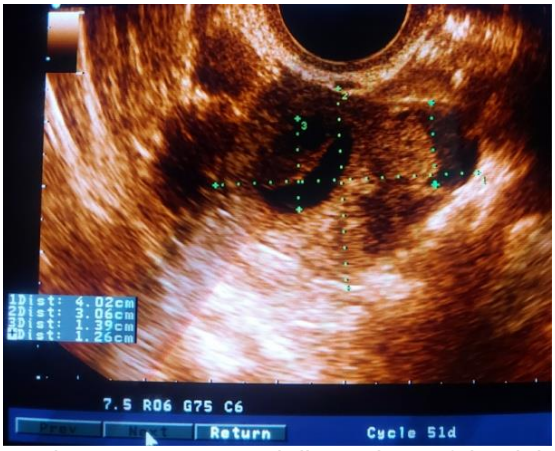

Figure 6. The appearance and dimensions of the right ovary

Figure 7. The right ovary – heterogeneous echotexture

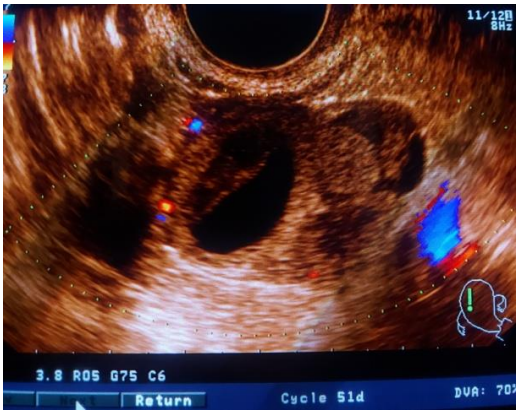

Figure 8. The right ovary – another section

The ultrasound examination performed at 66 days of amenorrhea showed the presence of a gestational sac with in uterine cavity, an yolk sac and an embryo with crown-rump length of 6.10 mm, corresponding to a pregnancy of 6 weeks and 3 days of gestation (Figure 10, 11).

Figure 9. Color Doppler image of the vascularity of the right ovary

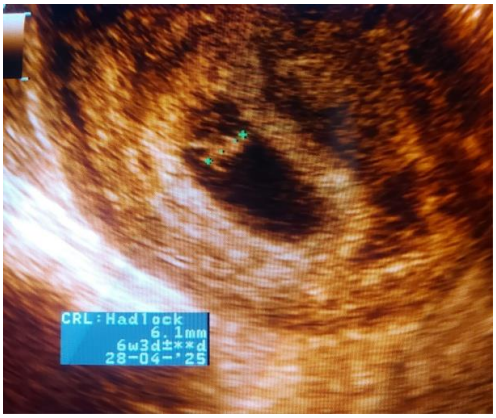

Figure 10. The gestational sac and the embryo with crown-rump length of 6.10 mm

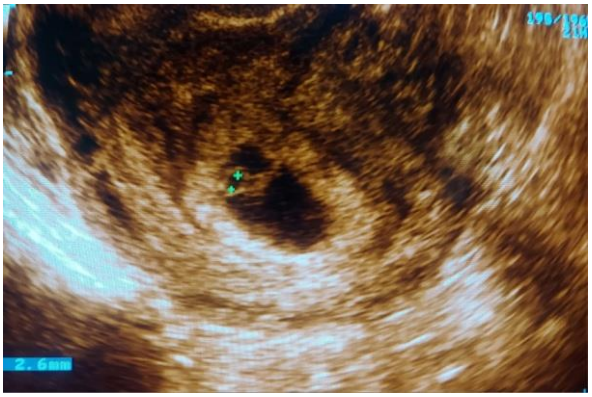

Figure 11. The yolk sac adjacent to the embryo

CONCLUSIONS

In order to establish a correct diagnosis, it is essential to correlate the clinical information with the ultrasound examination and laboratory tests.

Ultrasound examination is the only method that can confirm the diagnosis of intrauterine pregnancy by visualizing the gestational sac and the embryo, especially in women with irregular menstrual cycles, in whom the gestational age of the pregnancy cannot be established using the data of the last menstruation.

The chorionic gonadotrophin measurement confirm the diagnosis of pregnancy, but cannot alone determine the intrauterine development of the pregnancy, even if there are different growth rates of the hormone values.

The occurrence of a pregnancy during the administration of combined oral contraceptives does not affect the development of the embryo and does not require termination of the pregnancy.

REFERENCES

Basu J., Mikhail M.S., Palan P.R., Thysen B., Bloch E., Romney S.L. 1992. Endogenous estradiol and progesterone concentrations in smokers on oral contraceptives. Gynecol Obstet Invest.; 33(4):224-7. doi: 10.1159/000294888. PMID: 1505811

Doubilet P. M., Benson Carol. 2017. Ultrasound of the Early First Trimester. In „Callen's Ultrasonography in Obstetrics and Gynecology". Sixth Edition. Elsevier. 82-97.

Gridelet V., Perrier d'Hauterive S., Polese B., Foidart J.M., Nisolle M., Geenen V. 2020. Human Chorionic Gonadotrophin: New Pleiotropic Functions for an "Old" Hormone During Pregnancy. Front Immunol.; 11:343. doi: 10.3389/fimmu. 2020.00343. eCollection 2020. PMID: 32231662. Free PMC article. Review.

Kroon L.A. 2007. Drug interactions with smoking. Am J Health Syst Pharm.; 64(18):1917-21. doi: 10.2146/ajhp060414. PMID: 17823102. Review.

Pelinescu-Onciul D., Bari Maria. 2005. Ecografia sarcinii normale în primul trimestru de sarcină. În „Ecografia în obstetrică şi ginecologie". Editura Didactică şi Pedagogică. Bucureşti. 78-81.

Porche Lea, Abuhamad A. Ecografia. 2019. În „Ghiduri şi protocoale în obstetrică". Editor Vincenzo Berghella. Ediţia a treia. Editura Hipocrate. Bucureşti. 48-58.

Rahman N.A., Rao C.V. 2009. Recent progress in luteinizing hormone/human chorionic gonadotrophin hormone research. Mol Hum Reprod.;15(11):703-11. doi: 10.1093/molehr/gap067. Epub 2009 Aug 26. PMID: 19710244. Review.

Velez M.P., Shellenberger J., Ray J.G. 2023. Accuracy of Serum Human Chorionic Gonadotrophin for Estimating Gestational Age in the First Trimester of Pregnancy: Population-Based Study. J Obstet Gynaecol Can.; 45(5):331-337. doi: 10.1016/j.jogc.2023.02.015. Epub 2023 Mar 15. PMID: 36924991.

*** 2010, Synevo Laboratory. References specific to the work technoogy used. https:// www.synevo.ro/ shop/ hcg-total-hcgbeta.