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AN OVERVIEW OF OVARIAN CYSTS

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ABSTRACT: To study various types of the benign cyst, differential diagnosis, diagnosis for identification of cyst, suitable treatment options based on various types of cysts that are occurring in the ovaries. An ovarian cyst is a commonly occurring mass in reproductive-age women. Functional ovarian cysts are physiologic and usually dissolve spontaneously within a couple of menstrual cycles. A combination of oral contraceptives can be used to prevent the occurrence of these cysts. The scope of this review is to focus on the types, causes, and treatment options of benign ovarian cyst in the fertile women. Ovarian cysts are a commonly occurring condition in women nowadays. The differential diagnosis includes functional cysts, dermoid cysts, endometrioma, and another confirmatory diagnosis such as ultrasonography are used to know the type and size of the occurring mass in the ovaries. A suitable evaluation includes a medical history and physical examination, laboratory tests, and other imaging modalities. The treatment options include conservative follow-ups, medical treatment with the help of pills, and lastly, surgery depending upon the severity of the case.

INTRODUCTION: The ovaries are paired sex glands or gonads in the female who are concerned with germ cell maturation, storage, and release, which is known as ova or ovum. The ovaries are also concerned with steroidogenesis. The substance of the gland consists of the outer cortex, which shows the structural changes during the ovular cycle. The medulla consists of connective tissue, some unstripped muscles, blood vessels, and nerves and also has hilus cells that are homologous to the interstitial cells of the testes. The functional cysts of the ovary are related to temporary hormonal disorders.

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The functional cysts are different from the neoplastic cysts as they are; usually, 6-8 cm, asymptomatic, regress spontaneously, are unilocular, contain clear fluid [1].

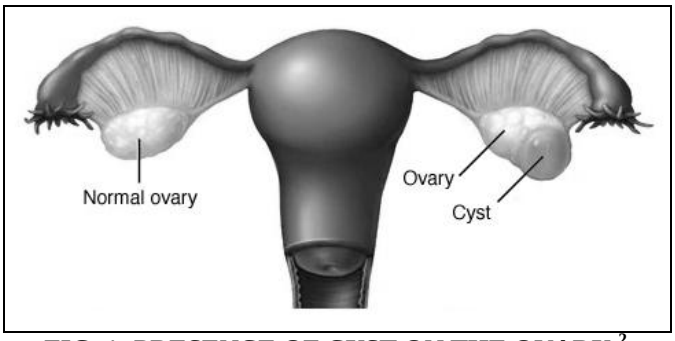

FIG. 1: PRESENCE OF CYST ON THE OVARY [2]

Ovarian cysts are the common gynecological problems encountered by gynecologists in their daily practice. They can occur in any age group in females. They are broadly divided into two types, *i.e.*, physiological or pathological.

Physiological cysts are mainly follicular and luteal cysts and need no treatment unless the cysts are complicated. Pathological cysts can be benign or malignant. Benign tumors are more common in young females, while malignant ones are common in elderly females. Benign tumors generally are not harmful and will not lead to cancer, while the malignant tumor is harmful and will become cancerous in the future; hence should be treated immediately [3].

Ovarian cysts don't show any symptoms until they become large up to a harmful size; thus, diagnosis is required to detect them. The number of diagnosed cases of ovarian cysts has improved with the widespread carrying out of regular physical examinations by gynecologists and ultrasonographic technology. The detection of an ovarian cyst causes substantial anxiety in women owing to fears of malignancy and cancer, but a majority of ovarian cysts are benign. These cysts can progress in females at any stage of life, from the neonatal period to the post-menopausal stage. Most ovarian cysts arise during infancy and adolescence, which are hormonally active periods and cysts usually occur due to hormonal imbalance. Most cysts are functional in nature and resolve without any treatment. However, ovarian cysts can become a reason for an underlying malignant process and may even distract the gynecologists from a more unsafe condition, such as appendicitis, ovarian torsion, or ectopic pregnancy. When ovarian cysts are initially diagnosed, large, painful, or persistent, then medicinal/surgical methods may be required to remove a cyst from the ovary, but if the cysts are frequently occurring, then ovaries may be removed permanently to avoid any further complications [4].

Signs and Symptoms: Most patients with ovarian cysts are asymptomatic; the ovarian cyst remains undiscovered as no identifying symptoms are observed until ultrasonography or routine pelvic examination is done by a gynecologist. Some cysts, however, may be associated with a range of symptoms, which are sometimes severe, while malignant ovarian cysts frequently do not cause symptoms until they reach an advanced stage. Pain or anxiety may arise in the lower abdomen. Torsion (twisting) or rupture may lead to more severe pain. In cyst rupturing, there is sudden, unilateral, sharp pelvic pain. This can be allied with trauma, exercise, or coitus. Furthermore, cyst rupture can lead to peritoneal signs; abdominal distention and bleeding occur that are commonly self-limited [5, 6].

Other symptoms include the following:-

- Patients may experience discomfort with intercourse, particularly deep penetration.
- Difficulty in bowel movement or pressure may develop, leading to a desire to defecate.
- Some patients may experience tenesmus.
- Abdominal fullness and bloating.
- Young children may present with precocious puberty and early onset of menarche.
- Indigestion, heartburn, or early satiety.
- Micturition due to pressure on the bladder.
- Hirsutism, infertility, oligomenorrhea, obesity, and acne.
- Irregularity of the menstrual cycle and abnormal vaginal bleeding, the menstrual interval may be prolonged, followed by menorrhagia.
- Theca-lutein cysts are normally bilateral and, therefore, can cause bilateral and dull pelvic pain [7].

These cysts can be allied with excess stimulation, as is seen in pregnancy (in particular twins), a large placenta, and diabetes. Newborns might likewise develop theca-lutein cysts as a result of the effects of maternal gonadotropins. In occasional cases, these cysts can progress in the setting of hypothyroidism, as a result of relationships between the alpha subunit of TSH and Hcg [7, 8].

Ovarian masses are categorized as functional cysts, benign neoplasm, or malignant neoplasm. In a review of females under the age of 21 undergoing surgery for an adnexal mass, 57.9% of the cases were diagnosed with an ovarian cyst. The prepubertal adolescent is at risk of developing functional cysts due to the failure of the involution of follicles, i.e., follicle's capacity to shrink up to normal size. Prepubertal cysts are commonly

caused by gonadotropin stimulation of the ovary by the immature hypothalamic-pituitary axis. These cysts are mostly small (<1cm) and insignificant and may disperse themselves after some time. In the post-pubertal adolescent, cysts result from failure of ovulation or persistence of ovarian follicles [9-11].

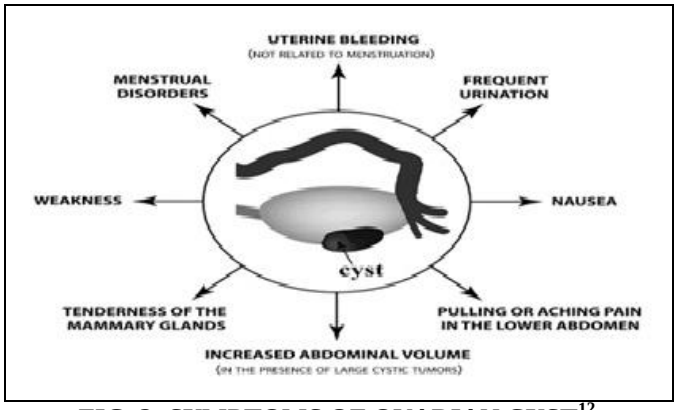

FIG. 2: SYMPTOMS OF OVARIAN CYST[12]

Diagnosis:

Differential Diagnosis: Differential diagnosis of an adnexal mass should include gynecologic and non-gynecologic sources for the evaluation. When evaluating an ovarian cyst, the differential diagnosis includes both benign and malignant lesions; it is mainly done to distinguish a benign tumor from a malignant tumor or other serious conditions with a similar occurrence and symptoms [13]. At an early age group, the vast majority of ovarian masses are benign; however, due to suspicion of malignancy and some other conditions like the presence of pregnancy, leukocytosis, anemia, and hemorrhage, differential diagnosis is required to separate ovarian cyst from other conditions.

Benign ovarian cysts include:

- Functional cysts,
- Follicular cysts,
- Cysts following GnRH agonist treatment,
- Corpus luteum cysts,
- Theca lutein cysts,
- Benign cystic teratoma (Dermoid),
- Endometrioma,
- Serous cystadenoma,
- Mucinous cystadenoma.

Functional cysts are benign and usually asymptomatic and, therefore, do not require any treatment as they are not harmful. Followed up with repeated scans will usually confirm the spontaneous resolution of the cysts. But when the cyst is large, it may interfere with fertility treatments and *In-Vitro* Fertilization (IVF). The formation of cysts during IVF treatment may be of no clinical significance, but it may negatively influence the results of IVF treatment; hence diagnosis is very crucial for the success rate of treatments such as IVF [14].

Transvaginal Ultrasonographic guided cyst check-up is often performed in cases where cysts appear during GnRH agonist treatment before starting ovarian stimulation. Benign cysts, also known as teratoma (dermoid) cyst, is the most common ovarian tumor in women in the second and third decades of life [10]. Surgical management was often advised with a view of making a definitive diagnosis, and the cyst found was removed while preserving the healthy tissues of the ovary. Recently, a more conservative approach has been suggested regarding dermoid cysts; evidence suggests that a dermoid cyst, especially when it is smaller than 6 cm, can be a little more complicated.

If cysts are not growing and not painful, then the removal of a dermoid cyst can be delayed until family planning is resumed. Endometrioma is usually a sign of more advanced endometriosis, which is a cause of infertility. According to the new (European Society of Human Reproduction and Embryology) ESHRE guidelines, surgery should not be performed before ART only with the aim of improving the pregnancy rate. Surgery should be considered before ART for tissue diagnosis only; it reduces the risk of infection after oocyte retrieval and improves the accessibility of follicles [14-16].

Medical History and Physical Examination: During the examination of a patient with an ovarian cyst, a thorough medical history should be considered, and a complete physical examination should be done in search of warning signs of malignancy. The medical history should focus on the risk factors and warning signs for malignancy. Symptoms such as abdominal bloating, abdominal and pelvic pain, and early satiation and appetite changes should alert the physician for the presence of malignancy, and the appropriate steps should be taken for appropriate treatment approaches to be taken [17, 18].

It is also important to search for symptoms that suggest endometriosis, especially in the group of patients of reproductive age and women with infertility [18].

The physical examination should include an abdominal and pelvic region examination along with a bimanual pelvic region examination. One should look for alerting signs such as an irregular, solid, fixed, and nodular mass accumulated in the area around ovaries that might feel physically or a bilateral finding may be present. The presence of fluids in the peritoneal cavity should warn us about the possibility of malignancy. The physician should remember that physical examination has poor sensitivity for detecting ovarian masses (15% - 51%), and it will not provide reliable information about the presence of a cyst in the ovaries [18, 19].

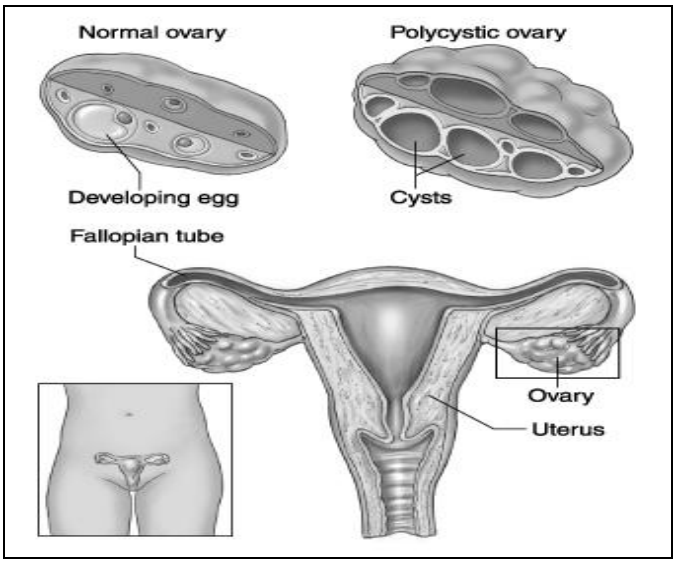

FIG. 3: REPRESENTATION OF MULTIPLE CYSTS IN OVARY [20]

Laboratory Tests: During testing of a benign ovarian mass in the reproductive age group, there is no benefit of doing CA-125 test in the reproductive-age, as, during reproductive age, there is a rise seen in numerous conditions like fibroids, endometriosis, adenomyosis, and pelvic infections during the normal menstrual cycle. This makes CA-125 test an unreliable marker for differentiating benign from malignant masses and not useful at all in the differential diagnosis of benign cysts [21-23].

Anti-mullerian hormone (AMH) is a relatively new marker for testing ovarian cyst than CA-125, and it is considered as the most accurate one available today. When the serum AMH level is found above 0.5ng/mL, it is considered to be a good ovarian reserve, while lower levels than 0.5ng/ml suggest a depleted ovarian follicle pool. Pre-operative and post-operative AMH levels can also be used as a tool for evaluating ovarian damage after surgery and comparing the condition of ovaries before and after the operation [24].

Ultrasonography: The most commonly used imaging modality is gray-scale, high-frequency transvaginal ultrasonography. In the asymptomatic and reproductive age group, this is the imaging modality of choice to detect the presence of a mass in the ovaries [25]. The ultrasonographic examination will give us information about the size, consistency, laterality, and intracystic structures (septations, nodules, papillary extensions) of the cyst [26]. Colour Doppler technique may not improve diagnostic results, but the combination of color flow mapping along with 3D imaging will improve sensitivity in complex masses, hence providing better results and helping in recognizing the actual mass [27].

Other Imaging Modalities: Computed Tomography (CT) scan and Magnetic Resonance Imaging (MRI) are the techniques that are used for the confirmation of such cases when there is a possibility of presences of malignancy.

Causes of Ovarian Cysts: The most common causes of ovarian cysts are:

Hormonal Problems: Functional cyst vanishes away on their own without any treatment. A functional cyst may occur because of hormonal problems or by drugs used for ovulation.

Endometriosis: Endometriosis is a condition when the lining of the uterus grows outside of the uterus. Women with endometriosis can develop a type of ovarian cyst due to the growth of uterus lining over the ovaries called an endometrioma. The endometriosis tissue may attach to the ovary and can start growing. These types of cysts can be painful during intercourse and during menstruation.

Pregnancy: An ovarian cyst generally develops in early pregnancy to support the pregnancy until the placenta is formed. But in a few cases, the cyst stays on the ovary until the later phase of the pregnancy and will have to be removed.

Severe Pelvic Infections: Infections of the pelvic region can spread to the ovaries and Fallopian tubes and can become a reason for the cyst to develop on the ovaries [28].

Types of Ovarian Cysts: There are many different types of ovarian cyst:

- Functional Cysts
- Follicle Cyst
- Corpus Luteum Cyst
- Dermoid
- Endometrioma
- Cystadenoma

Follicle Cyst: During the menstrual cycle, an ovum grows a sac, which is a fluid-filled pocket of tissues known as a follicle cyst. This sac is found inside the ovaries. They generally occur during the reproductive years of women as a result of ovulation. In many cases, the follicle or sac breaks open and release ova. But if the follicle doesn't open for ovum release, then the fluid inside the follicle can form a cyst on the ovaries.

Corpus Luteum Cyst: The follicle sac generally dissolves after releasing the ova, but if the sac doesn't dissolve and in the opening of follicle sacs, additional fluids can develop inside the sac, and this accumulation of fluids causes a corpus luteum cyst in the ovaries.

Dermoid Cyst: Sac like growth over the ovaries that may contain hair, fat, and other tissues.

Cystadenoma: Non-Cancerous growth can develop on the outer surface of the ovaries.

Endometrioma: Uterus lining tissues when grows outside the lining of the uterus may attach to the ovaries and can start growing their forming out a cyst [29].

Polycystic Ovaries Disorder: Some women can develop a condition known as Polycystic Ovaries Disorder (PCOD). This is a condition in which the ovaries develop a large number of small cysts on the outer edge of the ovaries. It leads to enlargement of the ovaries size, and if left untreated, PCOD can become a reason for infertility in women suffering from this. PCOD have become a commonly found disorder of women now a day, it may occur due to combination of genetic and environmental factor, or due to imbalance of reproductive hormones thus it is known as hormonal disorder also.

Complications of PCOS can include:

- Infertility gestational diabetes or pregnancy involves high blood pressure.
- Miscarriage or premature birth can happen.
- Non-alcoholic steatohepatitis: An extreme liver inflammation that is caused by fat accumulates in the liver.
- Metabolic syndrome such as a cluster of conditions like high blood pressure, high blood sugar, and abnormal cholesterol or triglyceride levels that significantly increase your risk of cardiovascular disease.
- Type 2 diabetes or prediabetes.
- Sleep asphyxia, depression, anxiety and eating disorders.
- Abnormal uterine bleeding, cancer of uterine lining (endometrial cancer) [30]

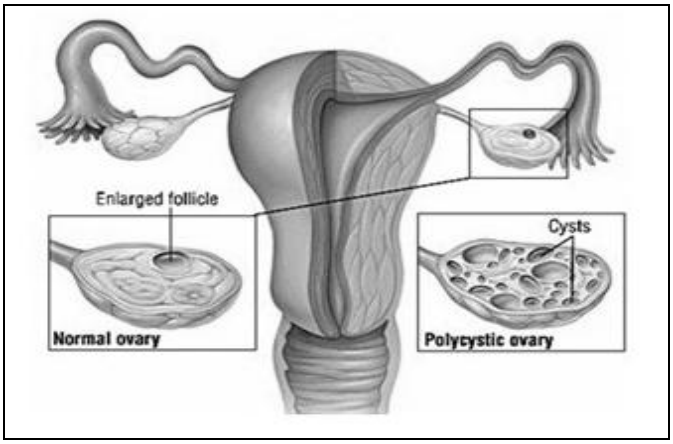

FIG. 4: NORMAL OVARY *vs.* OVARY SHOWING POLYCYSTIC OVARIES DISORDER (PCOD) [31]

Treatment Options: The treatment option for ovarian cyst includes conservative treatment, medical treatment, and surgical treatment.

Conservative Treatment: Conservative treatment can opt for women with small and simple ovarian cysts; it can be characterized by less than 50mm in diameter, thin-walled, clear fluid, and no intracystic

structures. This group of women requires no follow-up since the cysts are almost invariably physiological, and it will deteriorate spontaneously within 3 menstrual cycles [32].

Medicinal Treatment: A combination of oral contraceptives has been proposed for the treatment of functional ovarian cysts such as follicle cyst and corpus luteum cyst. According to the Cochrane review of the effects of the oral contraceptive pill in the treatment of functional ovarian cysts, there was no significant resolution of oral contraceptives in the treatment group when compared to the control group. It has been shown that the use of a combination of oral contraceptives may also be helpful in reducing the risk of cyst occurrence. Therefore, a combination of oral contraceptives is still regarded as a possible treatment option for an already existing functional cyst. There is no other medicinal treatment for benign cystic teratoma (dermoid cyst) except for expectant follow up. The problem with this type of treatment options is that they can cause infertility in women [33, 34].

Surgical Treatment: Surgical treatment should be offered when tissue diagnosis is required when the ovarian cyst is disturbing with the oocyte retrieval or ovarian stimulation. When surgery is taken into account for the reproductive-age patient, the ovarian reserve should be evaluated prior to the procedure of surgery, and if the reserve is found to be reduced, then surgery may be delayed until other treatment options should have opted. If surgery is to be performed, then we should discuss with the patient about the issue of ovarian reserve compromise after surgery and its effects on future fertility. Ovarian cysts that exist or increase in size after several menstrual cycles are not functional cysts [35-37]; for example, mature cystic teratoma(dermoid cysts) have been shown to grow over time, increasing the risk of pain and other ovarian accidents such as torsion and rupture. Surgical treatment is, therefore, usually appropriate in these situations [38].

CONCLUSION: Ovarian cyst is usually benign and not malignant in women of reproductive age. Measurement of CA-125 is not useful in differentiating between benign and malignant ovarian masses. For functional cyst, conservative treatment is appropriate since most cases resolve themselves. The advantage of the use of combined oral contraceptives is not proven yet. Surgical management is reserved for the cases of big or symptomatic functional ovarian cyst. For benign cystic teratoma, surgical management is indicated when the cyst is growing larger or to provide better accessibility where the cyst may be blocking the oocyte retrieval.

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REFERENCES:

1. Konar H: Text Book of Gynecology. Jaypee Brothers Medical Publishers, New Delhi, Edition 6, 2013: 289-90.
2. https://www.mayoclinic.org accessed on 30 September 2019
3. Pudasaini S: A study of ovarian cyst in a tertiary hospital of Kathmandu valley. Nepal Medical College Journal 2011; 13: 39-41.
4. Bosetti C: Benign ovarian cysts and breast cancer risk. International Journal of Cancer 2006; 119: 1679-82.
5. Bottomley C and Bourne T: Diagnosis and management of ovarian cyst accidents: Best Practice & Research: Clinical Obstetrics & Gynaecology 2009; 23: 711-24.
6. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins Gynecology: Practice Bulletin No. 174: Evaluation and Management of Adnexal Masses. Obstetrics & Gynaecology 2016; 128: 210-26.
7. Stany MP and Hamilton CA: Benign disorders of the ovary Obstetrics & Gynaecology. Clinics of North Americal Journal 2008; 35: 271-84.
8. Lobo R, Gershenson D and Lentz G: Comprehensive Gynecology. Elsevier Publication, 7th Edition 2016.
9. Templeman C, Fallat M, Blinchevsky A and Hertweck S: Non inflammatory ovarian masses in girls and young women. Obstetrics & Gynecology Journal 2000; 96: 229-33.
10. Emans S and Laufer M: Pediatric and adolescent gynecology. Lippincott Williams and Wilkins, Philadelphia, 5th edition, 2017: P. 706–710.
11. Jessica R, Zolton, Priya B, Maseelall and Naniak C: Evaluation of Ovarian Cysts in Adolescents. Open Journal of Obstetrics & Gynecology 2013; 3: 12-16..
12. https://www.vectorstock.com accessed on 30 Sep. 2019.
13. Brown M, Hebra A, McGeehin J and Ross A: Ovarian Masses in Children: A review of 91 cases of malignant and benign masses. Journal of Pediatric Surgery 1993; 28: 930-32.

14. Grovas A, Fremgen A, Rauck A, Ruymann FB, Hutchinson CL, Winchester DP and Menck HR: The national cancer data base report on patterns of childhood cancers in the United States. The American Surgeons Commission on Cancer and the American Cancer Society; 1997: 80: 2321-32.
15. Warner BW, Kuhn JC and Barr LL: Conservative management of large ovarian cysts in children: the value of serial pelvic ultrasonography. Europe Pubmed Central 1992; 112(4): 749-755.
16. Surratt J and Siegel M: Imaging of pediatric ovarian masses. Radiographics 1991; 11: 533-47.
17. Department of Health, "Ovarian cancer: key messages for health professionals," 2009, http://www.dh.gov.uk/en/ Healthcare/Cancer/DH_095624.
18. Ueland FR: The accuracy of examination under anesthesia and transvaginal sonography in evaluating ovarian size. Gynecologic Oncology 2005; 99: 400-03.
19. Ballard KD: Can symptomatology help in the diagnosis of endometriosis? Findings from a national case-control study Part 1. International Journal of Obstetrics and Gynaecology 2008; 115: 1382-91.
20. https://www.antalyadogum.com accessed on 30 September 2019
21. Padilla LA, Radosevich DM and Milad MP: Accuracy of the pelvic examination in detecting adnexal masses Obstetrics and Gynecology 2000; 96: 593-98.
22. Kahraman K: Extremely elevated serum CA-125 level as a result of unruptured unilateral endometrioma: The highest value reported. Fertility and Sterility 2007; 88: 968.
23. Zurawski VR: Elevated serum CA 125 levels prior to diagnosis of ovarian neoplasia: Relevance for early detection of ovarian cancer. International Journal of Cancer 1998; 42: 677-80.
24. Broekmans FJ: A systematic review of tests predicting ovarian reserve and IVF outcome. Human Reproduction Update 2006; 12: 685-718.
25. Timmerman, D: Subjective assessment of adnexal masses with the use of ultrasonography: An analysis of interobserver variability and experience: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology 1999; 13: 11-16.
26. Holsbeke CV: Endometriomas: their ultrasound characteristics. ultrasound in obstetrics & gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology 2010: 35: 730-40.
27. Sassone AM: Transvaginal sonographic characterization of ovarian disease: Evaluation of a new scoring system to predict ovarian malignancy. Obstetrics and Gynecology 1991; 78: 70-76.
28. https://www.womenshealth.org accessed on 22 September 2019.
29. https://www.radiologyassistant.nl accessed on 30 September 2019.
30. https://www.healthline.com accessed on 22 September 2019.
31. https://www.blog.milliyet.com accessed on 30 September 2019.
32. MacKenna A: Clinical management of functional ovarian cysts: A prospective and randomized study. Human Reproduction 2000; 15: 2567-69.
33. Holt VL, Cushing-Haugen KL and Daling JR: Oral contraceptives, tubal sterilization, and functional ovarian cyst risk. Obstetrics and Gynecology 2003; 102: 252-58.
34. Kim SH: Update on the treatment of endometriosis. Clinical and Experimental Reproductive Medicine 2013; 40: 55-59.
35. Ben-Ami M: Management of functional ovarian cysts after induction of ovulation. A randomized prospective study. Acta Obstetricia Gynecologica Scandinavica 1993; 72: 396-97.
36. Steinkampf MP, Hammond KR and Blackwell RE: Hormonal treatment of functional ovarian cysts: A randomized, prospective study. Fertility and Sterility 1990; 54: 775-77.
37. Turan C: Expectant management of func- tional ovarian cysts: An alternative to hormonal therapy. International Journal of Gynaecology and Obstetrics 1994; 47: 257-60.
38. Alcazar JL: Is expectant management of sonographically benign adnexal cysts an option in selected asymptomatic premenopausal women, Human Reproduction 2005; 20: 3231-34.

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