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Case Report Open Access

OHSS Complicated With PID and Pelvic Abscess after IVF in a 35 Year Old Woman: A Case Report and Review of the Literature

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Abstract

Background: Ovarian hyper stimulation syndrome is an iatrogenic serious complication that presents after human chorionic gonadotropin stimulation or after the spontaneous peak of luteizing hormone. Pelvic inflammatory disease following the *in vitro* fertilization and oocyte retrieval is a rare and infrequent complication. Tubo-ovarian abscess has been described as rare and significant complication .We present an uncommon case according the literature in which rare complications of IVF are described.

Methods: We present a case of a 35 year old female patient, gravida 1, para 0 with history of in vitro fertilization short protocol and oocytes retrieval before a month ,attended our hospital complaining for deep abdominal pain since 8 days with significant gynecological past history. Clinical evaluation proved abdominal pain on palpation without fever. Serum levels of C-reactive protein were significantly elevated reaching the plateau of 320,943.

Results: Transvaginal ultrasonography noticed the presence of a big left adnexal formation max diameter 18 cm that could be attributed to marked inflammation. Behind this, free fluid detected by the presence of adhesions that could be attributed to hydrosalpinx. The diagnosis of ovarian hyper stimulation syndrome followed by pelvic inflammatory disease was made and she hospitalized for 10 days. The patient came to our hospital 3 months later for her follow up and the transvaginal examination revealed left tubo-ovarian abscess. A new transvaginal ultrasonography after 3 months was clearly improved compared to the previous images.

Conclusion: Ovarian hyper stimulation syndrome which is complicated with pelvic inflammatory disease and especially pelvic abscess after in vitro fertilization and oocyte retrieval guided by ultrasound is a rare and simultaneously significant complication. Transvaginal ultrasonographical examination seems to be a pivotal tool primarily for the diagnosis and secondarily for the follow up of these infertile women.

Keywords: Abscess; Transvaginal ultrasound

List of Abbreviations: OHSS: Ovarian Hyper stimulation Syndrome; PID: Pelvic Inflammatory Disease; IVF: *In Vitro* Fertilization; HCG: Human Chorionic Gonadotropin; Ht: Hematocrit; Hb: Hemoglobin; PLT: Platelets; RBC: Red Blood Cells; CRP: C-Reactive Protein; TOA: Tubovarian Abscess; LH: Luteinizing Hormone; IL: Interleukin; TNF: Tumor Necrosis Factor; VEGF: Vascular Endothelial Growth Factor; TVOR: Ultrasound-guided Transvaginal Oocyte Retrieval; ESR: Erythrocyte Sedimentation Count; MRI: Magnetic Resonance Imaging

Introduction

Ovarian Hyperstimulation Syndrome (OHSS) is an iatrogenic serious complication that presents after human chorionic gonadotropin stimulation or after the spontaneous peak of luteizing hormone. Its pathophysiology based on the increased capillary permeability which leads to consequent fluid accumulation in the third space; its symptoms appear 5 to 10 days after gonadotropin stimulation. Punctual treatment of OHSS is based on its early prediction. The combined incidence of moderate and severe stages of OHSS ranges from 3% to 8%.Its third severe stage has a mortality risk of 1 in 450,000 to 500,000 and it presents in 1,4% of OHSS patients and can present in 0,1 to 3% of all cycles [1,2]. Milder forms can be developed at a rate more than 20-30 % of IVF cases [3]. Pelvic inflammatory disease (PID) following the ivf and oocyte retrieval guided by transvaginal ultrasound is a rare and infrequent complication; It may occur in 0, 6% of all patients within the first week after the procedure. Especially the pelvic abscess as a manifestation of late pelvic infection is rarely described. Johnny Younis et al. in a study of three infertile women, showed that severe endometriosis and ovarian endometriomas consist an important risk factor for the development of pelvic abscess after oocyte retrieval for in vitro fertilization [4].This report discusses the case of a 35 year old infertile woman with a significant gynecological past history, which underwent IVF and oocyte retrieval and treated in or hospital for its rare complication; PID which followed OHSS.

Case Presentation

A 35 year old female patient, gravida 1, para 0, with history of in vitro fertilization (IVF) short protocol and oocytes retrieval before a month ,attended our hospital complaining for deep abdominal pain since 8 days. Ovulation was induced with gonadotropins and an injection of human chorionic gonadotrophin (HCG) was given for last maturation of follicle; 22 days after embryo transfer she started having abdominal pain and fever. Her gynecological past history is significant including cervical conization for adenocarcinoma before 2 years followed by radical trachelectomy with bilateral pelvic lemphadenectomy and laparoscopic symphysiolysis. Clinical evaluation proved abdominal pain on palpation without fever.

Transvaginal ultrasonography noticed the presence of a big left adnexal formation max diameter 18 cm that could be attributed to marked inflammation. Behind this, free fluid detected by the presence of adhesions that could be attributed to hydrosalpinx (Figure 1).

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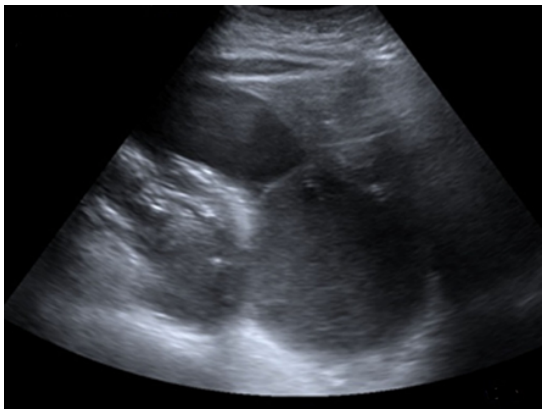

Figure 1: Ultrasonography of upper and lower abdomen.

Laboratory results showed that Ht, Hb, PLT, RBC, Na and K were fluctuated in normal ranges; she had leukocytosis (Total leukocyte count 12200/cc) and serum levels of C-reactive protein (CRP) were significantly elevated reaching the plateau of 320,943. The last supported the ultrasonographically marked inflammation.

The diagnosis of OHSS followed by pelvic inflammatoty disease (PID) was made and she was started on intravenous netromycin, metronidazole and cefuroxime; she remained well and her vital signs were normal the day after admission, while six days later she had fever up to 38.6°C; thus the antibiotics were changed into ceftriaxone and metronidazole. On the seventh day after admission she underwent paracentecis of cystic formations; 80 cc of mixed serous and purulent liquid were drained. The first sample of paracentecis had no microbial growth; in the second sample e.coli was developed which was sensitive to almost all antibiotics. Approximately 9 days after admission laboratory tests revealed a decreasing CRP of 79,148 and her clinical condition gradually improved; she became apyrexial and the fourteenth day after admission laboratory tests showed that PLT, WBC, Hb and Hct ranged normally; noteworthy is that CRP was reduced to 29,287. Gradually patient became comfortable and was discharged with satisfactory condition.

The patient came to our hospital 3 months later for her follow up with transvaginal sonography without clinical symptoms. The examination revealed left tuboovarian abscess (TOA) (Figure 2).

She didn't take any medical treatment and her doctor suggested a new ultrasonography after 3 months which was clearly improved compared to the previous images (Figure 3).

Discussion

OHSS is characterized by the ovarian enlargement. It caused by an acute shift of protein-rich fluid out of the intravascular compartment to the third space; it is the major medical complication of IVF with severe morbidity and probably mortality leading to enlarged ovaries and many other symptoms which differ depending on the stage [5]. The severe stage of OHSS in females who underwent ovarian stimulation for IVF has an incidence ranging 0, 5-2% [6].

Risk factors are classified into two categories; primary risk factors include young age (<35), previous OHSS, polycystic ovary syndrome and a history of increased response to gonadotropins. Secondary risk factors contain elevated levels of serum estradiol E2, follicular number and size and number of oocytes which are collected [7-10].

Pathophysiology based on the increased capillary permeability leading to the "third spacing". The large fluid shift can cause ascites, pleural effusion, pericardial effusion and anasarca edema [11]. Causal factors for OHSS include estradiol, prolactin, histamine, LH, HCG, various inflammatory mediators (IL-1, IL-6, IL-2 .TNF-a) and the vascular endothelial growth factor VEGF; the last factor represents the main causal factor of OHSS [12]. New studies demonstrated that HCG leads to increased concentration of VEGF and vascular permeability, which is the major pathophysiologic mechanism of the syndrome [2].

Until our days, several systems of classification have been described of great scientists such as Rabau et al. (1967), Schenker and Weinstein (1978), Golan et al. (1989), Navot et al. (1992), Rizk and Aboulghar (1999) [13]; According to Pratap Kumar et al. the classification of the syndrome is divided into three categories and six grades, based on symptoms, signs, and laboratory findings. The first category or mild ohss includes *grade 1* in which patients have abdominal distention and discomfort and *grade 2* which includes the symptoms of grade 1, combined with nausea, vomiting and/or diarrhea and ovarian enlargement from 5 cm to 12 cm .The second category or moderate ohss includes *grade 3* which describes the findings of *Grade 2* combined with ultrasonographic evidence of ascites. The last one or severe ohss includes *grade 4* and gr*ade 5*; *grade 4* includes the characteristics of moderate OHSS plus clinical evidence of ascites and/or hydrothorax and breathing difficulties. It is defined by the presence of ascites, pleural effusion and other severe pulmonary manifestations such as atelectasis, ARDS, pulmonary infection and pulmonary thromboembolism. Finally *grade* 5 describes all of the above plus a change in the blood volume, increased blood viscosity due to hemoconcentration and coagulation abnormalities leading to acute renal failure [10].

Ultrasonographic appearance reveals thin, hyperechoic follicle walls

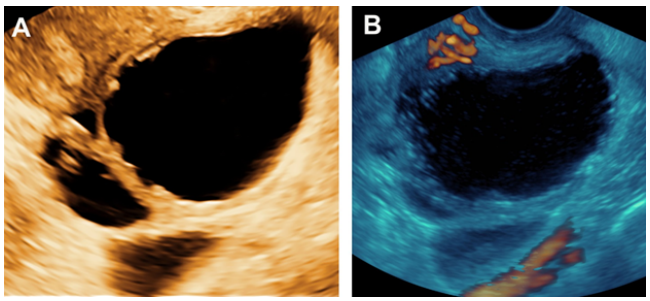

Figure 2: Transvaginal Sonography showing Left Tuboovarian Abscess (TOA).

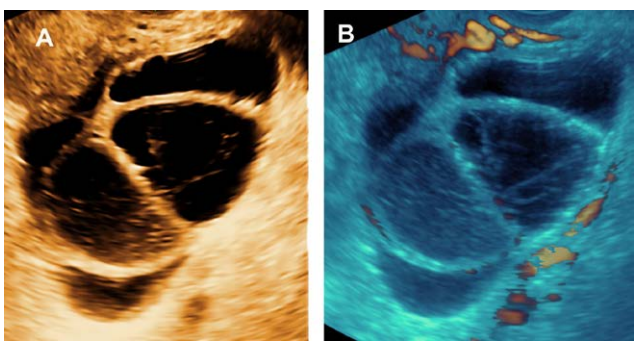

Figure 3: Ultrasonography after 3 months which was clearly improved.

while the cystic interior is hypoechoic. Color flow Doppler examination reveals marked vascularity of the follicle walls. The dimensions of the ovaries enlarge extremely and could reach diameters bigger than 10 cm. typically this enlargement is bilateral with multiple cysts of varying sizes giving the classic wheel-spoke appearance; individual cysts may present an interior echo texture related with hemorrhage. The presence of ascites in the cul-de-sac or around the ovaries could be spotted on transvaginal ultrasonography; transthoracic ultrasonography may be important in revealing pleural effusion at the lung bases in severe episodes of OHSS [14].

The best treatment of syndrome is obviously the primary prevention; it is based on symptoms and the severity of OHSS. For the mild and moderate OHSS, treatment is symptomatic; women can be observed on an outpatient's basis by tracking weight gain or increased abdominal girth which is the first signs of fluid retention [8]. Both abdominal and transvaginal paracentecis are affective for the ascites; aggressive early transvaginal paracentecis is very important by relieving symptoms and shortening the hospitalization for the patients who belong to moderate OHSS [8]. Severe OHSS should be considered as a possible fatal complication which requires direct therapy through using iv fluids and restoring the electrolyte's balance; hypovolemia of severe OHSS can be faced with iv fluids, despite the fact that lead to increased ascetic fluid; aspiration of ascites by the guidance of ultrasound seems to be a relief solution and effective in improving symptoms despite the fact that could be a risk of rising infection [8,15]; an indwelling vaginal pigtail catheter has also been tried when abdominal paracentecis was not feasible [16]. The ovarian cysts are observed with ultrasound and when there is torsion or cyst rupture surgery is inevitable. Last but not least, it is important to note that management of critical OHSS requires intensive care in a critical care unit in order to face all its features; it may include decreased renal function, pulmonary complications, hepatic failure and thromboembolic phenomena [10].

Ultrasound-guided transvaginal oocyte retrieval (TVOR) is used as a simple and atraumatic technique with rare complications; it is method of choice in most IVF centers, because its excellent oocyte yields, increased speed and major pelvic vessel visualization. However, this method has several risks such as pelvic visceral trauma and pelvic infection (PID) [17].

Pelvic inflammatory disease (PID) is a complex of infections in the upper genital tract; it includes salpingitis, hydrosalpinx, pyosalpinx, endomitritis, tuboovarian abscess and finally pelvic peritonitis caused by the spreading of different microorganisms from the vagina and the endocervix, to endometrium, fallopian tubes and/or adjacent structures. The significant characteristic of PID is its polymicrobial nature [18].

The diagnosis of PID is based on clinical criteria (signs and symptoms), laboratory tests and imaging techniques.

Laboratory tests which can be useful include a complete blood count, erythrocyte sedimentation count (ESR), or C-reactive protein (CRP).

Hemila et al. after a measurement of serous CRP in a population of 152 patients, showed that CRP levels greater than 10 mg/l had good sensitivity (93%) and specificity (83%) in the diagnosis of PID. In addition CRP levels decrease to normal much sooner than ESR rate following effective antibiotic therapy. So it is an important monitoring tool [19,20].

Ultrasonography has been successfully used in the evaluation of PID; it is a very important tool because the examination is easy to perform, can be repeated and needs no anesthesia [21]. It is the imaging method of choice supplemented with MRI [19]. Describing the processing of PID, firstly in the duration of acute phase some changes can be recognized; the normal tubal mucosa becomes involved with thick wall and purulent exudate filling the lumen; some exudates can also spill into the cul-de-sac. This sonographic finding has been previously described from Rottem as '*cogwheel*' sign. Subsequently if the tubes become occluded, filling by pus or mucus, an entity called hydrosalpinx or pyosalpinx can be visualized. The presence of *incomplete septum* can be revealed in this phase as a result of tubal distending and folding upon itself; it is originated as a triangular formation from one of tubal walls without reaching the opposite wall. The next stage of PID involves the ovary, happening after the failure of the treatment; is a very severe phase characterized by the formation of *Tubo-Ovarian Abscess* (TOA) [22]; it has been described as a rare but simultaneously significant and recognized complication of oocyte retrieval during the program of IVF. A complex adnexal structure surrounded by thick walls and filled by pus with cellular remnants represents the characteristic ultrasonographic image of TOA. Patients may feel tenderness over the area of fluid collection during the transvaginal ultrasonography.

Finally due to accumulation of the fluid into the tube, its wall distends and becomes thin; it is the chronic phase of PID in which the sonography reveals the typical dilated, thin–walled structured studded with hyperechoic remnants which are known as "*beads-on-a-string*" [22].

Conclusion

OHSS syndrome which is complicated with pelvic inflammatory disease (PID) and especially pelvic abscess after IVF and oocyte retrieval guided by ultrasound is a rare and simultaneously significant complication. Ultrasonographical examination seems to be a pivotal tool primarily for the diagnosis and secondarily for the follow up of these infertile women.

Disclosure

All authors report no conflict of interest.

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