

# Ruptured tubo-ovarian abscess as a complication of IVF treatment: Clinical, ultrasonographic and histopathologic findings.

## A case report

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### Summary

Tuboovarian abscess is a rare complication of IVF treatment, which can be lethal on rupture. Hereby, we present a case of a ruptured tubo-ovarian abscess, following transvaginal ultrasound-guided oocyte retrieval for IVF and transcervical embryo transfer in a 38-year-old white female patient with five years of primary infertility who underwent aspiration of bilateral hydrosalpinges at the time of oocyte retrieval. This case suggests that the reactivation of latent pelvic infection due to a previous pelvic inflammatory disease (PID) was the possible route of infection after transvaginal ultrasound-directed follicle aspiration - transcervical embryo transfer. We conclude that physicians should consider the diagnosis of tubo-ovarian abscess in the differential diagnosis of abdominal pain, fever and leukocytosis after ovum retrieval and transcervical embryo transfer for IVF treatment. Preservation of the uterus and unaffected uterine adnexa should be attempted in such cases if future pregnancy is desired.

**Key words:** IVF; Ovarian abscess; Tubal abscess; Embryo transfer; Pelvic infection; Ultrasound-guided oocyte retrieval; Aspiration of hydrosalpinx.

### Introduction

Pelvic inflammatory disease (PID) is defined as a clinical syndrome attributed to the ascending spread of microorganisms (unrelated to pregnancy and surgery) from the vagina and cervix to the endometrium, fallopian tube and/or contiguous structures [1]. Symptoms and signs of PID include pyrexia, continuous pelvic pain, dysuria and vaginal discharge [2]. A tuboovarian abscess can be life-threatening on rupture into the peritoneal cavity [3]. Patients who suffer from ovarian abscess almost always have a history of salpingitis, endometriosis, pelvic adhesion, hydrosalpinx or pelvic surgery [3-5].

Ultrasound-guided transvaginal aspiration of follicles for the recovery of oocytes in IVF-embryo transfer programmes is a well accepted and universally used method in most IVF units today [6]. Although the incidence of complications of in vitro fertilization treatment with transvaginal ultrasound-directed oocyte retrieval appears to be low, there are a number of dangers including injury to blood vessels, and haemoperitoneum during or after follicle puncture, trauma to pelvic organs, infection or exacerbation of PID, rupture of endometriotic cystic masses and urinary tract infections [3-5, 7]. The reported incidence of pelvic infection after ovum pick-up is 0.2% to 0.5% per cycle [8, 9]. A pelvic infection becomes clinically evident within hours up to a few days after oocyte retrieval. The manifestation of an ovarian abscess is much longer. Intervals from one week up to 56 days have been reported [4, 5, 10]. These ranges in the intervals between

ovarian capsule disruption and clinical presentation depend on the bacterial inoculum dose, type of bacterium and its virulence [6]. Prophylactic antibiotics during oocyte retrieval are recommended in patients at increased risk, but subsequently cannot prevent pelvic infection in all patients [4, 5, 10]. In addition to transvaginal oocyte retrieval, the intrauterine catheterization for transcervical embryo transfer [11] and the aspiration of hydrosalpinges at the time of oocyte retrieval could be responsible for the development of pelvic abscess.

The purpose of this study is to report a severe life-threatening case of ruptured tubo-ovarian abscess, which developed following transvaginal ultrasound-guided oocyte retrieval for IVF and transcervical embryo transfer in a patient who underwent aspiration of bilateral hydrosalpinges at the time of oocyte retrieval. This study also illustrates the ultrasonographic findings of a ruptured tuboovarian abscess. Moreover, the pathological pictures of the tuboovarian abscess are presented and the international literature is reviewed.

### Case report

The patient was a 38-year-old, gravida 0, para 0. In 1996 a diagnostic laparoscopy for investigation of infertility revealed bilateral hydrosalpinges. In February 2000 she visited an IVF Centre in Athens to undergo IVF treatment. Culture of the vaginal and endocervical fluids showed the presence of chlamydia and the couple received 100 mg of doxycycline twice daily for 15 days. After the end of the treatment the new culture of her endocervical fluid was negative. Ovarian stimulation for IVF and embryo transfer was initiated according to the "short protocol" using leuprolide acetate and recombinant FSH. After

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the induction of ovulation the patient underwent aspiration of the bilateral hydrosalpinges at the time of oocyte retrieval. Two oocytes were successfully fertilized and the preembryos were transferred transcervically with an aseptic technique which proceeded without difficulty or incident. Prophylactic antibiotics were not used after the oocyte retrieval and the transcervical embryo transfer. Approximately 24 hours after the embryo transfer the patient experienced mild lower abdominal pain and fever. She contacted her obstetrician-gynaecologist from the IVF unit by telephone, but he thought that she might have a viral infection and no further attention was given. Her symptoms worsened with increasing lower abdominal pain, which became severe, fever of 38.5°C and vaginal bleeding. She was taken by ambulance to the Gynaecological Emergency Unit of "George Gennimatas" General State Hospital of Athens in June 2000. Clinical examination showed a normal pulse rate and blood pressure. Physical examination revealed an acute abdomen with diffused lower abdominal tenderness and rebound. Her abdomen showed muscular resistance. She was found to have cervical bleeding. Bimanual examination showed high tenderness cervical motion. The estimation of the uterine adnexa was difficult because of the muscular resistance of her abdominal wall. The pregnancy test was negative. Haematocrit was 39%, haemoglobin 12.5 g/dl and white blood cell count 23,000 per mm<sup>3</sup> with 90% polymorphonuclear leukocytes. Abdominal ultrasonography noted the presence of a large amount of free fluid with hyperechogenicity in the cul-de-sac and around the left adnexa (Figure 1). Culdocentesis of the cul-de-sac revealed mattery fluid, which was cultured in the Microbiology Department. Adequate drainage of the pus through the cul-de-sac was done and intravenous metronidazole 500 mg/100 ml twice daily, sodium piperacillin and sodium tazobactam 4 g four times per day and neltimicin 300 mg daily were initiated immediately. Also, antipyretic drugs were given. An abdominal ultrasonographic examination took place the next day, which noted an 8.39 x 5.63 cm left-sided pelvic mass (Figure 2). The sixth day of the patient's hospitalization, the antibiotic treatment changed to metronidazole 500 mg/100 ml and ceftriaxone 2 g twice daily and repeated abdominal ultrasound scans showed a mass with mixed echogenicity and a maximum diameter of 7.72 cm. This mass surrounded the left adnexa, expanded to the cul-de-sac, was in very close relation to the left iliac vessels, and had increased vascularity (Figures 3 & 4). A small amount of free fluid in the cul-de-sac and the right paracolic furrow was present. As there was neither resolution of the febrile state nor pelvic pain on the seventh day after admission, an exploratory laparotomy through subumbilical midline incision was performed. After mobilizing the uterus, pus appeared to emerge from the left ovary. A left tubo-ovarian abscess and right hydrosalpinx with no evidence of abscess formation were detected. On the left side, the abscess invaded the uterine wall. Left salpingo-oophorectomy and right salpingectomy were performed. The abdominal cavity was copiously irrigated with sterilized normal fluid; a drain was placed through the abdominal wall in the posterior pouch of Douglas and the procedure was terminated. The abdomen was closed in layers and a nasogastric tube was inserted. The patient was transfused with one unit of fresh frozen plasma on the first and third postoperative days, respectively. The patient menstruated the second day after operation. The pathological examination showed dense acute inflammation due to abscess mainly in the left tube expanding to the left ovary (Figures 5-7). The right tube had a picture of mild chronic inflammation with acute inflammatory infiltration of its serosal surface (Figure 8). Cultures of the pus grew colonies of gram-negative klebsiella, sensitive to cephalothin, cefoxitin, cefuroxime, cefepime, aztreonam, gentamicin, tobramycin,

netilmicin, amikacin, ciprofloxacin and co-trimoxazole. Postoperatively, intravenous antibiotics were continued until the sixth postoperative day: metronidazole 500 mg/100 ml and ceftriaxone 2 g twice daily. In addition, heparin of low molecular weight (tinzaparin sodium) was administered for all the postoperative days the patient remained in the hospital. The patient's postoperative course was uneventful. The fever dropped the fourth day after the operation and the patient remained afebrile afterwards during hospitalization. She was discharged on the tenth postoperative day with ciprofloxacin to be taken orally for eight accessional days. Upon discharge, the WBC was 6,800 per mm<sup>3</sup>. An ultrasound performed one month later revealed swelling of the right uterine adnexa with cystic masses measuring 2.6 x 3.9 cm and 1.3 x 2.6 cm with haemorrhagic elements. The endometrial thickness was 17 mm. Oral contraceptive pills were given for six months and a repeated ultrasound scan at the end of the treatment showed no evidence of cysts in the right ovary.

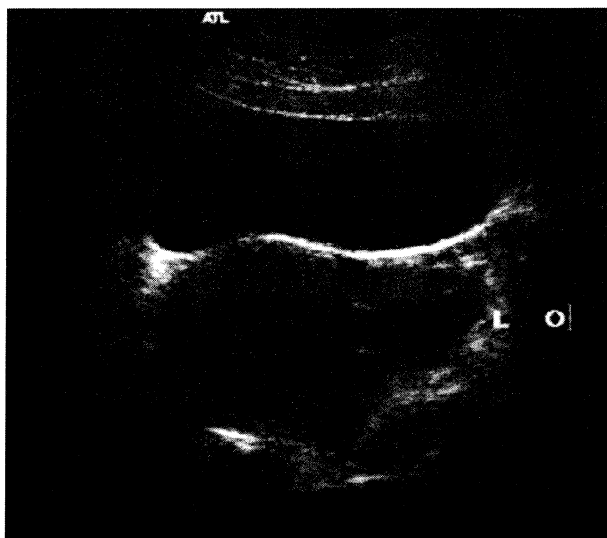


Fig. 1

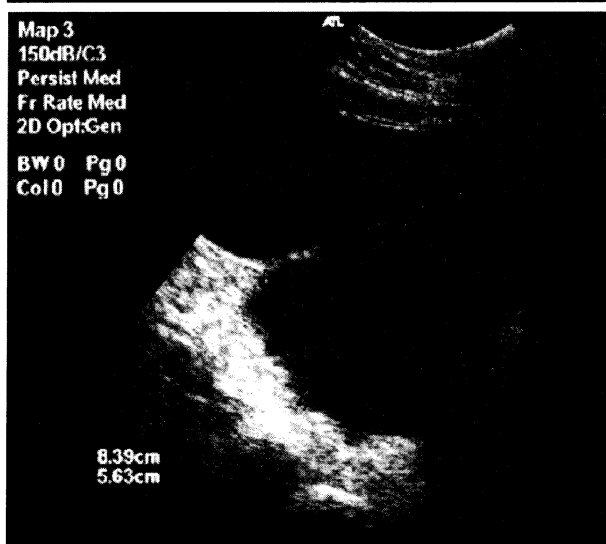


Fig. 2

Figure 1. — Abdominal ultrasonography upon admission of the patient to the hospital: Presence of large amount of free fluid with hyperechogenicity in the cul-de-sac and around the left adnexa.

Figure 2. — Abdominal ultrasound scan on the first day of treatment with intravenous antibiotics: An 8.39 x 5.63 cm left-sided pelvic mass.

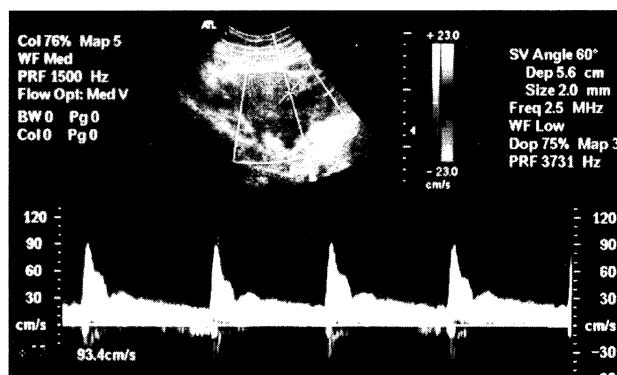


Fig. 3

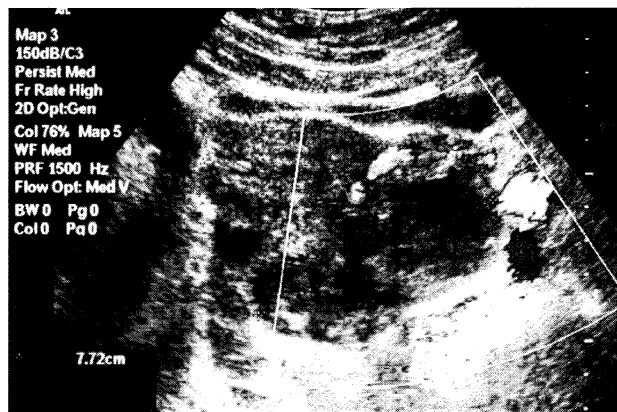


Fig. 4

Figures 3 & 4. — Abdominal ultrasound scan during the sixth day of the patient's treatment with broad-spectrum antibiotics: Presence of a mass with mixed echogenicity and maximum diameter of 7.72 cm. The mass surrounds the left adnexa, expands to the cul-de-sac, is in very close relation to the left iliac vessels and has rich vascularity.

## Discussion

Pelvic infection is the second most common complication of transvaginal ultrasound-directed follicle aspiration after minor vaginal haemorrhage [5]. It has been suggested that patients with severe pelvic damage resulting from previous PID or endometriosis are at an increased risk of developing postoperative pelvic infection, particularly where pelvic pseudocysts, hydrosalpinges, or endometriomas are present [5]. The possible factors for the cause of ovarian abscess are the disruption of the ovarian capsule, which give bacteria access to the ovarian stroma and the haematogenous and lymphatic spread [3]. Dicker *et al.* (1993) reported nine out of 3,656 patients (0.24%) who had undergone transvaginal ultrasonographically guided retrieval of oocytes for in vitro fertilization and transcervical embryo transfer, who subsequently developed tubo-ovarian and pelvic abscesses [3]. Moreover, Bennett *et al.*, found an incidence of 0.3% (9 out of 2,670) for minor pelvic infection defined as pyrexia and pelvic tenderness but with no evidence of abscess formation on ultrasound scan, and an incidence of 0.3% for severe pelvic infection [5].

There are a number of theoretical routes for PID after transvaginal ultrasound-directed follicle aspiration to occur: first, by direct inoculation of the vaginal organism;

second, by reactivation of latent infection in patients with a history of severe PID; and third, by trauma to a loop of large bowel [5]. Direct implantation of vaginal microorganisms is thought to be the cause of the majority of pelvic infections following oocyte retrieval, because anaerobic opportunists of the vagina are found to be the aetiological agents in pelvic abscess after transvaginal oocyte retrieval. *Escherichia coli*, *bacteroides fragilis*, *enterococcus* and *peptococcus* are commonly found microorganisms [3-5]. In addition, no pelvic infection was reported in large series with laparoscopic or abdominal oocyte retrieval [4, 5]. Reactivation of latent pelvic infection due to previous PID has been postulated as a possible route of infection after IVF procedures [5]. Flood *et al.*, reported two cases of pyosalpinx after transvaginal drainage of a hydrosalpinx [12]. Also, Scoccia *et al.*, published a case of a uterine abscess following vaginal oocyte retrieval in a patient with bilateral hydrosalpinges [13]. In addition, Dicker *et al.* (1993), found that all the patients who developed tubo-ovarian and pelvic abscesses had a history of healed PID in the past [3]. Finally, the present study indicates reactivation of latent pelvic infection after transvaginal drainage of hydrosalpinges at the time of oocyte retrieval as a route of pelvic inflammatory disease related to transvaginal ultrasound-directed follicle aspiration - transcervical embryo transfer. Routine prophylaxis with antibiotics has been strongly advocated by some authors [14]. In contrast, Bennett *et al.*, do not advocate routine antibiotic prophylaxis [5], since cases of infection have been reported where prophylactic doxycycline was employed during the collection procedure of oocytes [15]. In the case we present, given the patient's history of previous PID, no prophylactic antibiotics were administered by her physicians in the IVF unit. We strongly advise prophylactic antibiotic therapy when using the vaginal route of ovum aspiration and transcervical embryo transfer especially in patients with a history of salpingitis, endometriosis, pelvic adhesion, hydrosalpinx or pelvic surgery.

Symptoms suggestive of pelvic infection at any stage following transvaginal oocyte collection merit rigorous antibiotic therapy to cover the likely vaginal organisms [5]. Treatment of a pelvic abscess varies according to the clinical situation. Initial treatment is with intravenous antibiotics. Nevertheless, when no response to antibiotics occurs within 72 h, if the abscess ruptures, or if surrounding organs are affected by the inflamed mass, immediate laparoscopy or laparotomy with removal of the ovary is the treatment of choice [3]. In our case, the patient was initially treated with intravenous metronidazole + sodium piperacillin and sodium tazobactam + nelfitacin but her symptoms failed to settle and laparotomy and left salpingo-oophorectomy and right salpingectomy were performed. Following this, recovery was uneventful.

In conclusion, we have presented a very rare life-threatening case of a ruptured tubo-ovarian abscess, which developed from a possible reactivation of a latent PID after aspiration of bilateral hydrosalpinges at the time of oocyte retrieval, in a patient who underwent IVF-embryo

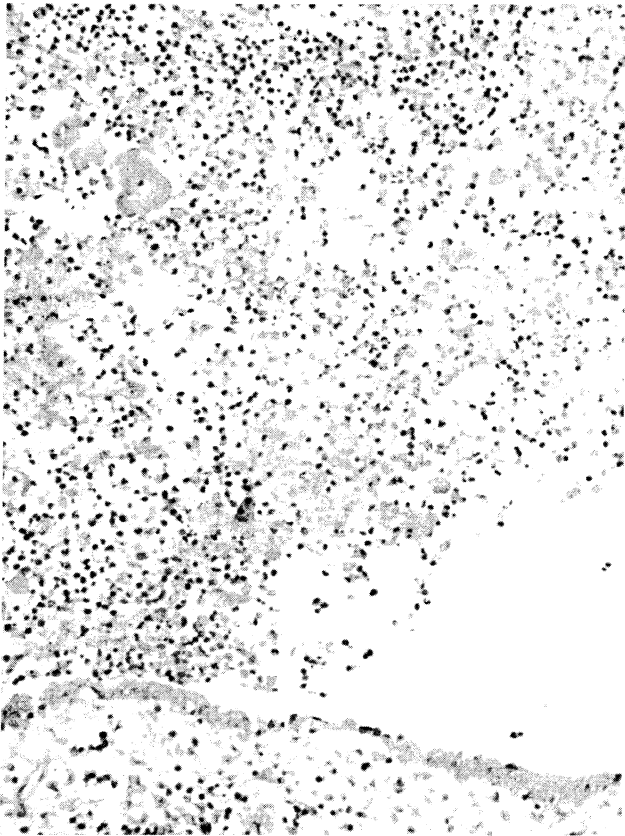


Fig. 5

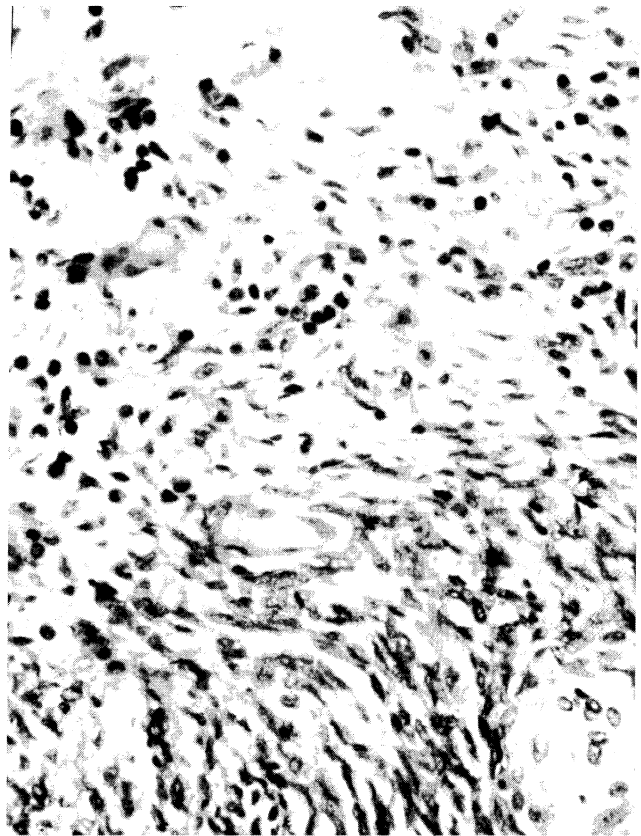


Fig. 6

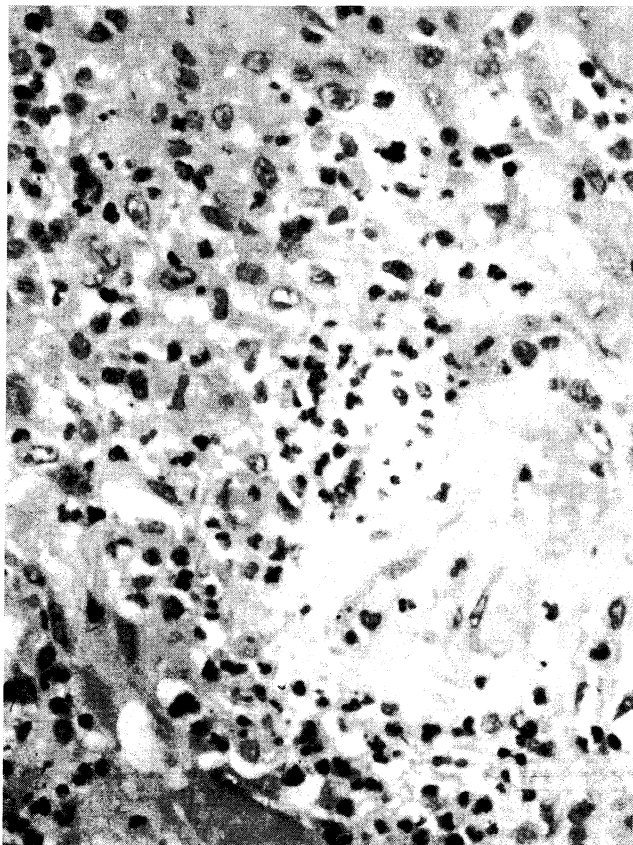


Fig. 7

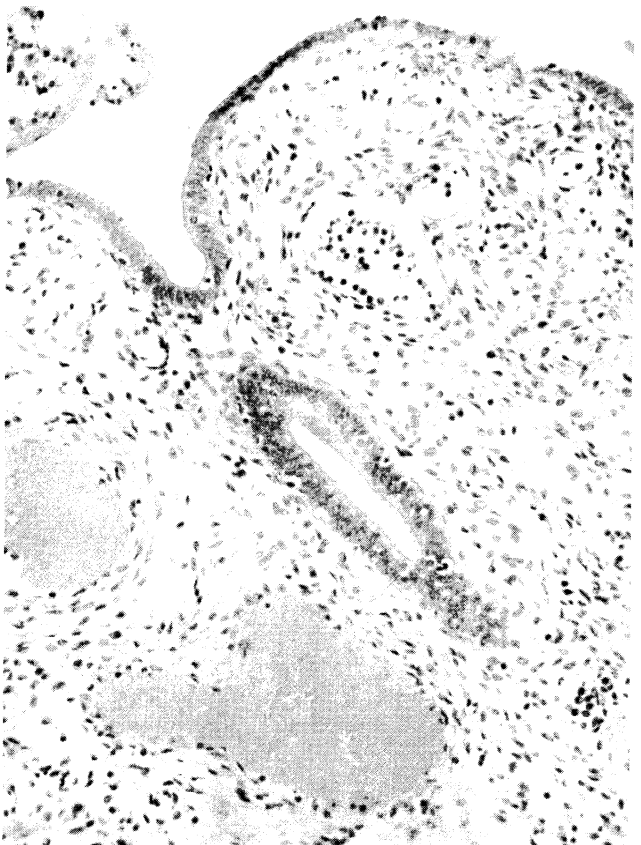


Fig. 8

Figure 5. — Acute inflammation due to an abscess in the left fallopian tube. Extensive destruction of the mucosa (H&E x 100).

Figure 6. — Acute extension of inflammation to the left ovary (H&E x 100).

Figure 7. — Left ovary in the region of its hilus with dense inflammation (H&E x 200).

Figure 8. — Acute inflammation of the right tube (H&E x 100).

transfer. Such cases should be reported to draw attention to their occurrence, aiming at early accurate diagnosis and prevention of an acute abdomen due to a ruptured abscess.

## References

- [1] Moodley J.: "Pelvic inflammatory disease". In: "Gynaecology". Shaw R., Soutter P., Stanton S. (eds.), London: Churchill Livingstone, 1992, 707.
- [2] Ashkenazi J., Farhi J., Dicker D., Feldberg D., Shalev J., Ben-Rafael Z.: "Acute pelvic inflammatory disease after oocyte retrieval: adverse effects on the results of implantation". *Fert. Steril.*, 1994, 61, 526.
- [3] Dicker D., Dekel A., Orvieto R., Bar-Hava I., Feldberg D., Ben-Rafael Z.: "Ovarian abscess after ovum retrieval for in-vitro fertilization". *Hum. Reprod.*, 1998, 13, 1813.
- [4] den Boon J., Kimmel C.E., Nagel H.T., Roosmalen J.: "Pelvic abscess in second half of pregnancy after oocyte retrieval for in-vitro fertilization". *Hum. Reprod.*, 1999, 14, 2402.
- [5] Bennett S.J., Waterstone J.J., Cheng W.C., Parsons J.: "Complications of transvaginal ultrasound-directed follicle aspiration: a review of 2670 consecutive procedures". *J. Assist. Reprod. Genet.*, 1993, 10, 72.
- [6] Dicker D., Ashkenazi J., Feldberg D., Levy T., Dekel A., Ben-Rafael Z.: "Severe abdominal complications after transvaginal ultrasonographically guided retrieval of oocytes for in vitro fertilization and embryo transfer". *Fertil. Steril.*, 1993, 59, 1313.
- [7] Bergh T., Lundkvist Ö.: "Clinical complications during in-vitro fertilization". *Hum. Reprod.*, 1992, 7, 625.
- [8] Curtis P., Amso N., Keith E., Bernard A., Shaw R.W.: "Evaluation of the risk of pelvic infection following transvaginal oocyte recovery". *Hum. Reprod.*, 1992, 7, 625.
- [9] Howe R.S., Wheeler C., Mastoianni L., Blasco L., Tureck R.: "Pelvic infection after transvaginal ultrasound-guided ovum retrieval". *Fertil. Steril.*, 1988, 49, 726.
- [10] Younis J.S., Ezra Y., Laufer N., Ohel G.: "Late manifestation of pelvic abscess following oocyte retrieval, for in vitro fertilization, in patients with severe endometriosis and ovarian endometriomata". *J. Assist. Reprod. Genet.*, 1997, 14, 343.
- [11] Sauer M.V., Paulson R.J.: "Pelvic abscess complicating transcervical embryo transfer". *Am. J. Obstet. Gynecol.*, 1966, 148.
- [12] Flood J.T., Muasher S.J., Simonetti S., Kreiner D., Acosta A.A., Rosenwaks Z.: "Comparison between laparoscopically and ultrasonographically guided transvaginal follicular aspiration methods in an in vitro fertilization in the same patients using the same stimulation protocol". *J. Vitro Fert. Embryo Trans.*, 1989, 6, 180.
- [13] Scoccia B., Marcovici I., Brandt T.: "Uterine abscess after ultrasound-guided ovum retrieval in an vitro fertilization - embryo transfer program : case report and review of the literature". *J. Assist. Reprod. Genet.*, 1992, 9, 285.
- [14] Meldrum D.R.: "Antibiotics for vaginal oocyte aspiration". *J. Vitro Fert. Embryo Trans.*, 1989, 6, 1.
- [15] Ashkenazi J., David M.B., Feldberg D., Shelef M., Dicker D., Goldman J.A.: "Abdominal complications following ultrasonically guided percutaneous transvesical collection of oocytes for in vitro fertilization". *J. Vitro Fert. Embryo Trans.*, 1987, 4, 316.

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