

Description of the parasite *Wucheria Bancrofti Microfilariae* identified in follicular fluid following transvaginal oocyte retrieval

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Abstract

Introduction This case study presents an unusual finding of filarial infection within follicular fluid obtained during an in vitro fertilization (IVF) oocyte retrieval procedure.

Case A 41 year-old G4P1030 immigrant from western Africa underwent in vitro fertilization (IVF). At the time of inspection of the follicular fluid obtained at oocyte retrieval, mobile worm-like organisms were observed and identified as *Wuchereria bancrofti microfilariae* (filariasis). The patient successfully underwent treatment for filariasis and *Onchocerciasis* co-infection. Following treatment, the patient underwent embryo transfer that failed to result in a pregnancy.

Discussion Recent years have seen an increase in international travel and immigration. Therefore, practitioners must become familiar not only with illnesses that are endemic to their geographic region but also diseases that are more common in remote regions of the world. The infertility evaluation and treatment offers physicians a unique opportunity

to identify and initiate treatment for diseases that might otherwise go undiagnosed.

Keywords Filariasis · Follicular fluid · IVF · Retrieval

Introduction

This case study presents an unusual finding of filarial infection within follicular fluid obtained during an in vitro fertilization (IVF) oocyte retrieval procedure. With the continual increase of international travel and immigration, it is vital that physicians become familiar with diseases that are not endemic to the geographic region in which they practice. The evaluation and treatment of patients suffering from infertility, including in vitro fertilization, offers physicians a unique opportunity to identify and initiate treatment for diseases that might otherwise go undiagnosed.

Case

A 41 year-old G4P1030 immigrant from western Africa was evaluated for 2 years of inability to achieve pregnancy. Her obstetric history was significant for a term delivery in Africa of a healthy child who died at age six from an “illness.” This was followed by three elective first trimester terminations. Several years after her final termination, she attempted pregnancy again without success. At this time, in her native country, she was diagnosed with extensive uterine myomas and underwent two abdominal myomectomies, performed 4 and 2 years prior to her presentation. The second myomectomy was complicated by significant blood loss, blood transfusion, and a partial sigmoidectomy

Capsule This report describes the identification of the parasite *Wucheria Bancrofti Microfilariae* in follicular fluid following transvaginal oocyte retrieval

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secondary to significant pelvic adhesions. She had immigrated to the United States several months following her second myomectomy. At presentation, she reported normal and regular cycles following her last myomectomy and intercourse several times per week with continued inability to conceive.

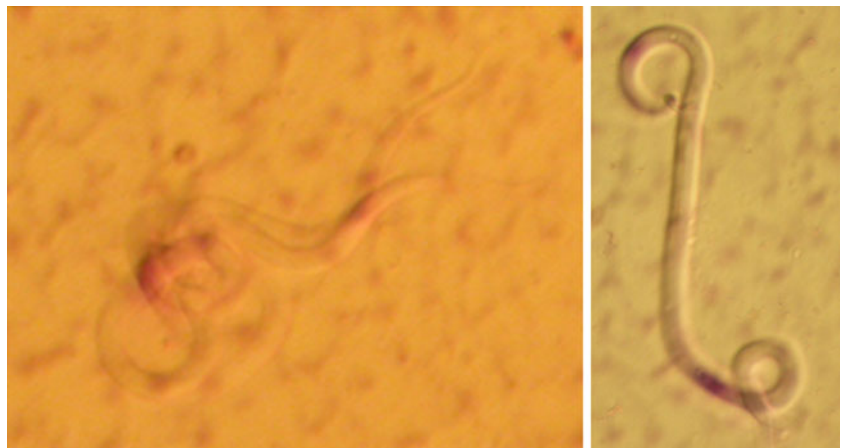
The patient noted no other significant medical history, stating the only medicine she was taking were her prenatal vitamins. She denied the use of alcohol, tobacco, or illicit drugs. Review of system was unremarkable. The patient's partner, who had also recently immigrated from the same African country, had successfully fathered a child 7 years ago in a different relationship, denied any significant medical history, and had a normal semen analysis.

On physical exam, the patient was 5 feet 4 inches tall and weighed 145 pounds. All vital signs were within normal limits. Her general physical exam was otherwise unremarkable. Gynecologic exam and transvaginal exam was unremarkable with the exception of a posterior fibroid measuring 5.7 × 5.1 cm. Serum laboratory evaluation, including Day-2 follicle stimulating hormone (FSH), was normal. On hysterosalpingogram and transvaginal ultrasound evaluation there was evidence of bilateral hydrosalpinx. After an extensive discussion of the risks and benefits of various treatment options the patient expressed the desire to proceed directly with an in vitro fertilization (IVF) cycle. In an effort to maximize pregnancy success, the patient was specifically offered bilateral salpingectomy prior to an IVF cycle given her history of bilateral hydrosalpinx. However, the patient declined any surgical interventions. Standard ultrasound monitoring and ovulation induction protocol accomplished using r-hFSH (follitropin α , Gonal F 1,050 IU, Merk Serono, Rome, Italy) and highly purified urinary gonadotropins (Menopur; Ferring Pharmaceuticals, North York, ON, Canada) coupled with Ganirelix (Orgalutran; Schering-Plough Canada) suppression and human chorionic gonadotropin (hCG, Profasi; Schering-Plough Canada) trigger.

At the time of transvaginal ultrasound guided oocyte retrieval three ovarian follicles greater than 18 mm were present and appeared normal with no evidence of filaricele. All three of these cystic structures were aspirated into separate tubes to ensure that accidental aspiration of hydrosalpinx fluid would not contaminate follicular fluid. Three follicles were aspirated and three oocytes recovered. The procedure was performed without any complications. At the time of inspection of the fluid from all of the three follicles, mobile worm-like organisms could be seen in each aspirate. (Figure 1) Of note, all follicular fluid was grossly normal in appearance (straw colored) without evidence of blood. During the oocyte retrieval procedure, the neither the right nor left hydrosalpinx was aspirated or disturbed. All were microscopic and demonstrated whip-like motion under the microscope. A specimen was sent to the parasitology laboratory that identified *Wuchereria Bancrofti* microfilariae (filariasis) by Giemsa stain. Three oocytes were retrieved, all of which were metaphase II and appeared mature. Following conventional fertilization, only one of the three oocytes fertilized. This embryo developed normally until Day-3 at which time it was cryopreserved with the intent of uterine transfer after resolution of the patient's disease and the patient was referred to the infectious disease department.

An exhaustive workup was completed which resulted in the additional diagnosis, via a full thickness skin biopsy, of Onchocerciasis. Other parasitic infections, such as Loa Loa, were excluded. An ophthalmologic slit lamp evaluation showed no evidence of ocular parasitic involvement. The patient was treated with estromectol (via pill carbamazine) 50 mg for 3 weeks and did not have any side effects from the treatment. Follow up evaluations indicated complete resolution of the parasitic infection. A subsequent natural cycle and embryo transfer of the cryopreserved embryo did not result in pregnancy and the patient wished not to pursue another IVF cycle.

Fig. 1 *Wuchereria Bancrofti* microfilariae (filariasis) observed in follicular fluid at time of oocyte retrieval



Discussion

The root causes for infertility are many. Physicians are trained to look for the most common etiologies of disease throughout their evaluation. The infertility evaluation, as in the case described above, often includes a detailed history and physical examination coupled with an evaluation of basic pelvic anatomy with a hysterosalpingogram, evaluation of basic hormonal parameters, and a semen analysis. While this evaluation often successfully suggests causes of infertility, it may also provide valuable clinical information that may suggest another disease process. In this case, filariae infection was diagnosed during the course of infertility treatment.

Lymphatic filariae are highly prevalent in tropical areas of Latin America, Africa and Asia. In some remote regions, microfilariae infection can be present in more than two thirds of the population [1]. Certain vector species, most commonly mosquitoes, have been identified as the source of filariasis transfer [1]. Even though these insect vector species are not prevalent in western countries, travel to tropical areas has led to filariasis being increasingly diagnosed outside of its endemic geographic area [2]. Lymphatic filariae have been shown to cause a wide range of symptoms and pathologies. *Wucheria Bancrofti*, which represents a distinctive species in the lymphatic filariae group and accounts for more than 115 million infections worldwide, has been associated with inflammation and disruptions in the lymphatic system [3]. Filarial infection can be detected through the presence of adult filarial worms or microfilariae [3]. Adult nematodes are predominantly found in the lymphatics, but have the capability to spread to the breast, vulva, and pelvic organs [3]. Microfilariae, which can readily travel throughout the lymphatics and blood vessels, can invade the placenta and fetus causing perinatal complications [4]. The use of ultrasonography in diagnosing filarial infection has been described, especially in the context of testicular infection in men [5]. However, no ultrasonographic abnormalities were noted in our case prior to proceeding with oocyte retrieval. Given that the physical exam, ultrasound, and follicular fluid appeared grossly normal, it is unlikely that filarial infection would have been diagnosed in the operating room if the patient had chosen to pursue surgery, such as diagnostic laparoscopy or laparoscopic hydrosalpinx removal, prior to undergoing IVF.

Filarial infections of species other than *Wucheria Bancrofti* have also been previously linked to infertility. Previous cases have shown the presence of *Loa Loa* and *Mansonella Perstans* microfilariae in aspirated follicular fluid during oocyte retrieval [2, 6]. To our knowledge, this case is the first report describing the parasite *W. Bancrofti* being isolated from follicular fluid during an IVF oocyte retrieval procedure. Using a Medline literature search, we

found one previously published case report that described *W. Bancrofti* infection and infertility occurred in 2006 regarding a 36 year-old female after several trips to Guinea, Africa [7]. In this prior case, the patient was diagnosed with the filarial infection following strong positive results from an Immunochromatographic White Blood Card Test (ICT), and the treatment was centered on restoring normal white blood cell count [7]. However, the *W. Bancrofti* parasite was not observed in the follicular fluid as was clearly observed in our case.

Traditionally, the most effective treatment for Filariasis is oral administration of Diethyl Carbamazine (DEC) at a dosage of 6 mg/kg/day [8]. Other common treatments for filariasis include the drug ivermectin and albendazole [9]. Co-infection, as in the patient described in this report, with the pathogen *Onchocerciasis volvulus* is commonly described with *W. Bancrofti* infection. This fact changes the treatment profile dramatically as DEC treatment can *Onchocerciasis* has resulted in severe allergic-type reactions [10]. As illustrated by this case, the complexities involved in treating parasitic infections demand a multidisciplinary approach with involvement of an infectious disease specialist as well as other specialties, such as ophthalmology, as necessary.

Research on endemic populations with high occurrence of *W. Bancrofti* indicates a minimal risk of maternal-to-fetal transmission of the parasite [11]. Others maintain that filariasis may cause implantation failure of the embryo at the level of the endometrium [7]. Even though pregnancy did not occur through IVF in our reported case, previous cases of *W. Bancrofti* infections successfully resulted in a complication-free pregnancy following appropriate treatment [12]. One study enrolling 2,165 patients, of which 28% were infected with *W. Bancrofti*, showed no impact on fertility or pregnancy related complications in infected women [12]. Therefore, one would not expect a history of *W. Bancrofti* infection, following treatment, to negatively impact fertility.

The technological changes seen in the past century have fundamentally changed the manner in which people around the globe interact with each other. Dynamic immigration patterns now make areas that were once remote easily accessible. For example, between 1990 and 2000, there was a 166% increase in the total number of African immigrants to the United States [13]. Furthermore, with the increased travel of U.S. citizens to exotic tropical regions in South America, Asia and Africa, similar exposure to illnesses not endemic to the U.S will only become more common. Patients who visit endemic areas should consider being screened for these pathogens before attempting pregnancy to avoid any possible complications. Practitioners in first world countries, such as the United States, must become familiar not only with illnesses that are endemic to their

geographic region but also diseases that are more common in remote regions of the world.

Conflict of interest None.

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