J Trop Med Parasitol. 2010;33:36-40.

CASE REPORT

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Genital Schistosomiasis: Mucinous Cystadenocarcinoma of the Ovary Containing *Schistosoma mansoni* Eggs

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Abstract

Schistosomiasis is an important parasitosis in view of its high prevalence worldwide. *Schistosoma mansoni* is the only endemic species described in Brazil. Hepatosplenic involvement is the most significant cause of morbidity; patients may be asymptomatic until the onset of signs of liver fibrosis and portal hypertension. Few descriptions of schistosomiasis affecting the ovary are found in the international literature. In some cases, this condition has been reported in association with a neoplastic process.

This case report describes a 39-year old woman with complaints of abdominal pain and distention resulting from a large abdominal/pelvic mass, which on ultrasonography resembled an adnexal tumor. The tumor was removed surgically at the Santa Casa de Misericordia Hospital in Vitória, ES, Brazil. Histopathology revealed an ovarian cystadenocarcinoma containing *S. mansoni* eggs. Some hypotheses have been developed to justify the presence of schistosomiasis at ectopic sites.

Keywords: cystadenocarcinoma, ovary, schistosomiasis, *Schistosoma mansoni*

Introduction

Although it is not the most common female neoplasia, ovarian cancer is one of the most lethal. It is generally diagnosed in patients 40-60 years old and the overall five-year survival rate is only 30-40% [1].

Most ovarian tumors are classified on the basis of their presumed histological origins, the most common being epithelial tumors originating in the coelomic epithelium [2]. Ninety to 95% of ovarian cancers are malignant epithelial neoplasias. Cystadenocarcinomas, of an epithelial subtype comprise 5-10% of this total [2].

In addition to being affected by neoplasias, ovaries are also the target of other pathological processes. Few descriptions of schistosomiasis affecting the ovary are found in the international literature [3]. Studies indicate ovaries are affected in only 0.5% of cases of ectopic schistosomiasis [4]. In some cases, ectopic schistosomiasis has been reported in association with a neoplastic process [5].

Schistosomiasis is an important parasitosis in view of its high prevalence worldwide.

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Approximately 250 million individuals living in sub-Saharan Africa, Asia and South America are infested with this parasite [6]. In Brazil, more than 30 million people are estimated to be exposed to the disease and around 3 to 4 million may be infected [5].

The first case of ectopic genital schistosomiasis was described in Egypt in 1899 [7]. Since then, the infection has been reported sporadically in the female genital tract in geographical locations in which schistosomiasis is endemic [8].

The present case report describes the histopathological finding of viable *S. mansoni* eggs within an ovarian cystadenocarcinoma in a patient receiving care at the Department of Gynecology and Obstetrics, Santa Casa de Misericórdia, Vitória, Espírito Santo, Brazil.

Case Report

DDP, a female, 39 years of age, of mixed race, who is a G6, P6, A0, was seen at the Department of Gynecology and Obstetrics on January 7, 2009, with progressively increasing abdominal swelling of approximately one month duration. She also complained of abdominal pain and frequent urination, but denied any signs of painful urination, gastrointestinal symptoms, fever, loss of appetite or weight loss. Physical examination revealed a patient in apparently a good general state of health, well-hydrated, afebrile, with no signs of anemia, jaundice or cyanosis. She had normal heart sounds and normal breath sounds.

Abdominal examination revealed a swollen, distended abdomen and the presence of bowel sounds. A large, hard, irregular, voluminous mass was identified extending from the pelvis to the epigastrium. The liver and spleen were of normal size. There were no signs of ascites or enlarged lymph nodes.

Speculum examination revealed a cervix with a normal appearing epithelium, a transversal external os with normal discharge. On digital vaginal examination, the cervix was fibroelastic, closed, mobile and painless. Bimanual palpation revealed the presence of a large pelvic mass that bulged into the pouch of Douglas. The boundaries of the uterine fundus were unclear due to the size of the tumor.

Ultrasonography on January 12, 2009 revealed a large abdominal/pelvic mass of 6,606.7 cm^3, with a predominantly cystic appearance and a solid component; the right ovary has an anechoic cystic of 4 cm^3 in volume; the uterine volume was 180 cm^3; and the endometrial thickness was 6.7 mm. There were no signs of ascites. Doppler flow showed a low resistance index of 0.44.

The results of supplementary tests carried out on January 7, 2009 were all within normal limits except for a urine culture, which grew out *Klebsiella pneumonia* and a CA-125 level of 24.87 U/mL (Reference value < 35 U/mL).

Prior to exploratory laparotomy a bowel preparation was performed on the eve of surgery and antibiotic therapy was initiated for the urinary infection. An exploratory laparotomy was performed through a median infraumbilical incision on January 13, 2009, during which a large, predominantly cystic tumor was found to occupy the entire abdominal/pelvic cavity and was attached to the left adnexa, occupying almost the entire abdominal/pelvic cavity. There were no extraovarian lesions, signs of ascites nor uterine abnormalities. Palpation of the omentum and liver revealed no alterations. The paraaortic lymph nodes were not found to be enlarged on palpation.

Surgery

Peritoneal lavage cytology was performed. A frozen biopsy of the left ovarian tumor indicated a borderline papillary tumor,. A total hysterectomy, bilateral adnexectomy and partial omentectomy were performed. The patient progressed satisfactorily postoperatively, no complications occurred and she was released from hospital on January 15, 2009.

Histopathology of the surgical specimen

Cytology of peritoneal lavage was negative for neoplastic cells. The surgical specimens from the total hysterectomy with bilateral adnexectomy and partial omentectomy revealed a uterus with

no notable histopathological alterations; the right ovary had a mucinous cystadenoma and the omentum had an absence of neoplasia.

Macroscopic examination revealed a left ovary measuring 25 x 20 x 8 cm, with a smooth, glossy outer surface (Fig 1). Sections revealed a cystic lesion with internal walls with numerous, irregular, friable vegetations and solid areas of firm white tissue. Microscopic examination revealed a mucinous cystadenocarcinoma, intestinal type, with solid, cystic, cribriform and infiltrative areas with foci of necrosis and the presence of numerous viable *S. mansoni* eggs surrounded by granulomas replete with eosinophiles permeating the neoplastic tissue (Fig 2,3) found in 2 of the 30 slides examined. The absence of fibrosis and calcification, the presence of an inflammatory reaction and the integrity of the egg shells indicate they were viable.

The patient was referred for adjuvant chemotherapy and praziquantel was prescribed to treat the schistosomiasis. She was referred to a specialized center to follow-up on the treatment of parasitosis.

Discussion

Among the several species of *Schistosoma* involved in schistosomiasis, only *S. mansoni* has been described in Brazil [5]. Eggs excreted in human feces hatch and release miracidia, which infect the intermediary host, a snail of the genus *Biomphalaria*, and develop into cercariae, which abandon their intermediary host, penetrate into human skin and develop into adult worms in the portal venous system [9].

Depending on the species, adult worms migrate to specific visceral venous plexuses, *S. mansoni* having a greater trophism for the venous plexuses of the large bowel and rectum [9].

Hepatosplenic involvement is the most significant cause of morbidity. Patients may be asymptomatic until the onset of signs of liver fibrosis and portal hypertension. Ectopic schistosomiasis refers to any lesion located outside the area corresponding to the portal-mesenteric system [4].

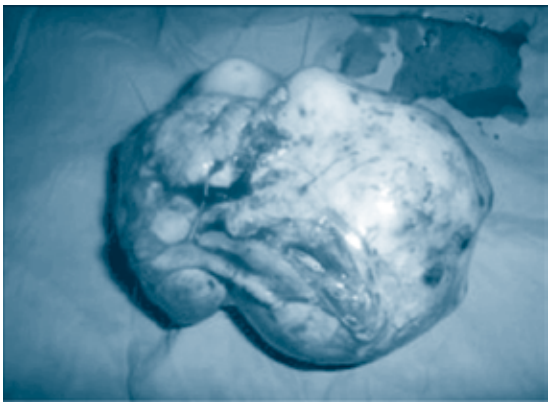

Fig 1 Macroscopic appearance of the left ovary (25 x 20 x 8 cm).

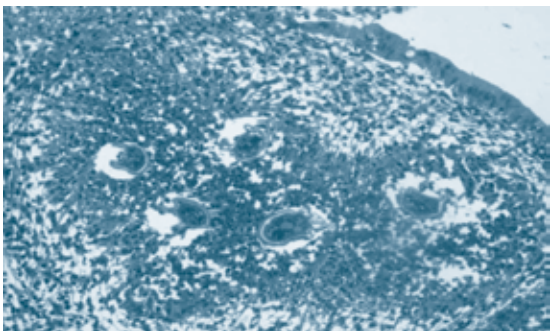

Fig 2 Viable *S. mansoni* eggs (hematoxilyn-eosin, 40x).

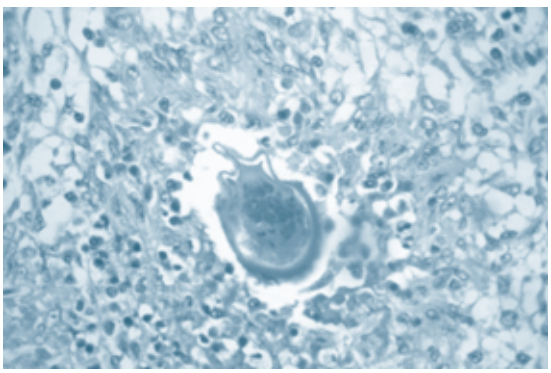

Fig 3 Detail of *S. mansoni* egg (PAS, 400x).

The clinical appearance of genital schistosomiasis is nonspecific. In most cases, patients are asymptomatic and the eggs are discovered during routine tests.

Several pathological processes in the ovary have been associated with genital schistosomiasis, including oophoritis, ovarian

cysts, hilar obstruction, periovarian adhesions and granulomatous lesions [3].

Some hypotheses have been developed to justify the presence of schistosomiasis at ectopic sites [10,11]: 1) eggs escaping through the pulmonary capillaries are deposited in distant arteriolae; 2) migration of adult worms against venous flow to collateral vessels, reaching terminal venules, where they reproduce and lay their eggs; 3) through the vertebral venous system, which offers a natural, avalvular communication route through the portal veins and vena cava to any organ.

The vascularization of the female pelvis facilitates migration of adult worms, in view of the numerous anastomoses connecting the ovarian and uterine venous plexuses with the portal-caval-mesenterial venous systems [8].

Studies have shown the microvasculature of preovulatory follicles is more extensive and better-developed than other follicles, resulting in a greater supply of nutrients, substrates and trophic hormones, facilitating follicular growth and development [12]. Placental vascular development begins early in pregnancy and is maintained through high blood flow rates in the uterine and umbilical vessels, guaranteeing fetal growth and development [12]. These dynamics in the regulation of angiogenesis during a woman's reproductive life and in pregnancy facilitate the occurrence of ectopic implantations of schistosomosis [8].

Neoplastic processes, such as the tumor described in the present report, produce substances that alter the regulation of angiogenesis and induce neovascularization so as to permit tumor growth and metastasis [13,14]. It appears likely a mucinous ovarian cystadenocarcinoma represents a migratory route for adult worms and embolization of eggs. Viable *S. mansoni* eggs found on slides of material removed from the tumor on the left ovary, diagnosed histopathologically as a mucinous cystadenocarcinoma, corroborate this hypothesis. No eggs were found on slides of material originating from the tumor on the right ovary, for which the histopathological diagnosis was mucinous cystadenoma. Therefore, it could be possible that *S. mansoni* ova can induce malignant change in a cystadenoma of the ovary. An association between *S. hematobium* and bladder cancer has been described [15]. However, there is insufficient data to confirm the association between *S. mansoni* and neoplasia. Well designed studies in areas where *S. mansoni* is endemic are necessary to demonstrate such an association. In the majority of cases, ectopic schistosomiasis lesions are diagnosed from surgical specimens or post-mortem.

Even in areas in which the disease is endemic, schistosomiasis is seldom part of a differential diagnosis unless there are other indications for this pathology. Undiagnosed genital schistosomiasis may result in secondary infertility following ovarian fibrosis or tubal occlusion, ectopic pregnancy, abortion, cervical lesions or the development of cervical cancer [6,9]. They may even facilitate the transmission and dissemination of HIV [6].

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