

Diagnostic Laparoscopy for Ovarian Tumor Due to Salmonella Infection

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Abstract

Ovarian abscess is thought to be caused by ascending infection. We experienced a case with ovarian abscess caused by Salmonella. The patient had been monitored for endometrial cysts at an outpatient clinic. She visited our hospital emergently with chief complaints of persistent fever and diarrhea. Although sexually transmitted disease was not suspected, she was diagnosed with pelvic inflammatory disease due to her high C-reactive protein (CRP) level and started antibacterial treatment. Two days later, diagnostic laparoscopy was performed for persisting CRP elevation, and she was diagnosed with ovarian abscesses due to *Salmonella* infection. As the patient had regularly eaten soft-boiled eggs and chicken, an association with her eating habits was strongly suspected as a cause. When a patient has symptoms of enteritis, preceding tubo-ovarian abscess should be considered the possibility of Salmonella infection. Early diagnosis and treatment are necessary for fertility preservation, and minimally invasive diagnostic laparoscopy is useful.

Keywords: Eating habit, minimally invasive surgery, ovarian abscess, *Salmonella agona*

INTRODUCTION

Pelvic inflammatory disease (PID), which includes ovarian abscess, is a general term for infection of upper female genital tract in reproductive age. PID is generally considered an ascending infection from vagina. Its main causative bacteria are *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, which are related to sexual activity. Moreover, Gram-negative anaerobic bacteria associated with bacterial vaginosis, and *Haemophilus influenzae*, which cause respiratory infections, though rare, have also been reported.^[1,2] Ovarian abscess caused by Salmonella is still rare, and only a few reports have suggested usual dietary as their cause.

We experienced a case which diagnostic laparoscopy was useful for ovarian abscess due to Salmonella infection likely caused by eating habits. This study was approved by the Institutional Review Board of Kawasaki Medical

School. Appropriate informed consent form was obtained from the patient.

CASE REPORT

A 43-year-old woman with gravida 3 para 2 had been diagnosed with bilateral endometrial cysts by the primary doctor and taking dienogest for endometriosis. She had no other medical history.

The patient visited the primary outpatient clinic for a fever of 39°C and stomachache. She was diagnosed with enteritis and had been monitored after being prescribed levofloxacin, acetaminophen, and antifatulent. However, her symptoms did not improve, so she visited our hospital emergently with chief complaints of persistent diarrhea and fever.

Her vital signs were as follows: body temperature was 39.3°C, blood pressure was 100/66 mmHg, and pulse was

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120 beats/min. Her abdomen was elastic hard, with rebound tenderness in the lower abdomen. The transvaginal ultrasound showed cystic masses with finely punctate echo inside in both adnexa.

Blood test findings included a white blood cell count of 16,580/ μ L and C-reactive protein (CRP) concentration of 23.57 mg/dL. Samples were obtained for sexually transmitted disease tests for *C. trachomatis*, culture of vaginal discharge, and venous blood culture. We recommended her to provide fecal culture, but she refused.

Computed tomography imaging showed mild edematous changes in the ascending colon but no evidence of appendicitis or diverticulitis. Moreover, enlargement of both ovaries was observed [Figure 1a].

Due to the absence of sexual intercourse during the past few months, peritonitis due to microperforation of endometrial cysts was suspected. Simultaneously, because of the presence of high fever, diarrhea, and elevated CRP, she started treatment with 1 g of ceftriaxone twice daily. Since no improvement was observed in the blood test, 2 days after antimicrobial drug administration, diagnostic laparoscopy was performed.

Both ovarian cysts had adhered to the broad ligaments and contained brown pus, which was sent for culture [Figure 1b]. Only the cyst was removed in the left ovary. In the right ovary, adnexectomy was performed because it was difficult to remove the tumor due to tissue fragility. We made drain tube indwell in her pelvis until draining fluid was decreased.

The pathological diagnosis was endometrial cyst, a finding consistent with bacterial infection [Figure 2a and b]. *Salmonella agona* (*S. agona*) was detected from the tumor content. Subsequent medical interviews confirmed that the patient regularly ate soft-boiled eggs and chicken for strict carbohydrate restriction. The postoperative course was uneventful, and she was discharged on the 10th day without symptom relapse.

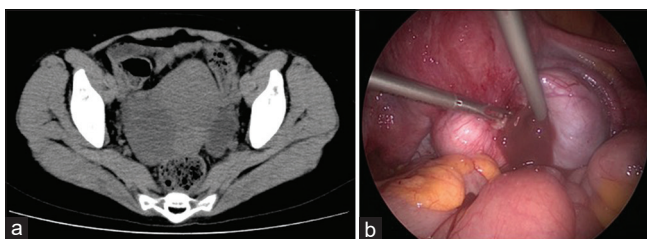


Figure 1: (a). Simple computed tomography image. Cysts are visible on both adnexa. The intestinal tract had mild edematous change and fluffing of the surrounding fat tissue. (b). Intraoperative findings. Ovarian tumors are adhered to the broad ligaments on the posterior surface of uterus. The content fluid is brown

DISCUSSION

We experienced a case in which infection by sexual activity was not suspected, and diagnostic laparoscopy was useful for ovarian abscess due to *Salmonella* infection likely caused by eating habits.

Although *Salmonella* is present in the gastrointestinal tract of various animals, they are rarely isolated from the stool of humans. The common routes of infection are oral, such as meat, eggs, and water. Furthermore, ovarian abscess formation pathways generally include an ascending route from the vagina, a hematogenous pathway due to bacteremia, and transmission from surrounding organs such as the appendix and small intestine.^[3]

Regarding the development of ovarian abscess, some cases reported that cystic lesions had been existed before infection, so it may be a risk of abscess due to *Salmonella*.^[4-6] Including the present case, there is not always an association with sexual activity, because there is a young patient who never had sexual intercourse.^[5] In terms of risk factors, it was reported that patients taking immunosuppressants because of primary diseases such as rheumatoid arthritis may be at risk.^[4] A few cases have speculated on the route of *Salmonella* infection associated with ovarian abscess, which is difficult to identify.^[4-7] The present report is a rare case in which the approximate route of infection was identified from an extremely unbalanced diet.

The serovar of *Salmonella*, in this case, *S. agona*, has important factor to be considered. *Salmonella* is classified into two species, as *Salmonella enterica* and *Salmonella bongori*. *S. enterica* is further divided into six subspecies that include over 2500 serovars.^[8] *S. agona* is serovar of subspecies enterica. They have induced multiple foodborne outbreaks in several countries so far. In the past, serovar infantis has been prevalent in Japanese broilers. However, it is reported that the dominant serovar had been shifted to *S. agona* at some farms raising broilers since 2014.^[9] In the future, infections caused by *S. agona* might be increased. In addition, there are some cases *Salmonella* form the abscess beyond the intestine to other places including ovaries. According to the review

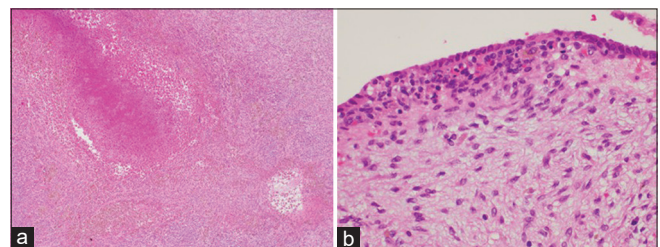


Figure 2: Pathological tissue. (a). Hemisiderosis and accumulation of histiocytes containing hemosiderin are visible on the cyst wall. (b). Epithelial components with stroma

report in Japan, *Salmonella* can spread to other organs, most commonly the aneurysm of the aorta followed by the spleen and ovaries in that order.^[10] When a patient has symptoms of enteritis, preceding tubo-ovarian abscess should be considered the possibility of *Salmonella* infection.

As for surgery, adhesions between organs were described in all reported cases of *Salmonella* infection.^[4-7] In fact, some cases chose more than salpingo-oophorectomy even for premenopausal cases.^[4-7] Several reports mentioned that the case which started initial conservative treatment with antibiotics eventually required surgical drainage.^[6,7] Because the present case showed poor improvement with antibiotic therapy, we switched to surgical treatment quickly. Early switch to surgical strategy and rapid diagnosis is important to preserve ovaries in young women from the point of view of fertility. In addition, less invasive laparoscopy is desirable for patients. However, it is important to provide patients a full explanation about the possibility of changing surgical contents according to the intraoperative findings.

Ethical approval

This study was approved by the Research Ethics Committee (REC) of Kawasaki Medical School and Hospital (approved number: 3826).

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

Prof. Mitsuru Shiota, an editorial board member at *Gynecology and Minimally Invasive Therapy*, had no role in the peer review process or decision to publish this article. The other authors declared no conflicts of interest in writing this paper.

REFERENCES

1. Hillier SL, Kiviat NB, Hawes SE, Hasselquist MB, Wolner Hanssen P. Role of bacterial vaginosis-associated micro-organisms in endometritis. *Am J Obstet Gynecol* 1996;175:435-41.
2. Heinonen PK, Miettinen A. Laparoscopic study on the microbiology and severity of acute pelvic inflammatory disease. *Eur J Obstet Gynecol Reprod Biol* 1994;57:85-9.
3. Granberg S, Gjelland K, Ekerhovd E. The management of pelvic abscess. *Best Pract Res Clin Obstet Gynecol* 2009;23:667-78.
4. Inoue M, Yanaihara N, Okamoto A. *Salmonella* ovarian abscess in a patient with rheumatoid arthritis (RA): A case report with literature review. *Clin Exp Obstet Gynecol* 2014;41:465-7.
5. Miller AS, Hunstad DA. *Salmonella* ovarian abscess in an adolescent. *Pediatr Infect Dis J* 2007;26:548-9.
6. Tohya T, Yoshimura T, Onoda C. Unilateral ovarian abscess caused by *Salmonella*. *Infect Dis Obstet Gynecol* 2003;11:217-9.
7. Sharma P, Bhujra A, Tuladhar R, Parry CM, Basnyat B. Tubo-ovarian abscess infected by *Salmonella typhi*. *BMJ Case Rep*. 2017. DOI: 10.1136/bcr-2017-221213.
8. Grimont PA, Weill FX. Antigenic formulae of the *Salmonella* serovars 9th edition, WHO Collaborating Centre for Reference and Research on *Salmonella*, Institut Pasteur, Paris, 2007. Available from: <https://www.researchgate.net/publication/283428414>. [Last accessed on 2021 Feb 12].
9. Tori Y, Yokoyama E, Seki M, Shigemura H, Ishige T, Yanagimoto K, *et al.* Genetic characteristics of emerging *Salmonella enterica* serovar Agona strains isolated from humans in the prior period to occurrence of the serovar shift in broilers. *J Vet Med Sci* 2019;81:1117-20.
10. Hattori M, Suzuki H, Kuze S, Shibahara H, Takamizawa J. A case report of an abscess in the pelvic space caused by *Salmonella* O7. *Nihonhukubukyuigakukaizasshi* 2007;27:69-72.