

## Case Report

# A Rare Case of Genital *Salmonella*

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- *Salmonella*
- Salpingitis
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## Abstract

*Salmonella* is a bacteria usually infecting the gastrointestinal system. However, other unusual presentations can be encountered such as genital tract infection. This case is about a young woman with suspected salpingitis and peritonitis who was eventually treated for an infected ovarian cyst by a *Salmonella enterica* serovar Reading. She had a four-day history of diffuse abdominal pain and presented increased white cell count and C reactive protein. She was not sexually active and did not have any genital symptoms or diarrhea. The first computed tomography revealed a right ovarian cyst and peritonitis but after an unsuccessful treatment attempt with laparoscopic peritoneal lavage and antibiotics, a second computed tomography revealed an increase of the cyst's size compatible with an ovarian abscess. The patient was successfully treated with surgical drainage of the cyst and antibiotics. *Salmonella* can infect an ovarian cyst via the haematogenous or uro-genital route and cause unusual but severe clinical presentations. *Salmonella* serovar Reading is rarely encountered in human medicine and this is the first reported case of an ovarian cyst infected with this serogroup.

## ABBREVIATIONS

CT: Computed Tomography; GL: Granulocytic Leukocytosis; CRP: C-reactive Protein; POD: Post-Operative Day.

## INTRODUCTION

Acute abdominal pain with fever is a common reason for consultation in the emergency unit. In a woman of child-bearing age, common diseases must be considered such as urinary tract infections, digestive and gynecological causes without omitting complications of pregnancy and screening of sexually transmitted genital infections. Salpingitis can be symptomatic or asymptomatic and even when present, clinical symptoms and signs lack sensitivity and specificity. The symptoms suggestive of a diagnosis of salpingitis are the following: spontaneous lower abdominal pain and adnexal pain on movement of cervix or uterus. The rest of the symptoms and particularly genital losses are inconsistent. The laparoscopic diagnosis has a better positive predictive value compared to the clinical diagnosis. [1-3]. *Gonococcus* and *Chlamydia* are the most common pathogenic germs discovered but digestive germs can also be held responsible for this disease. *Salmonella enterica* is a genus of the family *Enterobacteriaceae* subclassified into seven subgroups and more than 2,000 serotypes. Four clinical presentations can be encountered [4-6]. Typhoid and Paratyphoid *Salmonella* mostly affect developing countries and lead to the classic typhoid fever [7]. On the other hand, Nontyphoid *Salmonella* serotypes are a major cause of food-borne infections in industrialized countries and most often result in self-limited acute gastroenteritis. The most common clinical features consist of acute nausea, vomiting, abdominal cramps, diarrhea, headache and a fever up to 39°C [6]. These symptoms can last 5 to 7 days and do not require antimicrobial therapy. Approximately 3 to 10% of the patients

affected with *Salmonella enterica* develop bacteremia and an increased risk of extraintestinal focal infections such as aortitis, mycotic aneurysm, endocarditis, osteomyelitis and more [8-10]. Certain underlying conditions increase this risk of bacteremia such as immunodeficiency, immunosuppressive therapy and young age [11]. Asymptomatic carriers of *Salmonella* can also be identified [6]. We report the case of a young lady referred to our unit with a clinical suspicion of pelvi-peritonitis and salpingitis eventually treated for an infected ovarian cyst with *Salmonella enterica*.

## CASE PRESENTATION

A 19-year-old woman of African origin with no medical or surgical history was accepted in the Emergency Unit with a four-day history of progressive abdominal pain, nausea and vomiting. She did not have any fever, diarrhea or vaginal symptoms but she described urinary burnings. She was nulliparous and assured us she never had any sexual activity. She took no medication, did not travel recently and she was the only one in her family to have those symptoms.

At this time, her temperature was of 38°C but her heart rate and blood pressure were normal. Physical examination revealed moderate pain of the lower part of the abdomen without rigidity and careful genital examination did not reveal any purulent vaginal discharge other than menstrual losses. Laboratory tests revealed acute inflammatory syndrome with granulocytic leukocytosis [GL] of  $14 \times 10^3/\text{ml}$  and C-reactive protein [CRP] of 324 mg/l [Norm < 5 mg/l] but there was no elevation of the HCG and the urinary tests remained sterile. Abdomino-pelvic computed tomography [CT] demonstrated pelvi-peritonitis, a right ovarian cystic structure of 5 cm long and 5 cm wide and reactional ileitis, pancreatitis and hepatitis. A laparoscopy was performed but

did not found any purulent collection. Instead, there were false membranes, diffuse inflammation, peritoneal adhesions, a large right ovarian cyst and the right adnexa was swollen but not dilated. Peritoneal lavage, bacteriological samples and drainage system were performed.

The patient received parenteral antibiotics with Doxycycline and Metronidazole and her physical condition improved day by day as she did not have any fever and her abdomen was less painful. Meanwhile, the level of GL kept decreasing. However, on Post-Operative Day [POD] 5, due to abdominal pain recurrence and the rising of the GL up to  $19 \times 10^3$ /ml, a new abdomino-pelvic CT was completed and revealed increasing of the right ovarian cyst's size with a diameter of 7,5cm compatible with an ovarian abscess (Figure 1,2).

Bacteriological analysis of the false membranes and peritoneal lavage identified a *Salmonella enterica* subsp. *enterica* serotype Reading which was sensitive to Ceftriaxone and Ofloxacin. Therefore, Ceftriaxone was added to her treatment.

Meanwhile, according to standard protocol for pelvic infections, screening for sexually transmitted infections was negative.

She was addressed to a gynecology department and had to be transferred to a reanimation unit because of a severe sepsis. Surgery was performed and the ovarian abscess was

disrupted, sampled and drained. The patient fully recovered from this procedure and she was discharged with Doxycycline, Metronidazole and Ceftriaxone.

## DISCUSSION

This case is about an intra peritoneal *Salmonella* infection that mimicked a salpingitis and pelvi peritonitis in a young women. It highlights several issues.

On the one hand, it confirms that acute abdominal pain with fever in young female patients presents a great diagnostic challenge. Moreover, pelvic infection in those patients is often easily paired with sexually transmitted infections [12]. In our case, it did not add up as the patient had no vaginal symptoms and she never had any sexual activity. The principal hypothesis were salpingitis with pelvi-peritonitis or an ovarian abscess. However, we could not formally exclude endometrioma infection, an ovarian malignant mass or active Crohn's disease. In fact, *Salmonella* infection can be misleading by mimicking ovarian malignancy on radiographic studies and masquerading as a malignant process [13].

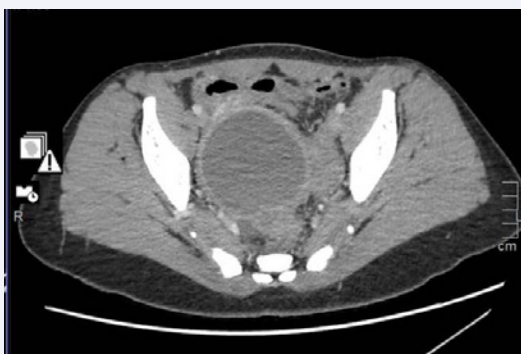
On the other hand, it confirms that although *Salmonella* infects predominantly the gastrointestinal tube, it has a real potential for metastatic infection via the haematogenous route or the urogenital route and can cause rare but severe ovarian cyst infections [14]. In fact, 3 to 10% of the patients develop bacteremia and most of the time, the extraintestinal localisations are aortitis, mycotic aneurysm, endocarditis, osteomyelitis and less frequently abscesses of any organ like the spleen, the appendix [15-20]. The risk of bacteremia is particularly important in children and adults with immunodeficiency. [11] In fact, many cases report ovarian abscess *Salmonella* infection in patients with systemic lupus erythematosus or rheumatoid arthritis. Most of the time, it is connected with the use of immunosuppressive drugs [21-26]. In our case, the patient did not take any medication and her serological status for the HIV was negative.

A Review of the Literature was published in 2017 and reported previous ovarian cysts and endometriomas infected with *Salmonella* between 1963 and 2016 [27]. There were 33 cases reported from 2 to 48 years old, mostly from Asia and Europe, only 55% of them had preceding diarrheal illness and most of the time, the diagnostic test was ultrasound or CT. Most of them had endometrioma or teratoma and only three of them had sepsis. The most common types of *Salmonella* were enteritis and typhi. All of these patients were treated with surgery and antibiotics such as penicillins, third-generation cephalosporins and fluoroquinolones [28-35].

*Salmonella Reading* is a minor serogroup, isolated for the first time in 1916 and rarely encountered in human medicine. The last epidemic occurred in the United States in 2016, causing 35 cases of gastroenteritis, probably related to the ingestion of contaminated alfalfa germ. A few other cases of *Salmonella Reading* infections show a more serious clinical picture of osteomyelitis or breast abscess [36,37]. According to the CDC, poultry and swine seem to be the common reservoirs for this serovar Reading and no virulence factors seem to be associated to this serotype [38]. This is the first case of human genital infection with *Salmonella Reading*



**Figure 1** Right ovarian abscess on the first abdomino-pelvic CT (cuts: 1,25mm) with contrast (left) and the same increased size abscess on the second CT with contrast (right).



**Figure 2** Right ovarian abscess on the first abdomino-pevic CT with contrast (cuts: 1,25mm).

After reviewing all the cases, we found many similarities with our case as most of the time, the abscesses appear to be simple ovarian cysts or teratomas on pre-operative imaging. Recovery is uneventful after treatment with antibiotics and repeated imaging demonstrate abscess characteristics of the cyst. In our case, the cyst had grown between the two CTs in a few days which lead us to the diagnostic of abscess. These cases also suggest that the treatment of choice is always surgery and antibiotics.

Even though ciprofloxacin seems to be the treatment of choice for salmonellosis, many studies report increasing of *Salmonella* resistant to quinolones in the United States and Asia [39-42]. We chose to pursue the initial administration of ceftriaxone as it was adapted to the antibiogram we received.

In conclusion, we report a case of ovarian abscess due to *Salmonella* infection that simulated a salpingitis and pelvi-peritonitis in a young woman. The infection of an ovarian cyst is not so rare and we must suspect *Salmonella* as it can be responsible for severe bacteremia. We must bear in mind this diagnostic as the morbidity of these surgeries can be important among which severe infection on a short-term and impairment of fertility on a long-term.

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