



# Case report: a rare presentation of typhoid fever due to eating over-ripened pineapple

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**Background and Importance:** Typhoid fever is an acute infection caused by *Salmonella typhi*, especially when it is waterborne or foodborne. Overripe pineapple causes typhoid fever because overripe pineapple is a desirable host for the survival of *S. typhi*. The importance of typhoid fever as a public health burden is reduced by early detection and appropriate antibiotic treatment.

**Case Presentation:** A 26-year-old black African male health care worker was admitted to the clinic on 21 July 2022, with a significant chief complaint of headache, loss of appetite, and watery diarrhea. The admitted patient presented with a 2-day history of hyperthermia, headache, loss of appetite, and watery diarrhea, as well as back pain, joint weakness, and insomnia. The H antigen titer was positive, which was 1 : 189 greater than the normal range and showed the past history of *S. typhi* infection. The O antigen titer value detected was a false negative result because it was done before the 7-day onset of fever. On admission, ciprofloxacin 500 mg was given orally twice a day for 7 days to treat typhoid by inhibiting the deoxyribonucleic acid replication of *S. typhi* by preventing *S. typhi* deoxyribonucleic acid topoisomerase and deoxyribonucleic acid gyrase.

**Clinical Discussion:** Typhoid fever pathogenesis is based on pathogenic factors, infecting species, and host immunity. By using the agglutination biochemical test, the Widal test was able to identify the patient's bloodstream as carrying the *S. typhi* bacteria that causes typhoid fever.

**Conclusion:** Due to contaminated food or unsafe drinking water sources, typhoid fever is associated with travel to developing nations.

**Keywords:** case presentation, ciprofloxacin, eating, over-ripened, pineapple, typhoid fever

## Introduction

Typhoid/enteric fever occurs as a result of contaminated water and food caused by *Salmonella typhi*<sup>[1]</sup>. Typhoid/enteric fever is a major cause of morbidity and mortality across the globe<sup>[2]</sup>. High-grade fever, chills, headache, tachycardia, joint weakness, back pain, and abdominal pain are the main clinical manifestations of typhoid/enteric fever<sup>[3,4]</sup>. The most common laboratory diagnosis of typhoid/enteric fever comprises clinical specimens such as blood, stool, urine, and bone marrow; the polymerase chain reaction; and the Widal test<sup>[5]</sup>. For the management of typhoid fever, ciprofloxacin was initially given to treat typhoid fever by

inhibiting deoxyribonucleic acid replication of *S. typhi* and preventing *S. typhi* deoxyribonucleic acid topoisomerase and deoxyribonucleic acid gyrase<sup>[6]</sup>. This study offers novel information to the scientific understanding that overripe pineapple causes typhoid fever because overripe pineapple is a desirable host for the survival of *S. typhi*. This case report describes a rare case of typhoid or enteric fever in an adult caused by eating overripe pineapple. This case report was submitted in accordance with the SCARE criteria<sup>[7]</sup>.

## Case presentation

A 26-year-old black African male health care worker was admitted to the clinic on 21 July 2022, with a significant chief complaint of headache, loss of appetite, and watery diarrhea. The admitted patient presented with a 2-day history of hyperthermia, headache, loss of appetite, and watery diarrhea, as well as back pain, joint weakness, and insomnia. The patient traveled to Malarious area for his education 5 years ago; once upon a time, he bought overripe mangoes from a vegetable vendor on the street and ate them there. The patient ate mangoes at 4:00 a.m. and began experiencing diarrhea at noon, at 10:00 a.m. The patient had taken ciprofloxacin at 11:00 a.m. from the student clinic without any clinical investigations based on his clinical manifestations due to the inaccessibility of laboratory investigations and diagnostic equipment, and he recovered totally from the illness after 2 days. No one in his family had previously been diagnosed with typhoid fever.

Recently, the patient traveled to a desert environment and malarious area for work and stayed there for 1 year. When he returned home after 1 year, he bought pineapple from the vegetable seller on the street, ate it after 3 days without putting

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Typhoid/enteric fever occurs as a result of contaminated water and food.

Overripe pineapple causes typhoid fever because it is desirable for bacterial survival.

Ciprofloxacin is the preferred treatment for typhoid fever.

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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it in the refrigerator, and experienced the above clinical manifestations after 12 hours. The patient said, 'I was suspecting typhoid fever because the pineapple I ate was over-ripe', and then the physician decided to identify the disease type through laboratory investigations and diagnostic criteria and started undergoing it. First, the physician had performed a laboratory investigation to identify malarial parasites in peripheral blood via thin and thick smears, and no malarial parasites were detected in the patient.

Second, a physical examination was performed and revealed a high-grade fever (40.3°C/107.4°F) (normal value: 37°C/98.6°F), slight dehydration, tachycardia, or a heart rate of 114 beats per minute (normal value: 60–100 beats per minute), a respiratory rate of 15 breaths per minute (normal value: 12–16 breaths per minute), and a blood pressure of 112/71 mm Hg (normal value: 120/80 mm Hg).

Third, laboratory investigations were performed and showed a white blood cell (WBC) count of 3160 cells/mm<sup>3</sup> (normal value: 3200–9800 cells/mm<sup>3</sup>), neutrophils of 47% (normal value: 54–62%); eosinophils of 2.1% (normal value: 1–3%), monocytes of 4.8% (normal value: 3–7%), basophils of 0.3% (<1%), and lymphocytes of 43% (normal value: 25–33%), a platelet count of 125 000/mm<sup>3</sup> (normal value: 130 000–400 000 cells/mm<sup>3</sup>), a serum creatinine level of 0.9 mg/dl (normal value: 0.6–1.2 mg/dl), an aspartate aminotransferase/serum glutamic oxaloacetic transaminase level of 68 units/l (normal value: 0–35 units/l), an (alanine aminotransferase/serum glutamic-pyruvic transaminase) alanine aminotransferase level of 95 units/l (normal value: 0–35 units/l), an erythrocyte sedimentation rate of 9 mm/h (normal value: 0–20 mm/h), 45% hematocrit (normal value: 39–49%), hemoglobin of 15.9 g/dl (normal value: 14–17.5 g/dl), mean corpuscular volume of 79.8 fl/cell (normal value: 80–97.6 fl/cell), mean corpuscular hemoglobin of 31 pg/cell (normal value: 27–33 pg/cell), and mean corpuscular hemoglobin concentration of 35 g/dl (normal value: 32–36 g/dl).

Finally, the physician performed the Widal agglutination test to find that the patient had active or previous typhoid fever. According to the Widal test, the H antigen titer was 1 : 189 and the O antigen titer (TO) was 1 : 137 (normal value: 1 : 20–1 : 80). Herein, the admitted patient had a past history of *S. typhi* and no detection of active infection with *S. typhi* because the patient was discharged after 5 days from the onset of fever, and O agglutinins can usually be detected 6–8 days after the onset of fever. The H antigen titer was positive, which was 1 : 189 greater than the normal range and showed the past history of *S. typhi* infection. Because active typhoid fever infection is not detected until 6 days after the onset of fever, laboratory investigations are used to identify it. The above TO titer value detected was a false negative result because it was done before the 6-day onset of fever.

On admission, ciprofloxacin 500 mg was given orally twice a day for 7 days to treat typhoid by inhibiting the deoxyribonucleic acid replication in *S. typhi* and preventing *S. typhi* deoxyribonucleic acid topoisomerase and deoxyribonucleic acid gyrase. On the same day, paracetamol 500 mg was given orally three times a day for 5 days to control the fever by inhibiting prostaglandin E2 secretion, which elevates heat secretion and lowers heat loss. The following day, 22 July 2022, the patient was free of all clinical manifestations except fever and sent home with ciprofloxacin and paracetamol.

### Patient perspective

The admitted patient recovered from a typhoid fever infection and was discharged back home with prescribed medications.

### Discussion

Typhoid/enteric fever is caused by *S. typhi*<sup>[8,9]</sup>. The typical clinical manifestations of enteric fever comprise fever, abdominal pain, watery diarrhea, loss of appetite, chills, tachycardia, and weight loss<sup>[10]</sup>. The above typical clinical manifestations are also used as a measure of the probability of typhoid fever infection becoming endemic. The pathogenesis of typhoid fever is based on infectious species, virulent factors, and host immunity<sup>[11]</sup>. Dissemination to systemic sites, survival and duplication within host cells, and adherence to and invasion of gut epithelial cells are the most commonly noted pathogenesis features of typhoid fever<sup>[12]</sup>. Rapid diagnosis and appropriate antibiotic therapy reduce the significance of typhoid fever for the public health burden<sup>[13]</sup>. Due to metabolic processes in *Salmonella*, a WBC count of 3160/mm<sup>3</sup> (normal value: 3200–9800 cells/mm<sup>3</sup>) in typhoid fever infection reduces packed cell volume by 27.4% (normal value: 38.3–48.6%) and WBC by releasing toxins on the bone marrow. The typhoid fever caused by *S. typhi* bacteria in the patient's bloodstream was detected by the Widal test through the agglutination biochemical test. Positive antigen O and antigen H indicate typhoid infection if the Widal test range is greater than or equal to 1 : 160 titer<sup>[14]</sup>. If the the H antigen titer is positive, the patient has a history of typhoid fever infection, and if the TO titer is positive, the patient is currently infected with typhoid fever<sup>[15]</sup>. The mainstay and only effective treatment for typhoid fever infection is antibiotics that kill the *S. typhi* bacteria<sup>[16]</sup>. In many resource-limited areas, fluoroquinolones have become affordable and the treatment of choice for typhoid fever<sup>[17]</sup>. Ciprofloxacin, 500 mg, taken orally twice a day for 7 days, treated typhoid by preventing *S. typhi* deoxyribonucleic acid replication by inhibiting its deoxyribonucleic acid topoisomerase and deoxyribonucleic acid gyrase<sup>[18]</sup>. Paracetamol 500 mg was given orally three times a day for 5 days to control the fever by inhibiting prostaglandin E2 secretion, which elevates heat secretion and lowers heat loss<sup>[19]</sup>. Paracetamol also reduces hyperthermia (elevated body temperature)<sup>[20]</sup>.

### Strengths of the case report

The laboratory diagnosis was done by using Widal test which is a rapid test diagnostic method, and results are ready in a few times.

### Limitations of the case report

Blood culture, which is the mainstay of laboratory diagnosis, was not performed because it required microbiology experts and was expensive. Widal test laboratory diagnosis has a low specificity and a positive predictive value.

### Conclusion

Typhoid fever is an infection of the intestinal tract and bloodstream caused by the bacteria *S. typhi*. Typhoid fever has been associated with travel history in underdeveloped countries because of unsafe drinking water sources and eating contaminated food. According to the findings of this study, overripe pineapple is a

favorable host for *S. typhi* survival. The presence of H and O serum agglutinins in the patient's serum was investigated by a Widal test. In underdeveloped countries, the Widal test is frequently performed because it is cheaper, easier to perform, and does not require microbiology experts. Ciprofloxacin is a fluoroquinolone antibiotic that is the preferred treatment for typhoid fever.

### Ethical approval

This case report did not require review by the ethics committee.

### Consent

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written informed consent is available for review by the editor-in-chief of this journal on request.

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### Author contribution

G.B. contributes to the preparation of the proposal, participated in preparing the first draft of the manuscript and edits of the manuscript. The author checked and confirmed the final version of the manuscript.

### Conflicts of interest disclosure

The authors declared that they have no competing interest.

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