Erythema Nodosum and Bilateral Breast Abscesses Due to *Salmonella enterica* Serotype Poona[▽]

Khalifa Al Benwan,¹ Ahmed Al Mulla,² Hidemasa Izumiya,³ and M. John Albert^{4*}

Departments of Microbiology¹ and Surgery,² Al Amiri Hospital, Sharq, Kuwait; Department of Bacteriology, National Institute of Infectious Diseases, Tokyo, Japan³; and Department of Microbiology, Faculty of Medicine, Jabriya, Kuwait⁴

Received 17 April 2010/Returned for modification 21 July 2010/Accepted 3 August 2010

A woman presented with erythema nodosum followed by bilateral breast abscesses without a gastrointestinal manifestation, due to a rare serotype of *Salmonella*, namely, *Salmonella enterica* serotype Poona. This is the first reported case of erythema nodosum presumably associated with *Salmonella* infection without a gastrointestinal manifestation.

CASE REPORT

In September 2009, a 23-year-old, married, nonlactating Ethiopian woman returning from a vacation in Ethiopia was admitted to Al-Amiri Hospital, Kuwait, with swelling of both legs of 3 days' duration. She had no history of systemic illnesses, immune disorders, or intake of immunosuppressant drugs. On examination, the swellings on the legs were symmetrical, tender, and erythematous, with warm nodules and raised plaques on the shins of both legs. Systemic examination was unremarkable. Her serum C-reactive protein (IMMAGE 800 immunochemistry system; Beckman, Brea, CA) was 48.1 mg/liter (reference, <1.0 mg/liter). An initial diagnosis of erythema nodosum was made, and no antibiotics were prescribed. On the eighth day of hospitalization, the patient developed painful swellings in both breasts, fever (38.2°C), and tachycardia (108 beats/min). An empirical treatment with intravenous clindamycin (600 mg every 8 h) was immediately initiated after blood was collected for culture. The left breast was swollen and tender, with a hard mass of around 7 cm by 4 cm located in the left lower quadrant. The right breast had a swelling of about 5 cm by 4 cm in size in the upper outer quadrant. The nipples of breasts were not retracted, and there was no discharge. There were palpable axillary lymph nodes of 1 to 2 cm on both sides. Blood examination (LH 750 analyzer; Coulter, Miami, FL) showed leukocytosis, with a white blood cell count of 17.8×10^9 cells/liter (reference, 4×10^9 to 11×10^9 /liter). The abscesses of both breasts were then drained surgically under general anesthesia. Pus specimens from both breasts were sent to the microbiology laboratory in a tightly capped, sterile universal container for investigations. Gram staining of both specimens showed numerous pus cells, but no microorganism was seen. Ziehl-Neelsen staining of smears and mycobacterial culture on Lowenstein-Jensen medium were negative for mycobacteria (5). Cultures of both specimens on MacConkey agar and blood agar (Oxoid, Basingstoke, United Kingdom) grew a

Salmonella species, which was identified by an automated system (Vitek; bioMérieux, Marcy l'Etoile, France) and API 20E tests (bioMérieux, Marcy l'Etoile, France), while blood culture (Bactec blood culture system; BD Diagnostic Systems, Sparks, MD) was negative after 7 days of incubation. The organism was identified as *Salmonella enterica* serotype Poona (antigens 1,13,22:z: 1,6) according to the Kauffmann-White scheme by using commercial (Murex, Dartford, United Kingdom; Statens Serum Institut, Copenhagen, Denmark; and Denka Seiken, Tokyo, Japan) and in-house antisera. The organism was susceptible to ampicillin, ceftriaxone, chloramphenicol, trimethoprim-sulfamethoxazole, and ciprofloxacin by disk susceptibility testing (Oxoid). Clindamycin was discontinued and ciprofloxacin given (400 mg every 12 h) for 9 days. The stool and urine cultures done on the day when *Salmonella* was identified were negative for pathogens (1). The pus culture for anaerobic bacteria on blood agar did not yield any growth. The patient's blood was tested for hemoglobin electrophoresis by high-pressure liquid chromatography (10), and the values were normal (HbA, 98.8%; HbA2, 2.3%). She was also negative for human immunodeficiency virus, hepatitis B virus surface antigen, and hepatitis C virus by enzyme-linked immunosorbent assay (ELISA) (AxSYM; Abbott, Wiesbaden, Germany). Four weeks after admission, the patient was discharged and recovered fully.

The clinical presentations of nontyphoidal *Salmonella* infection are protean and include gastroenteritis (most common), bacteremia, septic arthritis, osteomyelitis, and endovascular infection (9). When associated with *Salmonella* infections, erythema nodosum is usually accompanied by intestinal *Salmonella* infections (6). Breast infection due to nontyphoidal *Salmonella* isolates is extremely rare (3). Breast abscess is commonly caused by *Salmonella enterica* serovar Typhi and *Salmonella enterica* serovar Paratyphi organisms (9). Thus, our case is novel in two respects: erythema nodosum occurred without a gastrointestinal illness, and breast abscesses were due to a rare serotype of nontyphoid *Salmonella* (serotype Poona). Risk factors for breast abscesses caused by salmonellae include extremes of age, immunosuppression, intravenous

* Corresponding author. Mailing address: Department of Microbiology, Faculty of Medicine, Kuwait University, P.O. Box 24923, Safat 13110, Kuwait. Phone: (965) 2498 6502. Fax: (965) 2533 2719. E-mail: john@hsc.edu.kw.

[▽] Published ahead of print on 11 August 2010.

drug abuse, hemoglobinopathies, and previous trauma (4). This patient did not have any of these risk factors. This suggests that *S. Poona* may cause breast abscesses in immunocompetent individuals.

S. Poona has been isolated from many foods, animals, and water. Even though it is a rare human pathogen, it has recently caused several cantaloupe-associated outbreaks of salmonellosis in North America (2). A case of meningitis in a neonate in association with maternal mastitis due to *S. Poona* has also been reported recently (8).

S. Poona infection has been reported in food animals in Ethiopia (7). The patient gave a history of eating meat while in Ethiopia. It is likely that the breasts became infected during a transient bacteremic episode originating from the patient's bowel. To our knowledge, this is the first reported case of erythema nodosum that is associated with an extraintestinal nontyphoidal *Salmonella* infection. While complete serotyping of *Salmonella* is not possible in routine clinical laboratories, laboratories should undertake this task with the help of reference laboratories, as has been done in our case, to identify rare serotypes of *Salmonella* causing unusual disease manifestations.

REFERENCES

1. Bopp, C. A., F. W. Brenner, J. G. Wells, and N. A. Strockbine. 1999. *Escherichia*, *Shigella*, and *Salmonella*, p. 459–474. In P. R. Murray, E. J. Barron, M. A. Pfaller, F. C. Tenover, and R. H. Tenover (ed.), *Manual of clinical microbiology*, 7th ed. ASM Press, Washington, DC.
2. Centers for Disease Control and Prevention. 2002. Multistate outbreaks of *Salmonella* serotype Poona infections associated with eating cantaloupe from Mexico-United States and Canada. *MMWR Morb. Mortal. Wkly. Rep.* **51**: 1044–1047.
3. Cheng, S.-P., C.-L. Liu, and Y.-C. Chang. 2006. Extraintestinal *Salmonella* infection appearing as a suspicious breast mass. *J. Ultrasound Med.* **25**:277–279.
4. Girardin, F., N. Mezger, H. Hachler, and P. A. Bovier. 2006. *Salmonella* serovar Give: an unusual pathogen causing splenic abscess. *Eur. J. Clin. Microbiol. Infect. Dis.* **25**:272–274.
5. Kao, P. T., M. Y. Tu, S. H. Tang, and H. K. Ma. 2010. Tuberculosis of the breast with erythema nodosum: a case report. *J. Med. Case Rep.* **4**:124.
6. Mantadakis, E., V. Arvanitidou, A. Tsalkidis, S. Thomaidis, and A. Chatzimichael. 2010. Erythema nodosum associated with *Salmonella* enteritidis. *Hippokratia* **14**:51–53.
7. Molla, W., B. Molla, D. Alemaheyu, A. Muckle, L. Cole, and E. Wilkie. 2006. Occurrence and antimicrobial resistance of *Salmonella* serovars in apparently healthy slaughtered sheep and goats in central Ethiopia. *Trop. Anim. Health Prod.* **38**:455–462.
8. Mukerji, A., C. Sulowski, J. N. Friedman, and M. A. Poavsky. 2009. *Salmonella* Poona meningitis and mastitis causing neonatal meningitis. *Pediatr. Infect. Dis. J.* **28**:11412.
9. Rodriguez, M., I. de Diego, and M. C. Mendoza. 1998. Extraintestinal salmonellosis in a general hospital (1991 to 1996): relationships between *Salmonella* genomic groups and clinical presentations. *J. Clin. Microbiol.* **36**: 3291–3296.
10. Wild, B. J., and B. J. Bain. 2001. Investigation of abnormal hemoglobins and thalassemia, p. 231–268. In S. M. Lewis, B. J. Bain, and I. Bates (ed.), *Dacei and Lewis practical hematology*. Churchill Livingstone, London, United Kingdom.