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Salmonella typhimurium abscess of the chest wall

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Patient: **Male, 73**
Final Diagnosis: ***Salmonella typhimurium* abscess of the chest wall**
Symptoms: —
Medication: **Ciprofloxacin**
Clinical Procedure: —
Specialty: **Infectious Diseases**

Objective: **Unusual clinical course**





Background: Non-typhoid *Salmonella* extra-intestinal infections usually develop in infants and in adult patients with pre-existing predisposing conditions. Blood stream infections and urinary tract infections are the most common clinical presentations, but other sites of infection may be involved as well.

Case Report: We describe a case of invasive salmonellosis caused by *Salmonella typhimurium* involving the chest wall in a 73-year-old man. The patient had suffered from gastroenteritis followed by left basal pneumonia with pleural effusion 7 weeks before. The CT scan of the chest wall showed a pericostal abscess with shirt-stud morphology near the left last cartilaginous arch. The abscess was surgically drained and patient was cured after a 40-day ciprofloxacin treatment.

Conclusions: A review of the literature on extra-intestinal non-typhoid salmonellosis shows that pleuropulmonary and soft-tissue infections are uncommon. We argue that non-typhoid *Salmonella* might be considered as a possible cause of chest wall abscess in individuals with recent history of gastroenteritis complicated by pneumonia and pleural effusion.

Key words: ***Salmonella* • infection • soft-tissue • chest wall**

Full-text PDF: <http://www.amjcaserep.com/download/index/idArt/889546>

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Background

Non-typhoid *Salmonella* (NTS) can cause not only self-limited acute gastrointestinal infections, but also bacteremia with or without extra-intestinal focal infections. Such complications usually develop in children, or in adults with predisposing conditions or underlying diseases that compromise host defenses. Here, we describe a case report of an unusual site of NTS infection in a patient with diabetes mellitus.

Case Report

A 73-year-old man was admitted to our hospital for left chest pain, diarrhea, and fever. His past medical history was remarkable for hypothyroidism, arterial hypertension, and insulin-dependent diabetes mellitus. Seven weeks before the hospital admission, the patient had gastroenteritis followed by left basal pneumonia with pleural effusion. At that time, he received a 2-week regimen of amoxicillin/clavulanate and seemed to be eventually cured.

At hospital admission, physical examination was unremarkable except for a pasty and floating swelling, 4 cm in diameter, on the left side of his fifth intercostal space. Blood examinations were normal except for neutrophil leucocytosis (white blood cells $16\,560/\text{mm}^3$ – normal values $4000\text{--}10\,000/\text{mm}^3$; neutrophils $13\,910/\text{mm}^3$ – normal values $2000\text{--}7500/\text{mm}^3$) and elevation of C-reactive protein and erythrocyte sedimentation rate (ESR) (142.1 mg/L – normal value $<5\text{ mg/L}$ – and 99 mm/h , respectively).

Chest X-ray showed a small left basal consolidation with little concomitant pleural effusion, while CT scan of the thoracic wall (Figure 1) showed an $8\times 5\text{ cm}$ abscess with sand-glass morphology near the last cartilaginous arch on the left, without signs of bone involvement. Percutaneous incision of the lesion revealed the abscess was extending into the endothoracic space through a perforation of the intercostal muscles. The culture from the drained pus was positive for *Salmonella typhimurium*, which was sensitive to fluoroquinolones and trimethoprim-sulfamethoxazole, but was resistant to ampicillin. Treatment with ciprofloxacin by intravenous route was given, with clinical improvement. After 20 days, culture of swab from the chest wall lesion was negative, the chest wall breach was surgically sealed, and antibiotic therapy switched to oral ciprofloxacin for a further 20 days because of the persistence of fever. At 2-month follow-up, the chest X-ray showed a nearly total resolution of the lesion and pleural effusion, and the patient was fully recovered, with no evidence of disease persistence or recurrence.

Discussion

NTS are gram-negative bacilli of the family of *Enterobacteriaceae*, which can be acquired from multiple animal reservoirs. Human transmission occurs by many routes, including consumption of food animal products, especially eggs, poultry, undercooked meat and dairy products, fresh produce contaminated with animal waste, contact with animals or their environment, and contaminated water [1]. Salmonellosis may present in different clinical forms, ranging from asymptomatic chronic carrier to

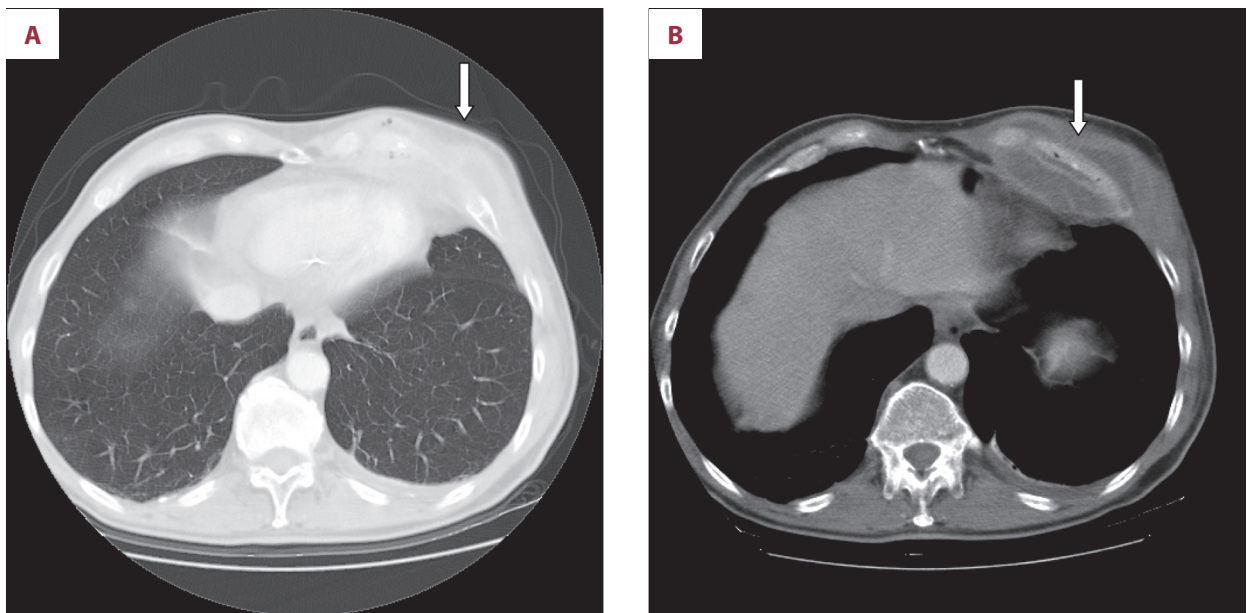


Figure 1. (A) Chest CT scan showing a pericostal mass in the left anterior chest wall. (B) Chest CT scan revealing the shirt-stud morphology of a pericostal mass measuring $8\times 5\text{ cm}$.

Table 1. Case series of extra-intestinal localizations of NTS** infections.

| Authors | Country and period of observation | Number of cases of invasive Salmonellosis | Clinical presentation/ extra-intestinal localizations | Most common isolated <i>Salmonella</i> species | Underlying diseases or predisposing conditions |
|-------------------------------|-----------------------------------|---|--|---|---|
| Arshad M.M. et al. 2008 [10] | USA 1995-2001 | 347 | 341 positive blood cultures 6 positive cultures from CSF | <i>S. heidelberg</i> 19.3% <i>S. typhimurium</i> 18.7% <i>S. enteritidis</i> 16.7% Other species 45.3% | Age <4 years |
| Chen P.L. et al. 2007 [4] | Taiwan 199-2005 | 130 | 130 positive blood cultures of whom: extra-intestinal focal infections 39.5% presenting as: mycotic aneurysm, pneumonia/empyema, spinal osteomyelitis, spontaneous bacterial peritonitis, liver abscess, splenic abscess, septic arthritis | Serogroups B 43.3% C/C1a 34.9%/31.8% D 20.2% E 1.6% | Malignancy, diabetes mellitus, immunosuppressive therapy, renal insufficiency, hypertension, human immunodeficiency virus infection, connective tissue disorders, liver cirrhosis, coronary heart disease, congestive heart failure, chronic lung disease |
| Jones T.F. et al. 2008 [2] | USA 1996-2006 | 2676 | Blood cultures cultures from abscess cultures from bone or joint fluid cultures from CSF | <i>S. dublin</i> 64% <i>S. choleraesuis</i> 57% <i>S. poona</i> 17% <i>S. schwarzengrund</i> 15% <i>S. heidelberg</i> 13% <i>S. enteritidis</i> 7% <i>S. typhimurium</i> 6% | Not reported |
| Heyd J. et al. 2003 [6] | Israel 1990-2000 | 112 | 112 patients with positive blood cultures of whom 2 patients with psoas abscess | <i>S. enteritidis</i> isolated from the 2 patients with psoas abscess: from blood cultures of 1 patient and from the drained abscess of the other patient | Idiopathic thrombocytopenic purpura treated with steroids and intravenous gammaglobulin Myasthenia gravis treated with steroids |
| Kedzierska J. et al. 2008 [7] | Poland 2000-2006 | 30 | 22 blood stream infections and 8 non bacteriemic focal infections of which: 1 retrocecal abscess, 1 subphrenic abscess, 1 abscess of the spleen, 1 pneumonia, 4 urinary infections | <i>S. enteritidis</i> 86.7% <i>S. hadar</i> 6.7% <i>S. infantis</i> 3.3% <i>S. braenderup</i> 3.3% | Haematologic malignancy, liver cirrhosis, renal failure, HIV infection, cancer, SLE* |
| Fisker N. et al. 2003 [3] | Denmark 1991-1999 | 135 | Bacteremia, heart or great artery, meningitis, osteomyelitis/bacterial arthritis, cellulites, pleural empyema urinary tract, subcutaneous abscess | <i>S. typhimurium</i> <i>S. enteritidis</i> Others | Diabetes mellitus, hepatic cirrhosis, immunosuppression, acid reducing treatment, age >65 years |
| Dhanoa A. et al. 2009 [5] | Malaysia 2002-2006 | 55 | Bacteriemia, lung, soft tissue, bone and joint, meningitis, mycotic aneurism, urinary tract, peritonitis | <i>S. enteritidis</i> 72.7% <i>S. corvallis</i> 7.2% <i>S. blegdam</i> 5.5% <i>S. paratyphi b</i> 5.5% Others 9.1% | Malignancy, AIDS, SLE*, hypogammaglobulinemia atherosclerotic conditions, hypertension, diabetes mellitus, ischemic heart disease, stroke, liver cirrhosis, renal disease |

Table 1 continued. Case series of extra-intestinal localizations of NTS** infections.

| Authors | Country and period of observation | Number of cases of invasive Salmonellosis | Clinical presentation/ extra-intestinal localizations | Most common isolated <i>Salmonella</i> species | Underlying diseases or predisposing conditions |
|--------------------------------|-----------------------------------|---|--|---|--|
| Asseva G. et al. 2012 [8] | Bulgaria 2005–2010 | 33 | Sepsis, septic shock, meningitis, subphrenical abscess, empyema, acute cholecystitis, appendicitis, perianal abscess, pyelonephritis, pneumonia | <i>S. enteritidis</i> 63% <i>S. typhimurium</i> 18% <i>S. choleraesuis</i> 9% Others 12% | Chronic liver diseases, diabetes mellitus, organ abscess, hypertension, AIDS, liver cirrhosis, gastric hypoacidity |
| Zaidenstein R. et al. 2010 [9] | Israel 1996–2006 | 1415 | Blood stream infection, urinary tract infections, abscesses, respiratory infections, meningitis, intra-abdominal sources (bile and peritoneal fluid) | <i>S. enteritidis</i> 31.6% <i>S. virchow</i> 20% <i>S. typhimurium</i> 14% Others 35% | The incidence of extra-intestinal NTS infection is higher in childhood and in patients >60 years |

* SLE – systemic lupus erythematosus; ** NTS – non typhoid *Salmonella*.

Table 2. Literature case reports of chest wall abscesses caused by Non Typhoid *Salmonella* (NTS) spp.; all the cases were treated with surgical drainage.

| Reference | Age/sex | Underlying condition | Isolated organism | Treatment | Outcome |
|-------------------------------|---------|----------------------|--|---|---------|
| Raffi 1990 [15] | 36/M | AIDS | <i>Salmonella typhimurium</i> | Ofloxacin | Cured |
| Suganuma 1993 [16] | 18/F | AIDS | <i>Salmonella newport</i> | | Cured |
| Porcalla A.R. 2001 [11] | 11/F | Healthy condition | <i>Salmonella enterica</i> serogroup C | Cefotaxime Ceftriaxone Amoxicilline | Cured |
| Gupta S.K. 2003 [12] | 48/M | Healthy condition | <i>Salmonella enteritidis</i> | Cefuroxime Ciprofloxacin | Cured |
| Vazquez E.G. 2005 [13] | 55/M | Healthy condition | <i>Salmonella enteritidis</i> | Ciprofloxacin | Cured |
| Fajardo Olivares M. 2007 [14] | 8/M | Healthy condition | <i>Salmonella enteritidis</i> | Cefotaxime | Cured |

gastroenteritis, bacteriemia, and extra-intestinal infections [1]. In recent years, several case series of NTS infection with extra-intestinal localizations have been reported in many countries (Table 1) [2–10]. Among the extra-intestinal localizations of NTS, blood stream infections are the most common, representing the 94.3% in a case series in the USA between 1996 and 2006 [2] and 82% in a Danish case series of 135 patients observed between 1991 and 1999 [3]. Other reported extra-intestinal localizations of NTS include: urinary tract infection, endovascular infection and endocarditis, meningitis, osteomyelitis, pneumonia, and soft-tissue and other visceral involvement. Pneumonia, with or without pleural empyema, and soft-tissue abscesses represent uncommon complication of NTS infection, accounting for 10% [4] and from 3.7% [3] to 7.3% [5], respectively, of extra-intestinal focal infections. To the best of our knowledge, chest wall abscesses caused by non-NTS have been reported only in 6 patients between 1990 and 2011: 4 of them had no underlying disease or predisposing condition [11–14] and 2 patients had AIDS [15,16].

Most extra-intestinal localizations of NTS infections develop in pediatric patients and in patients with underlying diseases or predisposing conditions, such as malignancies, diabetes mellitus, immunosuppressive therapies, liver cirrhosis, renal insufficiency, or HIV infection [4–9]. Indeed, our patient had diabetes mellitus.

Regarding the different *Salmonella* species isolated in systemic and extra-intestinal focal infections, *S. enteritidis* has been reported as the most common in the majority of the studies [5,7–9], followed by *S. typhimurium* and *S. heidelberg*, but the frequency of the different isolated *Salmonella* species varies geographically (Table 2).

Conclusions

Although NTS pleuropulmonary and soft-tissue involvements are quite uncommon, in our case we assume that *S.*

typhimurium caused the gastroenteritis and, by blood stream spread, pneumonia and pleural effusion. Afterwards, the organism entered into the chest wall by contiguity. Alternatively, a non-*Salmonella*-induced pneumonia with resulting local inflammation might have facilitated a deposition of *Salmonella*

in the nearby chest wall, finally leading to the abscess. Our case suggests that NTS should be considered as a possible cause of chest wall abscess in individuals with recent history of gastroenteritis complicated by pneumonia and pleural effusion.

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