

Case Studies

A RARE CASE OF *SALMONELLA* INFANTIS URINARY TRACT INFECTION IN A HIGH-RISK ELDERLY PATIENT

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ABSTRACT

Salmonella spp. are predominantly recognised as enteric pathogens, while urinary tract infection represents a rare extraintestinal manifestation, often indicating underlying host vulnerability. This report describes a case of urinary tract infection in a 63-year-old male with multiple predisposing factors, including chronic hepatitis B and C infection, prolonged immobilisation, a grade IV sacral pressure injury, and prior prolonged hospitalisation. The patient presented with fever, lethargy, and persistent urinary symptoms. Although initial urine microscopy showed no visible bacteria, subsequent urine culture yielded *Salmonella* spp. Further identification of the isolate was performed using the API® (Analytical Profile Index) system, which identified it as *S. Infantis*. Simultaneously, blood cultures isolated ESBL-producing *Escherichia coli*, suggesting a complex systemic co-infection. Antimicrobial susceptibility testing revealed that *S. Infantis* was resistant to ceftriaxone but susceptible to fluoroquinolones. Initial empirical therapy with IV Ceftriaxone was unsuccessful; however, targeted therapy with IV Ciprofloxacin 400mg BD for 14 days led to clinical stabilisation within 48 hours. This case highlights the importance of considering atypical pathogens such as *S. Infantis* in urinary tract infections, particularly in high-risk and immunocompromised patients. Early microbiological identification and susceptibility testing are essential for appropriate management and improved clinical outcomes. In conclusion, accurate microbiological diagnosis plays a critical role in the management of unusual urinary tract infections, especially in complex patients with multiple comorbidities.

KEYWORDS: *Salmonella* Infantis, urinary tract infection, elderly patient, extraintestinal infection, case report

INTRODUCTION

Salmonella spp. are well-recognised causes of gastrointestinal infections, ranging from self-limiting gastroenteritis to systemic enteric fever. However, extraintestinal manifestations are relatively uncommon and are more frequently observed in individuals with underlying comorbidities or impaired immune function. Urinary tract infections caused by *Salmonella* spp. are rare and account for only a small proportion of reported urinary infections.

Isolation of *Salmonella* spp. in urine may indicate underlying host susceptibility, including chronic illness, structural abnormalities of the urinary tract, prolonged immobilisation, or possible systemic dissemination of infection. Previous studies have shown that such infections are more commonly reported among elderly or debilitated patients with prior healthcare exposure and multiple comorbidities. Failure to recognise atypical urinary pathogens may lead to delays in appropriate antimicrobial therapy and adversely affect clinical outcomes.

Non-typhoidal *Salmonella*, such as *S. Infantis*, is typically associated with gastrointestinal disease but may cause invasive infections in high-risk individuals. The present report describes a case of *S. Infantis* urinary tract infection in a bedbound elderly patient with multiple predisposing factors, highlighting the importance of accurate microbiological diagnosis in identifying unusual pathogens and guiding appropriate clinical management.

MATERIALS AND METHODS

Study design and ethical considerations

The paper is a retrospective clinical case study that reports a unique manifestation of *S. Infantis* in the urinary tract. This research was conducted on the basis of the Declaration of Helsinki guideline [11]. The Institutional Review Board (or Ethics Committee) of the guideline approved the research under the formal review and ethical exemption, as the research consisted of one retrospective case with fully anonymised clinical data.

Technical information

The diagnosis was achieved through standardised microbiological and clinical protocols.

1. **Collection of Samples:** A catheter-obtained urine sample was collected aseptically due to the patient's bedbound status.
2. **Microbiological Identification:** Urine samples were cultured on blood agar and MacConkey agar and incubated at 37°C for 18–24 hours. Identification of the isolate was performed using the API® (Analytical Profile Index) system (bioMérieux, Marcy-l'Étoile, France). Serotyping was performed using standard agglutination methods according to established laboratory protocols.
3. **Antimicrobial Susceptibility Testing (AST):** Antimicrobial susceptibility testing was conducted using the disk diffusion method on Mueller-Hinton agar under standard incubation conditions according to CLSI M100, 33rd edition, 2023.

Statistics

Formal statistical analysis was not performed due to the nature of this study as a single-subject case report. Data analysis was limited to the descriptive interpretation of clinical findings and laboratory values.

RESULTS

A 63-year-old bedbound male presented with a one-week history of fever associated with chills, lethargy, reduced oral intake, and urinary complaints, including reduced urine output and increased frequency. The patient had multiple underlying conditions, including chronic hepatitis B and hepatitis C infection, previous prolonged hospitalisation following a motor vehicle accident complicated by fracture-related infection, and a grade IV sacral pressure injury with purulent discharge. He was also an active smoker with a history of intravenous drug use.

On admission, clinical assessment demonstrated features suggestive of systemic infection. Urine microscopy showed the presence of leukocytes, with no casts, crystals, bacteria, yeast, or epithelial cells observed. Urine culture was obtained due to persistent urinary symptoms. Microbiological analysis of the urine specimen yielded growth of *S. Infantis*. Identification was performed using the API (Analytical Profile Index) system. The isolate was considered clinically significant in view of the patient's symptoms and absence of mixed bacterial growth. Blood investigations revealed elevated C-reactive protein levels, with normal urea and low creatinine levels. Blood culture was performed and yielded growth of *E. coli*, consistent with an extended-spectrum beta-lactamase-producing strain.

Antimicrobial susceptibility testing was performed according to the CLSI M100-33, 2023 (reference), and treatment was guided by susceptibility results. AST revealed the *S. Infantis* was resistant to Ceftriaxone (Zone: 6mm) but susceptible to Ciprofloxacin (Zone: 31mm). Microbiological culture characteristics are shown in Figure 1. Serotyping identified the isolate as *S. Infantis*, as shown in Figure 2. Antimicrobial susceptibility findings are summarised in Table 1. The patient was initially started on empirical IV Ceftriaxone 2g OD. Following AST results, treatment was switched to targeted IV Ciprofloxacin 400mg BD for a duration of 14 days. The patient showed rapid clinical improvement, becoming afebrile within 48 hours of targeted therapy.

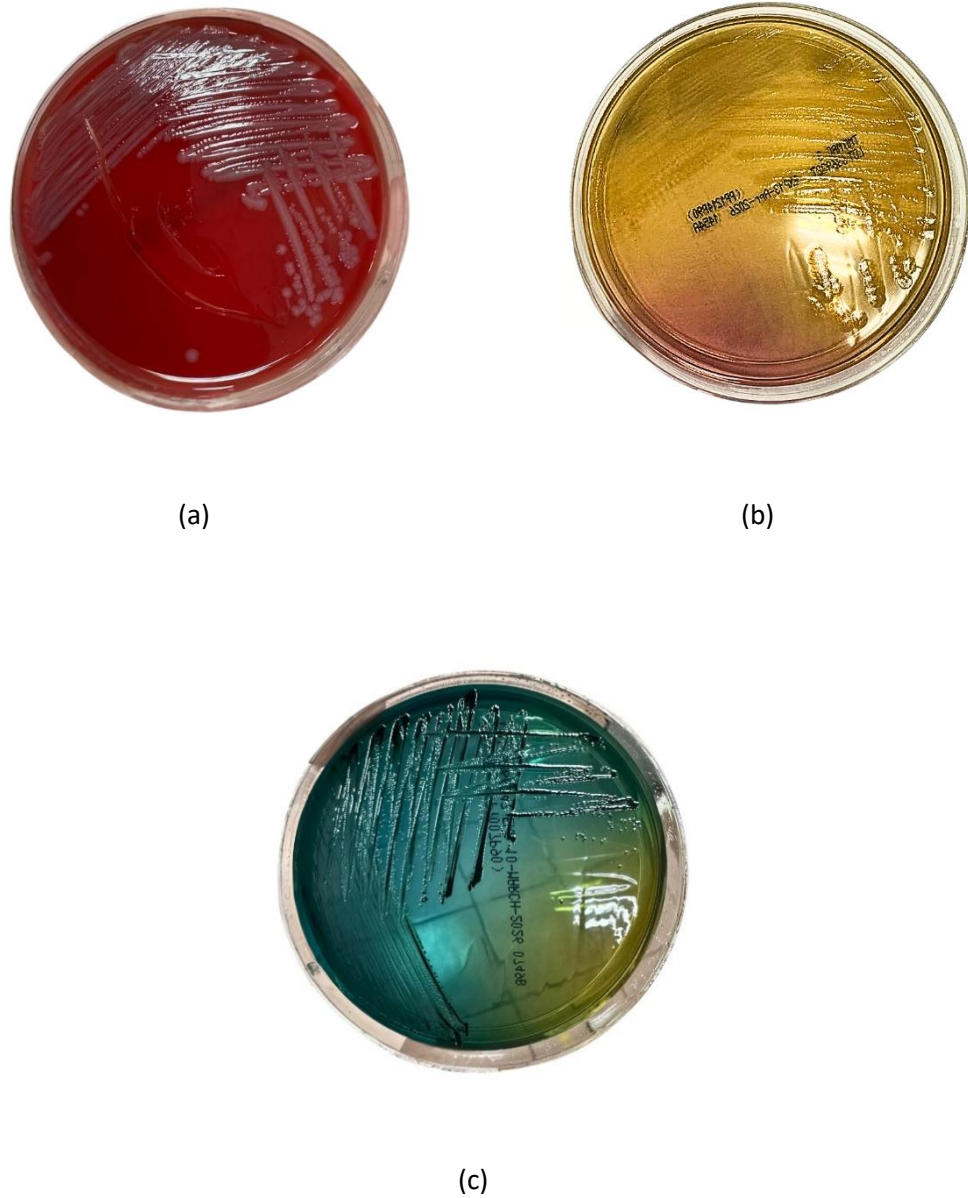


Figure 1. Culture characteristics of *S. Infantis* isolated from the patient's urine specimen showing growth on (a) blood agar and (b) MacConkey agar plates, and (c) Hektoen Enteric (HE) agar following incubation under standard laboratory conditions.

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LAPORAN MAKMAL PERMOHONAN UJIAN BAKTERIOLOGI KLINIKAL

No. Rujukan Makmal : [REDACTED]

Nama Pesakit : [REDACTED] ID Pesakit : [REDACTED] Kategori ID : NRIC Pesakit	Jantina : Lelaki Warganegara : Malaysian (Malaysian) Umur : 63 Tahun 7 Bulan
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Pemohon Asal : [REDACTED] Tempat Kejadian : Pemohon Transit : -	Negeri : [REDACTED] Pegawai Pemohon : Tarikh Terima di Makmal : 25-02-2026
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BUTIRAN SAMPEL

Jenis Spesimen	Tarikh & Masa Ambil (Format 24 Jam) Spesimen
Culture	14-02-2026 (Masa : Tiada Rekod)

KEPUTUSAN UJIAN BAKTERIOLOGI KLINIKAL

Spesimen	Ujian	Keputusan Ujian	Pegawai Pengesah	Tarikh Pengesahan
Culture (Tarikh Persampelan : 14-02-2026)	Serotyping for Salmonella	No Rujukan Ujian : [REDACTED] Keputusan : <u>Salmonella Infantis</u>	[REDACTED] Pegawai Sains (Mikrobiologi) C10	03-03-2026 Waktu Sah: 08:23:56 (Format 24 Jam)

Catatan Akhir :

Suhu Semasa Penerimaan di MKA* : 7.9°C (Semasa penerimaan di Makmal Kesihatan Awam)
 Suhu penerimaan spesimen di luar julat suhu optimum boleh mempengaruhi keputusan ujian.




Imbas QR Code Diatas Untuk Pengesahan Rekod di [HTTPS://SIMKA-OUTBREAK.MOH.GOV.MY](https://SIMKA-OUTBREAK.MOH.GOV.MY)

Sistem Informasi Makmal Kesihatan Awam (SIMKA)
 Makmal Kesihatan Awam Kebangsaan, Kementerian Kesihatan Malaysia.
 Ini adalah cetakan komputer. Ujian telah disahkan oleh pegawai seperti di atas dan tandatangan tidak diperlukan.

Figure 2. Serotyping identified the isolate as *S. Infantis*.

Table 1. Antibiotic Susceptibility Profile of *S. Infantis* Isolate

Antibiotic	Zone Diameter (mm)	Interpretation	Method
Ampicillin	6	Resistant	AST
Amoxycillin-Clavulanate	21	Susceptible	AST
Gentamicin	6	Resistant	AST
Ampicillin-Sulbactam	19	Susceptible	AST
Ceftriaxone	6	Resistant	AST
Trimethoprim-Sulfamethoxazole	28	Susceptible	AST
Ciprofloxacin	31	Susceptible	AST

Note: Interpretations are based on CLSI M100, 33rd edition (2023) breakpoints. (AST: antimicrobial susceptibility testing).

DISCUSSION

Salmonella spp. are predominantly recognised as enteric pathogens, while their involvement in the urinary tract represents an uncommon extraintestinal manifestation [1]. The discrepancy between the negative urine microscopy and positive culture in this case likely results from a low bacterial load below the microscopic detection threshold ($<10^5$ CFU/mL) or the inhibitory effect of early empirical antibiotics on bacterial morphology.

In the present case, the occurrence of a *S. Infantis* urinary tract infection in a debilitated elderly patient with multiple comorbidities and significant functional impairment is consistent with previous reports that such atypical infections are more frequently encountered among vulnerable populations [7, 8].

Several mechanisms have been proposed to explain the pathogenesis of urinary tract infections caused by *S. Infantis*, including hematogenous dissemination following gastrointestinal colonisation, ascending infection associated with faecal carriage, and persistent colonisation in immunocompromised or chronically ill patients [2, 4, 7]. The patient described in this report had multiple predisposing factors, including chronic viral hepatitis B and C, prolonged immobilisation, and a severe grade IV sacral pressure injury. These conditions likely contributed to impaired host defences and urinary stasis, thereby facilitating colonisation and subsequent infection by an atypical organism [9]. The concurrent isolation of ESBL-producing *E. coli* from blood culture is highly significant, suggesting a complex co-infection likely originating from the systemic translocation of bacteria via the severe sacral pressure injury [2, 4].

The antimicrobial susceptibility profile demonstrated resistance to selected beta-lactam agents, including third-generation cephalosporins, while remaining susceptible to alternative therapeutic options such as fluoroquinolones and trimethoprim-sulfamethoxazole. The observed ceftriaxone resistance is noteworthy, pointing towards the production of extended-spectrum beta-lactamases (ESBL), a concerning trend in non-typhoidal *Salmonella* globally. This underscores the limitations of

empirical therapy. Targeted treatment with IV Ciprofloxacin, initiated after empirical ceftriaxone proved ineffective, was the decisive factor in the patient's recovery. [3, 5].

Recognition of *S. Infantis* as a urinary pathogen carries important clinical implications, especially in geriatric and long-term care settings [10]. The detection of unusual organisms in urine should prompt clinicians to evaluate for underlying risk factors, potential sources of infection, and possible systemic involvement [2, 5]. Early identification and appropriate management are essential, as delayed recognition may lead to suboptimal treatment outcomes.

Despite its strengths, this report has several limitations. Although serotyping was performed, further molecular characterisation was unavailable, which may limit understanding of the isolate's epidemiological significance. Additionally, as a single-case report, the findings may not be generalizable to broader populations. Further studies involving larger case series are warranted to better define the epidemiology, risk factors, and optimal management strategies for *S. Infantis* urinary tract infections in high-risk patients [1, 7].

CONCLUSION

This case highlights the clinical significance of *S. Infantis* as an atypical uropathogen and a critical diagnostic marker for systemic host vulnerability. The emergence of ceftriaxone resistance in non-typhoidal *Salmonella* presents a significant therapeutic challenge, necessitating vigilant microbiological surveillance. Ultimately, our findings demonstrate that successful management of such complex infections relies on moving beyond empirical protocols to adopt targeted antimicrobial strategies based on accurate susceptibility profiles. This approach is essential for improving clinical outcomes in debilitated patients with extensive comorbidities.

Supplementary Materials: Not applicable.

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Institutional Review Board Statement: Ethical review and approval were waived for this study due to its nature as a retrospective case report involving a single patient. The study was conducted in accordance with the Declaration of Helsinki, and the data used were fully de-identified to protect patient confidentiality.

Informed Consent Statement: Patient consent was waived due to the retrospective nature of this case report and the use of fully anonymised clinical data. All personal identifiers have been removed to protect the anonymity of the individual involved. In accordance with the journal's policy, as no recognizable images of the patient are used and all data are de-identified, the instructive value of the report is maintained while strictly protecting patient privacy.

Data Availability: The clinical data supporting the findings of this case report are documented within the article. Additional information regarding the microbiological analysis is available from the corresponding author upon reasonable request.

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Conflicts of Interest: Authors have no conflict of interest to declare.

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