Journal of Rawalpindi Medical University

Open Access Original Article

DOI: 10.37939/jrmc.v29i2.2836

Dengue Fever With Shigellemia: A Case Report

Anum Mahmood[1], Fakhar Uddin[2], Faisal Iqbal Afridi[3]

1,3. Microbiologist, Ziauddin University 2. Medical Technologist, BMSI, JPMC, Karachi.

Corresponding author: Dr. Fakhar Uddin, fakharindhar@hotmail.com.

Abstract

Shigella mostly causes gastroenteritis and rarely causes sepsis. Mostly malnourished children and elderly immunocompromised population at high risk of blood stream infection. Here, we are presenting a case of a male, aged 73 years. He was a known case of diabetes, hypertension, and ischemic heart disease (history of angioplasty twice) who came into the emergency department on 16th October 2024. The presenting with of loose bloody stools for 5 days, with shortness of breath. Initially, the patient was managed on the line of viral haemorrhagic fever with secondary bacterial infection of the Gastrointestinal tract, including Shigella. The patient was improving with symptomatic treatment and on antibiotics. This case highlights the rarity of and generates awareness among health care workers and physicians to direct their approach considering patient risk factors and clinical deteriorating conditions and early diagnosis of secondary bacterial infections in viral and immunocompromised patients. This approach reduces the hospital stay and cost, risk of treatment failure and mortality rate.

Keywords: Bacteremia, Blood culture, Dengue fever, Immunocompromised host

Introduction

Shigella spp. are non-motile, facultative anaerobes, non-spore forming rods.[1] The *Shigella* genus comprises only four species: *S. dysenteriae*, *S. boydii*, *S. flexneri* and *S. sonnei*.[2] The current global landscape of *Shigella* disease is dominated by *S. flexneri* and *S. sonnei*, with *S. sonnei* clearly in the ascendency in many low- and middle-income countries (LMICs).[3] Infection initiated by faeco-oral route early symptom diarrhea elicited by enterotoxin may occur when organism pass through small intestine, hallmarks of shigellosis are bacterial invasion of colonic epithelium and inflammatory colitis.[3] Bacillary dysentery showed unformed stools with blood and mucus.[4] Bacillary dysentery is differentiated from amoebic dysentery by performing a fecal smear, which is positive for neutrophils in Shigellosis but absent in *Entamoeba* dysentery. Complications of Shigellosis include bacteremia, convulsions, other neurological sequalae, hemolytic uremic syndrome (HUS) and reactive arthritis.[1,4] It is estimated that the greatest burden of Shigellosis is in LMICs with poor sanitation, resulting in approximately 200,000 deaths annually.[5] *Shigella* usually causes gastroenteritis since it does not reach beyond the lamina propria; hence, it very rarely causes bacteremia and positive blood culture except in special conditions.[4] Blood stream infections prevalence is ranging from 0.4% to 7.3% of the Shigellosis cases.[6] Limited published case reports detail instances of bacteremia, primarily in malnourished children, men who have sex with men (MSM), or adults suffering from HIV, diabetes, cirrhosis, or conditions that lead to immunosuppression.[7] It is suggested that blood cultures should be obtained from elderly or immunocompromised patients with acute febrile gastroenteritis to detect shigellemia as well as bacteremia caused by other enteric pathogens, including *Salmonella* or *Campylobacter*.[8] A few cases of shigella are documented in the paediatric population from India in which blood and stool cultures were positive for *Shigella*.[8] The environmental conditions are favoring the spread of shigellosis and dengue fever. The main risk factors are poor sanitary conditions, stagnant water conditions and contaminated water; these are directly or indirectly responsible for the spread of these two diseases. The prevalence of *Shigella* was 7.9%, and the predominant species was *S. flexneri*, followed by *S. boydii* (3.1%).[9] Dengue fever is also common in Pakistan, and reported prevalence revealed from 4% to 45% in different regions.[10] In Pakistan, there is no case report of *Shigella* isolated from blood culture and especially in dengue fever, therefore, this is a first case of shigellemia and helpful highlighting the importance of accurate identification of rare pathogen

Contributions:
A.M, F.I.A - Conception of study
- Experimentation/Study Conduction
F.U - Analysis/Interpretation/Discussion
F.U - Manuscript Writing
A.M, F.I.A - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

Conflicts of Interest: None
Financial Support: None to report
Potential Competing Interests: None to report

Institutional Review Board Approval
6241222AMMIC
04-05-2023
Ziauddin University

Review began 07/02/2025
Review ended 04/06/2025
Published 30/06/2025

How to cite this article: Mahmood A, Uddin F, Afridi FI. Dengue Fever With Shigellemia: A Case Report. JRMC. 2025 Jun. 30;29(2). https://doi.org/10.37939/jrmc.v29i2.2836

causing septicemia secondary to gastroenteric infection and timely treatment. This case was diagnosed during the research work of FCPS.

Case Presentation

Elderly male, 73 years old, known case of diabetes, hypertension, and ischemic heart disease (history of angioplasty twice) came in the emergency department on 16th October, 2024 with complaints of loose stools for 5 days, blood in stools for 1 day along with shortness of breath. On general physical examination, he was alert and oriented. The rest of the systemic examination is unremarkable, with bilateral harsh non-vesicular breathing at room air maintaining oxygen saturation at 74%. A working diagnosis of acute gastroenteritis/acute coronary syndrome /viral haemorrhagic fever COPD exacerbation was made. He was admitted in monitoring set up, intravenous (IV) line was maintained, and samples were sent for baseline workup (table 1).

Table 1: Laboratory investigations of case

Lab: Investigations	Results
Complete Blood Count (CBC)	
Hb	13.6 g/dL
Platelets	$275X10^9$/L
TLC	$11.5X10^9$/L
Malarial Parasite (MP)	
MP ICT	Negative
MP peripheral smear	Negative
Dengue serology	IgM positive and IgG negative.
C-Reactive Protein (CRP)	154mg/dL
Trop I	0.012ng/mL
Serum biochemistry	
Sodium (Na)	143meq/L
Potassium (K)	3.7meq/L
Chloride (Cl)	103meq/L
Serum urea	25mg/dL
Serum creatinine	0.91mg/dL

On the same day, blood (10ml) in a blood culture bottle (Biomer) and a stool sample were sent for culture and sensitivity (C/S). Blood culture was come to be positive by BacT/ALERT 3D (bioMérieux, S.A. Marcy L Etoile, France). Gram stain was performed, showing gram-negative rods, and a sample from the blood culture bottle was inoculated on MacConkey and Chocolate agar plates (OXOID, Basingstoke, UK) and incubated at 37°C for 24 hours. After the incubation period, the isolate was identified on the colonial characteristics, motility and a battery of biochemical tests including hydrogen sulfide (H_2S), indole, urease, citrate and triple sugar iron (OXOID, Basingstoke, UK). The results after incubation revealed non-lactose fermenter colonies, non-motile and biochemical tests results (table. 2)

Table 2: Traditional biochemical tests applied for the identification of Shigella

Biochemical test	Results
Indole	Negative
Citrate	Negative
Urease	Negative
Triple sugar iron	Alkaline/ acid, without H_2S
Oxidase	Negative

Presumptive identification of Shigella was made, and serology was performed from available Shigella antisera (S. dysenteriae, S. boydii, S. sonnei, S. flexnerii) (MAST group Ltd. Maerseyside, UK). Serology came positive from S. flexnerii antisera. After the preliminary diagnosis, species identification was confirmed by VITEK-2 compact (bioMérieux, S.A. Marcy L Etoile, France), using VITEK-2 GN CARD. The result showed the Shigella group with a 99% probability. Antimicrobial sensitivity set up on Mueller Hinton agar (MHA) with inoculum made from colony suspension, equivalent to 0.5 McFarland standard with incubation of 16 to 20 hours, including Ampicillin (AMP 10µg), Trimethoprim/sulfamethoxazole (SXT 1.25/23.75µg), Chloramphenicol (C 30 µg), Ceftriaxone (CRO 30 µg), Meropenem (MEM 10 µg), Azithromycin (AZM 15 µg), Ciprofloxacin (5 µg). MHA plates were incubated in an ambient air incubator at 35°C +/-2 for 16 to 18 hours. And after the incubation period, a susceptibility profile was observed (table.3) according to the clinical and laboratory standard institute (CLSI, 2024).[11] Routine quality control was performed

Escherichia coli ATCC 25922 Pseudomonas aeruginosa ATCC 27853 (carbapenem), Staphylococcus aureus ATCC 25923 (disc diffusion) when tested azithromycin against Shigella spp.

Table. 3 Antimicrobial susceptibility profile of Shigella

Antibiotics	Disc diffusion Zone of inhibition (mm)	MICs (VITEK-2)	Interpretation
AMP	15	35 µg	R
SXT	20	≤2/38 µg	S
C	20	4 µg	S
CRO	07	6 µg	R
AZM	13	≤16 µg	S
MEM	25	≤1 µg	S
CIP	31	≤0.06 µg	S
LEV	28	<0.12 µg	S

The isolate of *Shigella* species was an extended-spectrum beta-lactamases (ESBL) producer, which was detected phenotypically by a double disk susceptibility test as described by Clinical Microbiology Procedure and Handbook.[12] He was put on back-to-back nebs with IV steroids along with fluid, and empiric meropenem was given. The patient's vitals gradually improved, and the plan was to shift in ward, but the patient left against medical advice on the next day.

Discussion

Shigella infection is usually restricted to the intestine, and few cases are reported from the blood. These are mostly from malnourished children and immunocompromised adults. Fatality cases in Shigella bacteremia are higher than in non-bacteremia shigella. Protein malnutrition is the most important risk factor in Shigella bacteremia along with the association of underlying disease process. This case report highlights the importance of blood culture in cases of dysentery where, the majority of the times, blood cultures came to be negative. This case revealed that underlying diseases and immunocompromised cases having dysentery should be investigated for stool and blood cultures simultaneously for the proper management of the patient and antimicrobial therapy. In rare cases, Shigella causes a higher mortality rate from the secondary infection.[1] There have been previous reports of simultaneous infection with the dengue virus and a flavivirus, Chikungunya. Additionally, there have been cases of co-infection with various bacteria such as Salmonella Typhi, Shigella Sonnei, and Leptospira species.[13] but in our case, it is S. flexnerii. Dengue fever is endemic in India and Pakistan, so cases may be increased by active surveillance on this line of research. Globally, a significant number of patients suffering from Shigella bacteremia are also infected with HIV. In the United States, case studies have reported instances of Shigella bacteremia in children under one year old, as well as in adults who are malnourished, living with HIV, or affected by other conditions that compromise the immune system, such as diabetes mellitus and cancer.[14]

Conclusions

This case revealed that in underlying diseases and immunocompromised cases having dysentery should be investigated for stool and blood cultures simultaneously for the proper management of patient and antimicrobial therapy.

References

1. Rotramel HE, Zamir HS. Shigella Bacteremia in an Immunocompetent Patient. Cureus. 2021 Nov 20;13(11): e19778. https://doi.org/10.7759/cureus.19778.
2. Schnupf P, & Sansonetti PJ. Shigella pathogenesis: new insights through advanced methodologies. Microbiol Spectr. 2019, Mar;7(2):BAI-0023, https://doi.org/10.1128/microbiolspec.BAI-0023-2019
3. Baker S, Scott TA. Antimicrobial-resistant Shigella: where do we go next? Nat Rev Microbiol, 2023; 21:409–410. https://doi.org/10.1038/s41579-023-00906-1
4. Aslam A, Hashmi MF, Okafor CN. Shigellosis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–.
5. Raso MM, Arato V, Gasperini G, Micoli F. Toward a Shigella Vaccine: Opportunities and Challenges to Fight an Antimicrobial-Resistant Pathogen. Inter J Mol Sci, 2023; 24(5):4649. https://doi.org/10.3390/ijms24054649
6. Nayyar C, Thakur P, Tak V, Singh A. Shigella sonnei Sepsis in an Infant: A Case Report. J Clin Diagn Res, 2017; May;11(5):DD01-DD02. doi: 10.7860/JCDR/2017/25594.9796.
7. Stefanovic A, Matic N, Ritchie G, Lowe CF, Leung V, Hull M, et al. Multidrug-Resistant Shigella sonnei Bacteremia among Persons Experiencing Homelessness, Vancouver, British Columbia, Canada. Emerg Infect Dis, 2023; Aug;29(8):1668-1671. doi: 10.3201/eid2908.230323.

8. Gupta R, Gupta V, Bhat D, et al. Shigella flexneri Sepsis in a Well-nourished Immunocompetent Child: A Rare Case Report. J Gastrointest Infect, 2021;11:44–46. https://doi.org/10.5005/jp-journals-10068-3046
9. Nisa I, Qasim M, Driessen A, et al. Molecular epidemiology of Shigella flexneri isolated from pediatrics in a diarrhea-endemic area of Khyber Pakhtunkhwa, Pakistan. Eur J Clin Microbiol Infect Dis, 2020; 39:971–985. https://doi.org/10.1007/s10096-020-03811-0
10. Khan U, Azeem S. The rising toll of dengue cases in Pakistan every year: An incipient crisis. Ann Med Surg (Lond), 2022: Mar 31;76:103549. doi:10.1016/j.amsu.2022.
11. CLSI. Performance Standards for Susceptibility Testing. 34th ed. CLSI supplement M100. Clinical and Laboratory Standards Institute Wayne (PA), USA; 2024.
12. Leber AL, Burnham CA, editors. Clinical microbiology procedures handbook, multi-volume. John Wiley & Sons; 2024.
13. Mark SHK, Begum M, Das S, Kabir J, Dewan S, Kafee MA. Dengue and Malaria Coinfection in a Young Adult with Atypical Feature. Bangladesh J Medicine 2024; 35: 38-41
14. Tobin-D'Angelo M, Oosmanally N, Wilson SN, Anderson EJ, Segler S, Poventud L. Shigella Bacteremia, Georgia, USA, 2002–2012. Emerg Infect Dis, 2020;26(1):122-124. https://doi.org/10.3201/eid2601.181698