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Grimontia hollisae Sepsis in a 9-Month-Old Female Infant: A Case Report

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ABSTRACT

Grimontia hollisae, an uncommon cause of sepsis, was identified in a 9-month-old infant in Africa without confirmed seafood consumption. Prompt diagnosis through blood culture and targeted antibiotic therapy ensured recovery, emphasizing the need for increased awareness, enhanced diagnostic tools, and active monitoring of emerging pathogens in tropical and resource-limited regions. We present a case report involving a 9-month-old infant who exhibited symptoms of acute gastroenteritis. The blood culture revealed *G. hollisae*. We treated the infant on empirical first-line antibiotics of IV ceftriaxone, IV gentamicin, zinc tablets, and syrup paracetamol for 5 days after which the child was discharged on oral metronidazole following resolution of symptoms. This case highlights the importance of *G. hollisae* in causing sepsis in infants in tropical settings. It also emphasizes the need for blood culture investigation and administering the appropriate antibiotics in the diagnosis of children presenting with suspected sepsis.

1 | Introduction

Grimontia hollisae (*G. hollisae*) is the current name of a gram-negative, oxidase-positive, motile bacterium that was first described in 1982 as *Vibrio hollisae* [1]. In 2003, the bacterium was reclassified as *G. hollisae*, the only species of the genus *Grimontia* to date [2]. This micro-organism produces toxins, and it is commonly known to cause moderate to severe cases of gastroenteritis in healthy humans. It is found naturally in marine waters and consumption of raw seafood appears to be the most likely source of infection. Although *G. hollisae* has rarely been found in environmental samples, it is far more commonly isolated from stool samples taken from clinical episodes of gastroenteritis, and severe diarrhea [3]. It is infrequently isolated from extraintestinal and sterile sites such as the blood samples [4]. While most human cases described in the literature are from developed countries [5–9], there are limited reported cases of *G. hollisae* infection in developing countries, particularly in Africa. We report a case of *G. hollisae* sepsis in a 9-month-old infant at a rural hospital in the Upper River region, in The Gambia. This case is unique because of the age group of the index patient and the absence of any confirmed seafood intake. It also highlights the importance of *G. hollisae* in causing sepsis in infants in tropical settings, emphasizing the need for blood culture investigation and administering the appropriate antibiotics to diagnose children presenting with suspected sepsis.

Abbreviations: API, analytical Profile Index; HIV, human immunodeficiency virus; IV, intravenous; ORS, oral rehydration salt; TCBS, Thiosulfate-Citrate-Bile-salts-Sucrose.

2 | Case History/Examination

A 9-month-old female infant presented to a hospital in rural Gambia with a 2-day history of fever, vomiting, and passage of loose stools. The fever was high-grade, intermittent, and partially relieved with the use of oral paracetamol. She experienced an average of four episodes of vomiting per day. The vomitus which initially contained ingested breastmilk, later became yellowish.

She passed four episodes of watery, non-mucoid, and non-bloody loose stools per day. There was no associated abdominal distension. The child was exclusively breastfed and had recently been introduced to supplementary feeding which is solely prepared by the mother under good hygienic conditions.

There was no history of consumption of seafood by either mother or child. However, the mother confirmed regular intake of fish herself and could neither confirm nor deny if the grandmother (who lives with them) gave the child fish or seafood to eat. There were no reported cases of diarrhea or vomiting among household members during that period. Her immunization status is up to date and developmental milestones are normal for her age.

On general examination, she weighed 9.9 kg, was not pale, not jaundiced, febrile with a temperature of 39.0°C, and was not cyanosed. Hydration status assessment revealed no sunken eyes, normal fontanelle, and capillary refill time was < 3 s. Her respiratory rate was 65 cycles/min, oxygen saturation was 100% and the chest was clinically clear. Her pulse rate was 170 beats/min, and the heart sounds were normal. She was conscious and alert with no signs of meningism. The abdomen was full and moved with respiration. The liver, spleen, and kidneys were not enlarged.

3 | Methods (Differential Diagnosis, Investigations, and Treatment)

A provisional diagnosis of acute gastroenteritis and sepsis was made, and the child was admitted. After collection of blood culture sample, she was started on intravenous (IV) ceftriaxone 400 mg 12 h and IV gentamicin 37 mg daily in two divided doses. She was put on syrup paracetamol 125 mg 8 h, a tablet of zinc 20 mg once daily for 10 days, and 50 mL of oral rehydration salt (ORS) to be given after each loose stool. We did not collect stool samples. The hemoglobin concentration was 10.1 g/dL and the malaria rapid diagnostic test was negative. Blood was collected into a pediatric BACT/ALERT PF Plus (BioMérieux, USA) culture bottle and was transported to the laboratory. After the blood culture sample was logged at the laboratory, it was immediately placed in a BACT/ALERT (BioMérieux, USA) machine. The sample signaled positive, and it was removed from the BACT/ALERT machine and subcultured on blood, chocolate, and MacConkey agar plates for 18–24 h. The blood culture yielded glucose non-fermenting colonies, and the Gram stain showed gram-negative rods. We processed the bacterium for identification using the Analytical Profile Index (API) 20NE. The identification number 7021544 on the API is consistent with *G. hollisae* with a 99.8% confidence rate. Antibiotic susceptibility testing of the pathogen using the disc diffusion method showed sensitivity to chloramphenicol, gentamicin, ciprofloxacin, cefotaxime, ceftriaxone, cefoxitin and ceftazidime, and resistance to tetracycline, cotrimoxazole, ampicillin and amoxiclav. The human immunodeficiency virus (HIV) test of both mother and child was negative.

4 | Conclusion and Results (Outcome and Follow-Up)

On the fifth day of admission, diarrhea and vomiting had stopped, and the child was feeding well. The fever had also subsided. The patient was discharged on syrup metronidazole 3 mL three times daily for 5 days as per national guidelines.

5 | Discussion

G. hollisae sepsis is rare in clinical settings with very few documented cases in the literature [8, 10–12]. *G hollisae* mainly causes gastroenteritis with most reported human cases occurring following consumption of raw or undercooked seafood, indicating it as the predominant mode of mechanism of transmission [6, 7, 9, 13–15]. Fish was the likely source of the infection in two cases [8, 12]. The incubation period ranges from 1 h to 2 weeks [1, 7, 12]. The majority of *G. hollisae* reported cases had occurred in coastal areas in the United States, especially along the Atlantic coast [11] and the Gulf of Mexico [13], and in Thailand [7]. Although *G. hollisae* has been identified in water, shellfish, and/or fish from various locations, a study in Japan found that the organism can also grow in tropical climates due to its affinity for warmer seawater compared to other diarrheal-causing organisms such as Vibrios [16].

This case represents the first reported *G. hollisae* sepsis case in an infant residing in sub-Saharan Africa. In this case, we could not confirm any consumption of seafood. However, the child's mother confirmed regular fish intake raising the possibility of transmission through supplementary feeding. The cases' residence is less than a kilometer from the River Gambia where fishing activities occur. Another intriguing finding is that no household contact had similar symptoms around this period. Although three of the few documented *G. hollisae* sepsis cases occurred in patients with underlying liver diseases [10–12], our case had no known underlying or immunocompromised disease.

The low number of reported cases of *G. hollisae* may be explained by the absence of growth of the organism on media used for the routine analysis of stool, such as thiosulfate-citrate-bile-salts-sucrose (TCBS) agar and MacConkey [1, 12]. In our index case, we could not perform stool investigation as stool examinations are not routinely performed at our hospital and, we had a strong suspicion of septicaemia and hence took blood culture for investigation. In suspected cases of *G. hollisae* infection, the use of sheep blood agar and marine agar plates for stool or blood culture is recommended as the organism is beta-hemolytic [17]. The use of the API 20NE and 20E strips from bioMérieux makes it possible to detect *G. hollisae* in a standard laboratory setting [9, 18].

In our patient, the antibiotic susceptibility testing showed sensitivity to chloramphenicol, gentamicin, ciprofloxacin, cefotaxime, and ceftriaxone which are the commonly used antibiotics for treating sepsis in our setting. The prognosis for *G. hollisae* infection seems favorable, with most reported cases responding well to antibiotics commonly used for gastroenteritis, such as ciprofloxacin [8]. Our report shows that *G. hollisae* infection might be more widespread than has been considered in the past. It also underscores the risk of *G. hollisae* infection in sub-Saharan Africa without a history of confirmed seafood intake. Therefore, to better understand its epidemiology and geographical distribution, active surveillance is recommended.

5.1 | Limitations

We could not take stool samples to confirm the presence of *G. hollisae* in the stool. We were unable to perform other relevant investigations such as complete blood count and C-reactive proteins as our laboratory is under-equipped.

Author Contributions

Abdulsalam Olawale Yusuf: conceptualization, investigation, writing – original draft, writing – review and editing. **Osei Isaac:** supervision, writing – review and editing. **Wutor Baleng Mahama:** writing – original draft. **Williams Oluwatosin Adefila:** writing – review and editing. **Keita Modou Lamin:** writing – review and editing. **Ilias Hossain:** writing – review and editing. **Minteh Molfa:** investigation. **Ousman Barjo:** investigation. **Mayowa Banke Omotosho:** investigation. **Rasheed Salaudeen:** investigation. **Grant Mackenzie:** investigation, project administration, resources, supervision.

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Ethics Statement

The clinical care provided was in a clinical trial approved by the Gambian Government Ministry of Health and Medical Research Council Gambia Joint Ethics Committee.

Consent

We obtained informed consent from the patient's father to publish this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing does not apply to this article as no datasets were generated or analyzed during the current study.

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